



Salt Pans as Avifaunal Habitat

The scientific case for the Nemmeli salt pans, and why freshwater impoundment would destroy them

A Conservation Evidence Note | Companion to the Nemmeli Coastal Wetland Complex Conservation Report (April 2026) | June 2026

Purpose and scope

This note sets out the peer-reviewed and official scientific evidence on how salt pans sustain waterbirds in Tamil Nadu and India. It accompanies the Kovalam - Nemmeli Coastal Wetland Complex Conservation Report (Suzhal Arivom, April 2026). The Nemmeli salt pans are former coastal wetland converted for salt production. The evidence below shows, with quantified data, that such habitats hold high avifaunal value, and that converting them into a deep freshwater reservoir would eliminate the three physical conditions, shallow depth, salinity, and a benthic prey base, on which their birds depend. Every source cited was verified in June 2026; no claim rests on assumption.

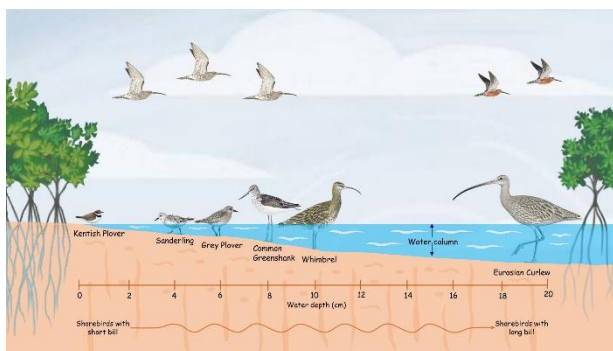
Note: Beyond its salt pans, the natural Kovalam-Nemmeli Wetland Complex boasts rich habitat diversity, including shallow waters, marshes, seasonal grasslands, mudflats, drylands, scrub, and riparian vegetation across primary brackish and freshwater zones. Collectively, these habitats are also part of Open Natural Ecosystems (ONEs), which are increasingly threatened. Crucially, the abandoned salt pans play an indispensable role in maintaining the area's ecological integrity and biodiversity

1. The mechanism: why birds need shallow, saline, prey-rich water

The avifaunal value of a salt pan is not a matter of opinion. It rests on three measurable physical conditions, each documented in peer-reviewed studies, several from India itself.

1.1 Shallow water is non-negotiable

Shorebirds and waders are mechanically constrained by the length of their legs and bills. A study of 19 shorebird species on the Indian coast confirmed that foraging water depth scales directly with bill length, and that most shorebirds will only feed where water is shallower than roughly **10 centimetres**. [3] Deepen the water beyond that and the foraging surface simply disappears for most species. This is why depth, more than any other single factor, governs where birds can feed.



This holds specifically in salt pans. In one of the world's largest coastal saltworks, researchers found that the distribution of foraging shorebirds was controlled **primarily by water depth**, and that the way to maximise a salt pan's value for birds is to **lower** water levels to expose shallow feeding surfaces. [4] A deep, embanked freshwater reservoir does the exact opposite of what the science prescribes.

1.2 Salinity builds the food supply

The prey that birds come for, benthic invertebrates such as polychaete worms, chironomid larvae and crustaceans, is itself governed by salinity. A 15-year programme on the Indian coast found prey density was driven by salinity, reaching over **1,000 invertebrates per square metre** in saline winter mudflats, and concluded explicitly that **altering freshwater inflow, for example through dams or barrages, would seriously harm prey organisms and the shorebird populations of the Central Asian Flyway that depend on them.** [5]

India already has a documented case of what freshening a coastal wetland does. After the Thanneermukkom barrage (1975) cut off saltwater and converted part of the Vembanad Ramsar estuary into a freshwater sector, benthic polychaete diversity **declined measurably over the following 30 years.** [6] The Nemmeli reservoir proposes the same intervention, blocking tidal salt water and holding fresh water, with the same predictable result for the food web.

