BRIEF DOCUMENT OF PARAVUR KAYAL

State / Union Territory : Kerala

Name and address of person(s) compiling this information :

1. Member Secretary, State Wetland Authority, Kerala (Director, Directorate of Environment and Climate Change, Govt. of Kerala), 4th Floor, KSRTC Terminal Complex, Thampanoor, Thiruvananthapuram-1.

2. Smt. Sreeja Raj S. R., Environmental Officer, Directorate of Environment and Climate Change, Govt. of Kerala, 4th Floor, KSRTC Terminal Complex, Thampanoor, Thiruvananthapuram-1

Section 1: Identification, Location and Jurisdiction

1.1 Name of the Wetland (Alternative names, including in local language should be given in parenthesis after official name) : **Paravur Kayal**

1.2 Name of the Village(s) , Tehsil(s), Municipal area (s) :

Villages : Adichanalloor, Eravipuram, Mayyanad, Meenad and Paravoor

Tehsil : Kollam

Panchayaths : Adichanalloor, Mayyanad, Chathannoor

Municipal areas : Paravur

Corporation : Kollam

1.3 District(s) in which wetland complex is located: Kollam

1.4 Geographical coordinates (Latitude and Longitude, to degree, minutes and second)

Latitude: From 8°48'41.464"N to 8°51'38.396"N

Longitude: From 76°37'29.097"E to 76°41'41.933"E

1.5 Name of the Department / Agency which has jurisdiction over the wetland / wetlands complex

: Kerala Coastal Zone Management Authority, State Wetland Authority Kerala and the Local Self Governments

Section 2: Site Characteristics

2.1 Area of wetland / wetlands category (ha) : **903.51** ha.

2.2 Wetland type (Please tick appropriate categories and sub-categories)

Category	Subcategory
❒ Natural (Inland)	❒ Permanent lakes ❒ Seasonal/ intermittent lakes ❒ Permanent streams/ creeks ❒ Seasonal/ intermittent streams/ creeks ❒ Oxbow ❒ River floodplain ❒ Permanent freshwater marshes ❒ Seasonal/ intermittent freshwater marshes ❒ Shrub-dominated wetlands ❒ Tree-dominated wetlands ❒ Geothermal wetlands ❒ Karst and other subterranean hydrological systems
☑ Natural (Coastal)	☑ Coastal lagoon ☑ Estuary ❒ Intertidal mud, sand or salt flats ☑ Mangroves ❒ Coral reefs
❒ Human-made	❒ Aquaculture pond ❒ Tank ❒ Saltpan ❒ Dam / Reservoir

2.3 Depth (m) : Average 2 m, Maximum : 3m

2.4 Elevation (m above mean sea level) : 0 to 340m (Including Zone of Influence)

2.5 Water regimes

a) Main source of water (tick all applicable)

☑ Rainfall ❒ Groundwater ☑ Catchment runoff ☑ Direct / indirect inflow from river ❒ Others, please specify_____

b) Water permanence

☑ Mostly permanent ❒ Mostly intermittent

c) Destination of water from wetland

❒ Feeds groundwater ❒ To downstream catchment ❒ To river ☑ To sea

d) Water pH

❒ Acid (< 5.5) ☑ Circumneutral (5.5 – 7.4) ❒ Alkaline (> 7.4) ❒ Not known

e) Water salinity

❒ Fresh (< 0.5 g/l) ☑ Brackish (0.5 – 30 g/l)) ❒ Euhaline (30- 40 g/l) ❒ Hypersaline (>40g/l)
❒ Not known

f) Nutrient in water

❒ Eutrophic ❒ Mesotrophic ☑ Oligotrophic ❒ Not known

2.6 Climatic setting

a) Annual Rainfall /Snowfall(mm) : 2272

b) Temperature (^{o}C) :Minimum 32 ^{o}C to 33^{o}C, Maximum 35 ^{o}C to 36 ^{o}C

c) Humidity (%) : No data available

2.7 Area of zone of influence (in ha) : 66131.58

2.8 Major land use within zone of influence (provide as approximate % of catchment area)

Forests	: 8.46
Plantation	: 1.22
Agriculture	: 44.58
Settlements (Rural) and (Urban)	: 44.28
Water body	: 1.46
Industrial	: 0.00

2.9 Map of wetland complex and zone of influence

(Enclosed as Annex I and II to this proposal):

Section 3: Biodiversity

3.1 Notable plant species present in wetland

Rhizophora mucronata, Bruguiera Cylindrica, Rhizophora apiculata

3.2 Notable animal species present in wetland

Mammal: Asian small clawed otter

Avian: *Threskiornis melanocephalus, Plegadis falcinellus, Gallinula chloropus, Fulica atra, Anas penelope*