1.3 Specialist prey cannot follow into freshwater

Some salt-pan food sources are obligately saline. Brine shrimp (*Artemia*), a staple of flamingo diets in hypersaline pans, survive across a wide salinity range but are absent in dense, harvestable concentrations from fresh water. [7] Remove the salinity and this food source, and the flamingos it supports, cannot persist.

Summary of the quantified mechanism:

Ecological variable	Documented finding (peer-reviewed)	Source
Water depth	Most shorebirds forage only where water is shallower than about 10 cm; foraging depth scales with bill and leg length. Deep water removes the foraging surface entirely.	Aarif et al. 2024 (India) [3]
Water depth (salt pans)	In one of the world's largest coastal saltworks, foraging shorebird distribution was governed mainly by water depth, not prey abundance. Helping birds means lowering water levels, the opposite of impoundment.	Lei et al. 2025, Yellow Sea [4]
Salinity and prey	Benthic invertebrate prey density was driven by salinity, exceeding 1,000 individuals/m ² in saline winter mudflats. Altering freshwater inflow (dams, barrages) is identified as a serious threat to prey and to Central Asian Flyway shorebirds.	Bhatt & Aarif et al. 2023 (India) [5]
Freshening a coastal wetland	An artificial salinity barrier (Thanneermukkom, 1975) that converted part of a Ramsar estuary to freshwater caused a measurable decline in benthic polychaete diversity over 30 years.	Vembanad estuary study 2023 [6]
Specialist prey	Brine shrimp (<i>Artemia</i>), a key flamingo food in hypersaline pans, are obligate saline-water organisms absent in dense numbers from fresh water; freshening removes them.	<i>Artemia</i> biology literature [7]

2. The Indian record: salt pans protected, not destroyed

Where India has assessed salt-marsh and salt-pan landscapes, the conclusion has consistently been that they are wetlands of high value deserving protection. Two cases are decisive.

2.1 India's largest waterbird site is a salt swamp complex

The Point Calimere / Great Vedaranyam Swamp on the Tamil Nadu coast is Ramsar Site no. 1210, designated in 2002. The listing itself describes a 385 sq km complex of **salt swamps, salt pans, mangroves, mudflats and grasslands**. [8][9] It has recorded the largest congregation of migratory waterbirds in India, peaks exceeding **1,00,000 birds**, and large wintering flamingo populations alongside globally threatened species. [10] India's premier east-coast waterbird site is, in other words, a salt-swamp and salt-pan landscape, protected at the highest level rather than impounded.

2.2 Salt pans brought under sanctuary protection: Thane Creek

On the west coast, the Thane Creek Flamingo Sanctuary protects a mosaic of mudflats, mangroves and salt pans. BNHS surveys recorded on the order of **1,21,000 flamingos** in the seascape, and identified salt-pan sites such as the Bhandup pans among the most species-rich for shorebirds, recommending they be brought formally within the sanctuary. [11][12][13] Again, the response to a working salt-pan habitat was legal protection, not conversion.

2.3 Nimmeli Salt Pans: Nationally Verified Avifaunal Data (State of India's Birds, June 2026)

The State of India's Birds (SolB) platform, operated by the Bombay Natural History Society and partner institutions, published a species report for the Nimmeli Coastal Wetland Complex on 14 June 2026, drawing on 80,103 field observations, 2,668 checklists, 1,797 unique lists, 1,830 hours of birding, and data from 619 independent observers recorded between 1900 and March 2026. This is not advocacy data. It is the same national scientific infrastructure used by the Government of India to monitor bird population trends under the National Action Plan for Migratory Birds along the Central Asian Flyway. [28]

The SolB report documents the following for the Nimmeli Coastal Wetland Complex: 236 total bird species; 91 migratory species confirming Nimmeli's role on the Central Asian Flyway; 50 High Conservation Priority species as defined by the State of India's Birds 2023 report; 8 globally threatened species per IUCN Red List; 31 Schedule I species under the Wildlife Protection Act; 1 Endangered species (Great Knot, *Calidris tenuirostris*); 7 Vulnerable species including Common Pochard, Grey Plover, Curlew Sandpiper, River Tern, Greater Spotted Eagle, Broad-billed Sandpiper, and Black-capped Kingfisher; 17 Near Threatened species including Spot-billed Pelican, Eurasian Curlew, Black-tailed Godwit, Lesser Flamingo, and Indian Courser; 2 CITES Appendix I species and 24 CITES Appendix II species; and 2 CMS Appendix I species and 97 CMS Appendix II species.