Fish: *Etroplus suratensi*s, Black tiger prawn, *Mugil cephalus*, Horse Mackerel, *Wallago attu*, *Stolephorus indicus*. Kaivetti, *Chiloscyllium indicum*, Puzhamala, *Macrobrachium rosenbergii*, Anabus, Maalai, *Xenentodon cancila*, *Arius arius*, Muzhi, *Systoma sarana*

3.3 Species of conservation significance (rare, endangered, threatened, endemic species)

Wallago attu is a vulnerable species

3.4 Major plant invasive alien species

Eichornia crassipes

3.5 Major animal invasive alien species

The rapid spread of the Charru mussel (*Mytella strigata*) reported here

Section 4: Ecosystem services

Importance	Relevant for the site (please tick yes or no)	If Yes, Details (upto 50 words for each category)
Source of drinking water for people living and around	❒ Yes ☑ No	-
Source of water for agriculture	☑ Yes ❒ No	The agriculture land mainly includes mixed crop, coconut or coconut dominant mixed crop cultivation. In some parts of the area, the paddy fields were converted into coconut plantations. Viruppu (single crop) is extended in the upstream part of the wetland system in small areas.
Fisheries	☑ Yes ❒ No	The main source of income for the peoples of Paravur Estuary is fishing which includes sea foods, Mussel Culture, Green chromide, Prawns etc. Fishing methods such as, Net fishing like Trawl netting, seine netting (Bag type, Purse type) Trap fishing, Hand fishing, Hand line and long line methods are seen at Paravur.
Cultivation of aquatic food plants	❒ Yes ☑ No	-
For buffalo wallowing and use of domesticated animals	❒ Yes ☑ No	-
Medicinal plants	❒ Yes ☑ No	-
Buffering communities from extreme events as floods and storms	☑ Yes ❒ No	Not assessed quantitatively
Groundwater recharge	☑ Yes ❒ No	Not assessed quantitatively
Water purification	☑ Yes ❒ No	Not assessed quantitatively
Acts as a sink for sediments	☑ Yes ❒ No	Ithikkara river drains into Paravur Kayal and sediments are deposited. Sand deposition from sea is also reported.
Has significant cultural and religious values	❒ Yes ☑ No	-
Is a site for recreation and tourism	☑ Yes ❒ No	Paravur Kayal, a unique wetland ecosystem is one of the main centres of attraction for the tourists. There are kayaking tours operated here. Now, several travel explorers are visiting the

Importance	Relevant for the site (please tick yes or no)	If Yes, Details (upto 50 words for each category)
		area and some resorts are seen surrounding the estuary.
Supports noteworthy plants species	☑ Yes ❒ No	Important mangrove species include *Rhizophora mucronata, Bruguiera Cylindrica*, and *Rhizophora apiculata*
Supports noteworthy animal species	☑ Yes ❒ No	The estuary supports habitat for the Pearl Spot - the State fish of Kerala.
Site of high congregation of migratory water birds	☑ Yes ❒ No	Migratory birds are seen at Polachira near the Kayal
Supports life cycle of fish or amphibians	☑ Yes ❒ No	Not assessed quantitatively
Mining	☑ Yes ❒ No	Mining of sand and clay from floodplains are reported
Any other, please list		

Section 5: Pre-Existing Rights and Privileges

Nature of right and privilege	Relevant for the site (please tick yes or no)	Does this negatively impact the wetland's ecological health?	Brief description (upto 50 words for each category)
Community Fishing (without any lease or permission from government department)	☑ Yes ❒ No	❒ Yes ☑ No ❒ Not assessed	Peoples near the wetland involves in community fishing.
Fishing under lease from government department	❒ Yes ☑ No	❒ Yes ❒ No ❒ Not assessed	-
Harvest of plants (without any lease or permission from government department)	❒ Yes ☑ No	❒ Yes ❒ No ❒ Not assessed	-
Harvest of plants under lease from government department	❒ Yes ☑ No	❒ Yes ❒ No ❒ Not assessed	-
Agriculture or horticulture within wetland	❒ Yes ☑ No	❒ Yes ❒ No ❒ Not assessed	-