Critically, the top-ranked hotspot within the entire wetland complex is Nimmeli Salt Pans with 207 species, ranked above Kelambakkam Backwaters (204 species), Muttukadu Backwaters (179 species), Mahabalipuram Backwaters (117 species), and the Great Salt Lake opposite SSN College (111 species). The salt pans are not the least ecologically significant part of the complex. They are its most species-rich node. [28]

The SolB Waterbird Congregations table independently confirms three species at Nemmeli that satisfy the Ramsar Convention's Criterion 6 threshold of 1% of the global biogeographic population: Painted Stork at 500 individuals (2% of global population, 1% threshold 250); Black-headed Ibis at 600 individuals (2% of global population, 1% threshold 250); and Spot-billed Pelican at 800 individuals (8% of global population, 1% threshold 100). The Spot-billed Pelican is also the most frequently reported species in the complex, appearing in 74% of all checklists, confirming it is not an occasional visitor but a resident dependent on this habitat. Any single one of these species records is independently sufficient to qualify Nemmeli for Ramsar designation under Criterion 6. [28]

These sit within a wider pattern: recent assessment of five Tamil Nadu coastal sanctuaries recorded **131 waterbird species** [14], and Indian wetland law under the Wetlands (Conservation and Management) Rules, 2017, consistent with the Ramsar Convention, expressly recognises human-made wetlands, salt pans included, as part of the protected wetland ecosystem. [15]

3. Nemmeli Already Qualifies as a Ramsar Site: The Unassessed Case

The Wetlands (Conservation and Management) Rules 2017 impose an obligation on state governments to identify and protect wetlands that satisfy Ramsar criteria. The Nemmeli Coastal Wetland Complex satisfies not one but five of the nine Ramsar criteria for Sites of International Importance, on the basis of independently verified, peer-reviewed, and nationally published data. No Ramsar screening of this site has been conducted. No such assessment accompanied the Environmental Impact Assessment for the Mamallan Reservoir. The conversion proposal has proceeded in the absence of any evaluation of whether the site it proposes to destroy already qualifies for the highest level of wetland protection under Indian and international law. [29]

3.1 Criterion 1 (Representative Wetland Type): Met

The Nemmeli Coastal Wetland Complex is an outstanding representative of a tidally influenced brackish coastal ecotone integrating six Ramsar wetland types simultaneously within a continuous 25 km corridor: estuarine waters (Type F), intertidal mudflats and salt flats (Type G), intertidal marshes (Type H), intertidal mangrove systems (Type I), seasonal freshwater marshes fed by 69 upstream lakes and tanks, and human-made salt pans (Type 5). This multi-type configuration, shaped by dual tidal influx from the Muttukadu and Kokilamedu estuaries, is largely irreplaceable within the South Asian biogeographical region. No comparable example of this specific ecotone type exists in proximity to Chennai. The salt pans are not peripheral to this qualification. They are one of the six constituent Ramsar habitat types that together make the site eligible. [29]

3.2 Criterion 2 (Threatened Species and Ecological Communities): Met

The wetland hosts 1 Endangered species (Great Knot, *Calidris tenuirostris*, IUCN 2024–2025), 7 Vulnerable species, and 17 Near Threatened species, as independently documented by the SolB platform from 80,103 field observations. It supports 50 High Conservation Priority species as defined by the State of India's Birds 2023 report, including species experiencing population declines exceeding 80% over 30 years. The broader wetland community itself, a rare tidally influenced coastal ecotone, constitutes a threatened ecological community of exceptional regional significance. Destruction of the salt pans eliminates one of the six habitat types that collectively support this threatened community. [28][29]