Nature of right and privilege	Relevant for the site (please tick yes or no)	Does this negatively impact the wetland's ecological health?	Brief description (upto 50 words for each category)
Grazing	☑ Yes ❒ No	❒ Yes ❒ No ☑ Not assessed	-
Religious practices	❒ Yes ☑ No	❒ Yes ❒ No ❒ Not assessed	-
Withdrawal of water for domestic use	❒ Yes ☑ No	❒ Yes ❒ No ❒ Not assessed	-
Withdrawal of water for agriculture or fisheries	❒ Yes ☑ No	❒ Yes ❒ No ❒ Not assessed	
Bathing or wallowing of domestic animals	☑ Yes ❒ No	❒ Yes ❒ No ☑ Not assessed	-
Plying of boats	☑ Yes ❒ No	❒ Yes ❒ No ❒ Not assessed	Kayaking boats and houseboats are operated here
Any other, please list here	❒ Yes ❒ No	❒ Yes ❒ No ❒ Not assessed	

Section 6: Present and Potential Threats

Threat	Degree	Present or Potential	Additional information, if any
Changes in water inflow and outflow	❒ High ☑ Medium ❒ Low	☑ Present ❒ Potential	The hydrological impacts of the regulator reported are : 1. The hydraulic continuity of the estuary has been disturbed. 2. The dug wells, which used to yield fresh water on the separated land mass, became dry. 3. The dug wells were consequently deepened and saltwater intrusion began.
Pollution	❒ High	☑ Present	Brick industries nearby causing air pollution. discharge of

Threat	Degree	Present or Potential	Additional information, if any
	❒ Medium ☑ Low	❒ Potential	domestic effluent, agricultural runoff, open defecation, dumping of garbage, carcasses etc are the primary causes of pollution of the estuary.
Unsustainable harvest of biological resources	❒ High ☑ Medium ❒ Low	☑ Present ❒ Potential	Illegal trapping methods (Padal, Nanju kalakkal) are rarely seen at Paravur. This may have a negative impact on the sustainability of these biological resources
Mining	❒ High ☑ Medium ❒ Low	☑ Present ❒ Potential	Mining of sand and clay from floodplains several meters below the water table has resulted in the reversal of the geohydrologic setting of the area.The water from elevated areas draining into the mine pits and subsequent pumping of water for further mining resulted in marked lowering of the water table in the hinterlands. Almost all tributaries draining the alluvial buildup were partially or wholly vanished from the coastal lands due to the indiscriminate sand and clay mining.
Siltation	❒ High ❒ Medium ☑ Low	☑ Present ❒ Potential	The construction of the spillway has resulted in sand deposits formed during the high tide, considerably reducing the water storage capacity of the lake.
Encroachment	❒ High ❒ Medium ❒ Low	❒ Present ❒ Potential	No data available
Spread of invasive species	❒ High ☑ Medium ❒ Low	☑ Present ❒ Potential	The rapid spread of the Charru Mussel (*Mytella strigata*) may have been triggered by Cyclone Ockhi which struck the region in 2017 ( )
Change in agricultural practices	❒ High ☑ Medium ❒ Low	☑ Present ❒ Potential	The age old rice shrimp rotational cropping system is being replaced by intensification of shrimp culture. Due to tremendous demand in the local

Threat	Degree	Present or Potential	Additional information, if any
			and international markets for shrimp, paddy fields have been converted to monoculture of shrimp by abandoning rice cultivation, and the farming practice changed from traditional to semi intensive, ignoring the ecological implications to the traditional rice fields

Section 7: Activities Proposed to be prohibited (other than those listed in Rule 4(2) of Wetlands Rules)

Activity	Place a tick mark if relevant	Prohibition within wetlands or zone of influence	Level of prohibition (in terms of people, restricted area or any other)	Name of department / agency responsible for prohibition	Additional information, if any
	❒	❒ Wetland / Wetlands complex boundary ❒ Zone of influence			

Section 8: Activities Proposed to be regulated

Activity	Place a tick mark if relevant	Regulation within wetlands or zone of influence	Level of regulation (in terms of people, restricted area or any other)	Name of department / agency responsible for regulation	Additional information, if any
Withdrawal of water/impoundment/diversion or any other hydrological intervention	☑	☑ Wetland / Wetlands complex boundary ☑ Zone of influence		SWAK, Wetland Management Unit (WMU), LSGs, Water Resources Department	Indiscriminate water impoundment/diversion has to be regulated to maintain the wetland ecosystem health