3.3 Criterion 4 (Critical Life Cycle Stage and Refuge): Met

Nemmeli serves as a critical wintering and staging ground for 88 recorded migratory species travelling along the Central Asian Flyway (CAF), including Bar-tailed Godwit, Great Knot, Curlew Sandpiper, and Little Stint, species for which India supports the largest wintering populations globally. The wetland also functions as a breeding and nursery ground for prawn species and marine fish, making it critical to the life cycles of commercially important aquatic species. The first documented record of the Demoiselle Crane in the Chennai region (March 2026) was recorded at this site, confirming its function as a refuge for rare and displaced migratory species during adverse conditions. [29]

3.4 Criterion 5 (20,000 or More Waterbirds): Met

Field surveys during the 2025–2026 winter season documented a peak count of approximately 45,000 birds across the 25 km wetland corridor, well exceeding the 20,000-bird threshold. This included over 16,000 migratory ducks representing the largest duck congregation recorded in the South Chennai region during that season. The site has been consistently surveyed as part of the Tamil Nadu Synchronized State Level Wetland Survey since 2023 and contributes data to the Asian Waterbird Census coordinated by Wetlands International South Asia. (Rapid Environmental Impact Assessment, Mamallan Reservoir) [29]

3.5 Criterion 6 (1% of Global Population): Met for Three Species

Three species independently satisfy this criterion at Nemmeli: Spot-billed Pelican at up to 600 individuals (6% of global population, 1% threshold 100); Painted Stork at up to 500 individuals (2% of global population, 1% threshold 250); and Black-headed Ibis at up to 600 individuals (2% of global population, 1% threshold 250). Any single species record satisfying Criterion 6 is, in itself, independently sufficient to qualify a site for Ramsar designation. Nemmeli satisfies it for three species simultaneously. [29]

3.6 The Legal Consequence: A Ramsar-Qualifying Site Cannot Be Converted Without Assessment

Under the Wetlands (Conservation and Management) Rules 2017, any wetland satisfying Ramsar criteria is eligible for notification as a wetland of importance under Rule 3. The Rules impose obligations on state governments to identify, assess, and protect such wetlands. The Kovalam–Muttukadu Backwaters corridor, within which the Nemmeli salt pans sit, is already designated as an Important Marine and Coastal Biodiversity Area (ICMBA) by the Wildlife Institute of India, one of 107 such nationally designated sites. [30] The proposed conversion of the Nemmeli salt pans has proceeded without any Ramsar screening, without any EIA addressing the wetland’s avifaunal values under the framework of the Wetlands Rules 2017, and without any formal assessment of whether the site constitutes a protected wetland under Rule 3. This is not merely a procedural gap. It is a substantive failure to apply the legal framework that exists precisely to prevent the irreversible destruction of internationally significant wetland habitat.

Site / Study (India)	Salt pan – Marsh character	Documented avifaunal value
Point Calimere / Great Vedaranyam Swamp, Tamil Nadu (Ramsar Site 1210)	385 sq km complex explicitly comprising salt swamps, an unsurveyed salt swamp, salt pans, mangroves, mudflats and grasslands.	Largest migratory waterbird congregation recorded in India, peaks above 1,00,000 birds ; large Greater Flamingo wintering populations and globally threatened species. [8] [9] [10]

Site / Study (India)	Salt pan – Marsh character	Documented avifaunal value
Point Calimere (Kodikkarai) salt pans, Tamil Nadu	Five traditional coastal salt pans, monitored with their benthic invertebrate prey base for one year.	Up to 44 waterbird/shorebird species ; bird density positively tracked benthic prey density ($P < 0.05$). [1] [2]
Ramanathapuram coastal sanctuaries, Tamil Nadu	Salt-influenced tank and marsh sanctuaries, including two Ramsar sites.	131 waterbird species across five sanctuaries, confirming the southeast coast's role on the Central Asian Flyway. [14]
Thane Creek Flamingo Sanctuary, Mumbai	Mudflat, mangrove and salt-pan mosaic (including the Bhandup salt pans), water levels tide- and gate-controlled.	BNHS recorded around 1,21,000 flamingos ; salt-pan sites ranked among the most species-rich for shorebirds and recommended for sanctuary protection. [11] [12] [13]

4. Avifauna in Tamil Nadu Salt Pans: Recent Media Evidence

The peer-reviewed record presented is corroborated by a pattern of recent field observations reported across Tamil Nadu's salt pans. Media coverage from 2025–2026 documents repeated, large-scale congregations of migratory and resident waterbirds in salt pan habitats in Nemmeli and along the state's coast, providing real-world confirmation that these landscapes function as critical avifaunal refuges well beyond the Nemmeli complex.

The following ground-level observations from across Tamil Nadu confirm, site by site, what the peer-reviewed science in Section 1 predicts: salt pans with shallow, saline, prey-rich conditions attract and sustain diverse waterbird assemblages, including globally threatened species.

4.1 Greater Flamingos Recorded at Nemmeli Salt Pans (September 2025)

Of particular relevance to this evidence note is a report by The Hindu documenting Greater Flamingos lingering in the Nemmeli salt pans themselves. This is not a sighting from a distant Tamil Nadu location: it is a direct, named observation at the very site under threat. The significance is considerable. Greater Flamingos are obligate shallow-water foragers whose presence is tied to salinity, benthic prey, and open, undisturbed habitat conditions, precisely the three conditions identified in Section 1 of this note. Their documented use of the Nemmeli salt pans places the theoretical mechanism on record as a ground-truth observation: the habitat functions as described, and it is doing so at Nemmeli [\[16\]](#). A deep freshwater reservoir would eliminate every one of the physical conditions that brought these birds here.



4.2 Thoothukudi Salt Pans: A Recurring Pattern of Avifaunal Significance (2025-2026)

The following pattern from Thoothukudi demonstrates that Nemmeli is not an isolated case but part of a statewide ecological dynamic: Tamil Nadu's salt pans, whether in active production, temporarily flooded, or abandoned, repeatedly and measurably attract diverse and globally significant waterbird assemblages.

Across 2025 and 2026, the salt pans of Thoothukudi have produced a consistent and independently corroborated record of high avifaunal activity, spanning multiple seasons, species groups, and observation methods.

In December 2025, heavy rainfall temporarily transformed the suburban salt pans into shallow wetlands. Multiple waterbird species colonised them almost immediately, and aquatic invertebrate and small-fish populations rose sharply [20]. Forest Department officials described the congregation as ecologically significant, noting that the episode "highlights the ecological value of such landscapes beyond their commercial use."

Building on this, ATREE and the Muthunagar Nature Trust conducted a formal three-day aquatic bird population census in January 2026, documenting migratory and resident species across the same salt pan habitats[19]. Large numbers of Rosy Starlings migrating from Northwest Asia and Eastern Europe were recorded. Researchers described the census data as a vital baseline for future wetland conservation, recognising that salt pans function as critical temporary refuges during migration. This was not casual observation; Tamil Nadu's salt pans are being actively and formally enumerated as conservation-significant landscapes.

That same month, large flocks of the Black-headed Ibis were recorded in the salt pans alongside Spoonbills and Oriental Darters[18]. Ornithologists attributed the congregation directly to the shallow, food-rich conditions of the salt pan environment and described it as a positive indicator of gradual coastal and wetland ecosystem recovery.

By June 2026, large flocks of migratory Greater and Lesser Flamingos were reported in the same salt pans [17], prompting conservation experts to call for stronger habitat protection. Researchers from ATREE noted that coastal salt pans, creeks and shallow water bodies provide the feeding and resting conditions flamingos require. Concern was also raised that pollution from domestic and industrial sources is degrading habitat quality. The Tamil Nadu government's designation of Dhanushkodi as a flamingo sanctuary was welcomed, though experts stressed that protection must extend across the coast.

Taken together, Thoothukudi's salt pans are not incidentally used by birds. They are actively, repeatedly and measurably depended upon salt pans, whether in active production, abandoned, temporarily flooded, attract and sustain diverse and sometimes globally threatened waterbird assemblages. They do so because they provide the exact conditions, shallow water, saline substrates, and invertebrate prey, that the peer-reviewed science identifies as irreplaceable. The Nemmeli salt pans are not an isolated case; they are part of a statewide pattern of avifaunal dependence on this habitat type. Eliminating them through freshwater impoundment removes a node in that wider ecological network.

4.3 Puthalam Salt Pans, Kanyakumari: 224 Species and State-First Records (2025)

The salt pans at Puthalam in Kanyakumari district, located approximately 10 km northwest of Kanyakumari town between the Manakudy estuary and the Indian Ocean, are among the most ornithologically significant salt pan sites on the Tamil Nadu coast. These are active, working salt pans in continuous production since the British colonial period, not abandoned or converted sites. [21]

With 224 bird species recorded on eBird to date, Puthalam holds the highest documented species count of any Tamil Nadu salt pan site referenced in this note. The site functions as an essential wintering, feeding, and roosting ground for migratory waders from distant continents. Species recorded include flamingos, ibises, pelicans, storks, terns, plovers, stints, ducks, egrets, and sandpipers. BNHS Deputy Director Dr S. Balachandran, whose hometown is 5 km from Puthalam, regularly monitors the site, conducting headcounts and recording the arrival and departure of migratory species. [21][22]

In August and September 2025, Puthalam produced two state-first ornithological records for Tamil Nadu. The Arctic tern (*Sterna paradisaea*), renowned for undertaking the longest annual migration on earth at nearly 70,000 km between the Arctic and Antarctic, was recorded at Puthalam on 13 September 2025, only the fifth confirmed sighting anywhere in India. The following day, the white-cheeked tern (*Sterna repressa*) was also recorded, a first for Tamil Nadu. In the same period, the red knot (*Calidris canutus*) and the red-necked stint (*Calidris ruficollis*), both near-threatened species of Arctic origin, were also documented at the site. [21]

Puthalam carries an additional precedent directly relevant to Nemmeli. The salt pans around the Manakudy estuary were previously earmarked for airport construction. The pans, which attracted birds in thousands and where greater flamingos were permanent residents, faced destruction. Strong public protests backed by forest department survey data ultimately saved the habitat. [23] The Nemmeli case presents the same conservation question: a salt pan of documented avifaunal significance facing conversion to an incompatible land use. The Puthalam outcome demonstrates that the scientific and public case for salt pan protection can and does succeed.

5. Answering the obvious objection

“If salt pans are themselves artificial, why is replacing them with another artificial water body a problem?”

Because the value of a salt pan to birds comes from specific physical conditions, not from the fact that it is human-made. The evidence in Section 1 shows those conditions are **shallow water, salinity, and a salinity-built prey base**. A salt pan retains all three. A deep freshwater reservoir behind raised bunds retains none: it is too deep to forage in, too fresh to grow the invertebrate prey, and sealed off from the tidal exchange that sustains the system. The two are not interchangeable “artificial wetlands”; one preserves the wetland’s biological function and the other extinguishes it. The Vembanad barrage case [6] is the proof, from India’s own record, that freshening a coastal wetland degrades its benthic life.

This is stated plainly so the argument cannot be misread: the case for Nemmeli does not depend on calling salt pans pristine. It rests on the documented fact that this former-wetland-turned-salt-pan still performs the ecological functions recorded in the base report, nearly **45,000 birds at peak** and up to **6% of the**

global Spot-billed Pelican population (Rapid Environmental Impact Assessment, Mamallan Reservoir), and that deep freshwater impoundment would end them.

5.1 The scientifically sound alternative: managed natural reversion, not impoundment

Salt pans are human-made structures that altered natural coastal wetlands, representing a significant land-use change along the Indian coast. Over the decades since their creation, however, they have undergone ecological succession and now function as surrogate wetlands supporting diverse avifauna. Peer-reviewed research comparing active salt pans in Sri Lanka to a natural lagoon within the Bundala Ramsar site found that the two habitats shared similar physico-chemical properties and waterbird communities, though with lower biodiversity in the salt pans, confirming that artificial salt pans support waterbirds but cannot fully replace natural wetland function. [24]

Given the long timescales of ecological recovery, it is not scientifically advisable to dismantle salt pans through freshwater impoundment. Peer-reviewed evidence shows that saltmarsh vegetation can take approximately 100 years to develop to a composition comparable to nearby natural marshes. [25] A global meta-analysis further found that longer abandonment duration has a positive impact on waterbird richness in restored habitats, confirming that ecological succession, if allowed to proceed undisturbed, produces measurable biodiversity gains over time. [26] Abrupt freshwater impoundment short-circuits this succession entirely and replaces a functioning surrogate wetland with a system that, as the Vembanad evidence demonstrates, actively degrades the benthic food web that waterbirds depend on.

The sustainable alternative is to allow the Nemmeli salt pans to gradually revert to their natural state, whether as coastal wetland, intertidal mudflat, or salt marsh, preserving both their current biodiversity value and their potential for long-term ecological restoration. Nature-based solutions including managed coastal realignment and tidal restoration have been shown in peer-reviewed literature to jointly deliver coastal habitat and waterbird benefits, and are increasingly adopted as the preferred intervention over hard engineering. [27] This reframes the conservation ask: not to freeze the salt pans in their current state indefinitely, but to protect them from irreversible conversion and allow natural ecological processes to determine their trajectory.

5.2 The Salt Pans Are Not the Starting Point — They Are the Middle of a 2,000-Year Conversion Story

The revenue land terms themselves confirm the natural origin of this landscape. Uppangazhi (உப்பங்கழி) literally means uppu (salt) plus kazhi (tidal creek or mangrove backwater), translating as “salt tidal creek” or “salt backwater.” The word kazhi in Tamil denotes a tidal creek or estuarine backwater, unmistakably a natural coastal wetland feature. Kazhuveli (கழுவேலி) means “passage to backwaters” or tidal flood plain, denoting a brackish tidal wetland landscape. These are not wasteland classifications. They are wetland classifications that encode the prior natural state of the land in their very names. The government’s own REIA for the Mamallan Reservoir confirms that the Great Salt Lake is hydraulically connected to the Bay of Bengal through the Kovalam and Kokilamedu estuaries. A land parcel that retains active tidal connectivity with the Bay of Bengal is, by the Ramsar Convention’s own definition, a functioning coastal wetland. [31]

Sangam classical Tamil poetry dated to approximately 200 BCE to 300 CE directly describes salt being extracted from the tidal brackish coastal backwaters of this coastline. Two verses from the Natrinai anthology are directly relevant: “The dark brackish waters produce white salt” (இருங்கழிச் செறுவின் வெள் உப்பு விளையும், Natrinai 311:4) and “They are harvesting salt without plowing” (உவர் விளைவு உப்பின் உழா உழவர், Natrinai 331:2). The key Tamil word in Natrinai 311:4 is *iruṅkazi* (இருங்கழி), meaning dark backwater or estuary, confirming that the salt was extracted from a tidal estuarine setting. This is not evidence that these lands were salt pans by nature. It is evidence that they were tidal wetlands that humans modified for salt production at least 2,000 years ago. [32]

Peer-reviewed satellite remote sensing of the Chennai coast, covering the lake near Nemmeli and Muttukadu creek across four epochs of Landsat imagery from 1988 to 2016, documented a 32% reduction in wetland cover in this corridor over 28 years, with salt pans and aquaculture among the documented conversion drivers. [33] The REIA itself acknowledges that the Kelambakkam–Kovalam Link Road blocks a 1.7 km wide floodplain, and that the East Coast Road runs as a 6.5-metre-high embankment severing tidal exchange. The wetland’s current degraded condition is a consequence of prior government-built infrastructure, not evidence that this landscape was never a wetland. A peer-reviewed study published in 2024 confirms that the Buckingham Canal connects the Great Salt Lake directly to Muttukadu Backwater, establishing that the Nemmeli salt pans, the Great Salt Lake, and the Muttukadu corridor form a single, hydrologically continuous coastal system. [34] Destroying the salt pan node does not merely affect that node. It severs a functioning link in a connected tidal ecosystem.

On 16 February 2026, 22 leading scientists including ecologists, ornithologists, coastal hydrologists, marine social scientists, and contributors to national and global climate assessments submitted a formal petition to the Chief Minister of Tamil Nadu and the Additional Chief Secretary (Environment, Climate Change and Forests), explicitly stating that the Kovalam–Nemmeli backwater is not an inland freshwater depression but a tidal-marsh ecotone hydraulically connected to the Bay of Bengal, that salt marshes support benthic invertebrates, serve as breeding grounds for fish and prawns, sustain migratory birds, and protect coastlines from erosion and storm surges, and that converting this ecotone into a freshwater reservoir would destroy all these ecological functions within a single season. This is the on-record expert scientific consensus, placed before the government in writing. The conversion proposal has proceeded regardless. [35]

The proposed Mamallan Reservoir would be the third major conversion of this landscape: from natural tidal marsh to managed salt pan (ancient, approximately 2,000 years ago, confirmed by Sangam literature and peer-reviewed soil science); from active salt pan to a partially degraded but still tidally functioning wetland (modern, as the ongoing tidal connectivity confirmed by the REIA itself demonstrates); and now from a functioning wetland to a freshwater reservoir (proposed). Each conversion has moved further from ecological integrity. Natural reversion is not a speculative future state. It is a return to a documented prior condition, the tidal connectivity for which still exists beneath the landscape, as the government’s own documents confirm. Abrupt freshwater impoundment makes that return impossible. [31][33]

6. Conclusion

The scientific record, much of it from India and Tamil Nadu, converges without contradiction: Salt pans sustain rich and internationally significant waterbird populations because they hold shallow, saline, prey-rich water and provide high-tide and dry-season refuge. India protects its largest such site as a Ramsar wetland and has brought comparable salt pans under sanctuary status. The measurable conditions that give these habitats their value, shallow depth, salinity, and a benthic prey base, are precisely the conditions a deep freshwater reservoir destroys, as India's own Vembanad barrage experience demonstrates.

On this evidence, the Nemmeli salt pans are a habitat of demonstrable and quantifiable conservation value, and the proposed freshwater impoundment would not modify that habitat but eliminate it. Along with other habitats, it is well established that the salt pans form a critical part of Kovalam-Nemmeli's biodiversity. Wetland Conservation Network calls on decision-makers to recognise the Nemmeli wetland complex for what the evidence shows it to be: a living, functioning coastal ecosystem supporting internationally significant wildlife, and to pursue the course that science, Indian law, and global conservation practice all support, protecting its shallow brackish hydrology, rejecting irreversible freshwater impoundment, and allowing this former coastal wetland to complete, in its own time, the ecological recovery that human use interrupted. The course supported by the science and by Indian precedent is **to protect and manage the Nemmeli wetland complex, maintaining its shallow brackish hydrology, not to impound it.**

This evidence note has been prepared by Wetland Conservation Network in the interest of conserving the Kovalam-Nemmeli Coastal Wetland Complex and protecting its internationally significant avifauna from irreversible habitat loss. It is ecological, scientific, and fact-based, drawing on peer-reviewed literature verified in June 2026, official Ramsar and government records, and field observations from the Nemmeli salt pans and the broader Tamil Nadu coast. Every quantified claim is attributed to its source. Claude was used solely for document structuring. We request all stakeholders, decision-makers, and readers to receive this note in the spirit of ecological responsibility, and to act on the weight of evidence it presents: to protect the Nemmeli wetland complex, reject freshwater impoundment, and allow this former coastal wetland to recover on its own ecological terms. For communication: wetlandconservationnetwork@gmail.com

References

All sources were verified through web search in June 2026. Quantified findings are attributed to the specific study from which they were retrieved.

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