Activity	Place a tick mark if relevant	Regulation within wetlands or zone of influence	Level of regulation (in terms of people, restricted area or any other)	Name of department / agency responsible for regulation	Additional information, if any
				and District Collector	
Harvesting of resources (living /non-living)	☑	☑ Wetland / Wetlands complex boundary ❒ Zone of influence		SWAK, Wetland Management Unit, LSGs, and District Collector	Large scale harvesting of resources shall be restricted and need to take prior permission from the WMU/SWAK
Discharge of treated sewage/ effluent / wastewater	☑	☑ Wetland / Wetlands complex boundary ❒ Zone of influence	To be monitored closely by the Pollution Control Board and Wetland Management Unit	SWAK, Wetland Management Unit, LSGs, Pollution Control Board and District Collector	Required to maintain the wetland ecosystem health. Need to get prior permission from WMU/SWAK
Construction of boat jetties, and facilities for temporary use, as pontoon bridges	☑	☑ Wetland / Wetlands complex boundary ❒ Zone of influence	Indiscriminate construction of boat jetties and facilities for temporary use has to be regulated	SWAK, Wetland Management Unit, LSGs, Pollution Control Board and District Collector	Required to maintain the wetland ecosystem health. Need to get prior permission from WMU/SWAK

Activity	Place a tick mark if relevant	Regulation within wetlands or zone of influence	Level of regulation (in terms of people, restricted area or any other)	Name of department / agency responsible for regulation	Additional information, if any
Aquaculture, agriculture and horticulture activities within the wetland boundaries.	☑	☑ Wetland / Wetlands complex boundary ❒ Zone of influence	Indiscriminate aqua-agri-horticulture has to be regulated	SWAK, Wetland Management Unit, LSGs and District Collector, Department of Agriculture Department of Fisheries	Required to maintain the wetland ecosystem health. Large scale commercial activities need to get prior permission from WMU/SWAK
Tourism	☑	☑ Wetland / Wetlands complex boundary ❒ Zone of influence	Indiscriminate tourism activities have to be regulated. The activities has to be permitted based on an approved tourism master plan	SWAK, Wetland Management Unit, LSGs and District Collector, Department of Tourism	Required to maintain the wetland ecosystem health. Large scale commercial tourism activities need to get prior permission from WMU/SWAK
Sand mining	☑	☑ Wetland / Wetlands complex boundary ❒ Zone of influence	To be regulated based on a detailed quantitative assessment	SWAK, Wetland Management Unit, LSGs and District Collector, Revenue Department	Required to maintain the wetland ecosystem health. Need to get prior permission from WMU/SWAK

Activity	Place a tick mark if relevant	Regulation within wetlands or zone of influence	Level of regulation (in terms of people, restricted area or any other)	Name of department / agency responsible for regulation	Additional information, if any
Any other, please list	❒	❒ Wetland / Wetlands complex boundary ❒ Zone of influence			

Section 9: Activities Proposed to be permitted

Activity	Place a tick mark if relevant	Within wetlands or zone of influence	Additional information, if any
Legal daily sustenance based capture fisheries	☑	☑ Wetland / Wetlands complex boundary ☑ Zone of influence	The local dependent community has to be permitted to do capture fisheries including clam collection for the daily sustenance
Sediment/silt removal	☑	☑ Wetland / Wetlands complex boundary ❒ Zone of influence	small-scale local silt removal by the local inhabitants shall be permitted based on the requirements and detailed quantitative assessment by competent agencies
Agri-Horti-Aquaculture	☑	❒ Wetland / Wetlands complex boundary ☑ Zone of influence	Agricultural and aquaculture activities shall be permitted in the catchment area of the estuary

Section 10: Listing of Available Scientific Resources Used

1. Monachan, A.K., Devika, G.N., Saji, K., Pillai, R.R. and Nair, S.S., 2019. Water Quality Assessment of Paravur Lake, *International Research Journal of Engineering and Technology*, 6 (6) pp (1009-1013)

2. Haritha .Y .A., Dr. Jayalekshmi .V .K., 2019. Physical Geography of Edava - Nadayara and Paravur Backwaters, Kerala, India, *International Journal of Science and Research*, pp (625-628)

3. John, S.E., Rajimol, T.R., Mohan S, V., Maya, K. and Padmalal, D., 2017. Environmental degradation of a tropical estuary due to human interferences - a case study from southern Kerala, SW India. *Arabian Journal of Geosciences*, *10*(16), pp.1-15.

4. Shaji, E., 2009, Hydrological Impact of a Tidal Regulator on Land and on Water in a Tropical Estuary of Kerala, India. *Nature environment and pollution technology*, 8 (4), pp (627-634)

5. CWRDM, 2017. Detailed Project Report submitted to DoECC, Centre for Water Resources Development and Management, Kozhikode.

6. Peter Pradeep, 2011. Study and analysis on the degradation of Paravur Lake. Report by Prof. Peter Pradeep, Help Foundation.

7. Ithikkara River in Kerala: Tampering with Nature – a recipe for negative NPV, https://sandrp.in/2019/01/25/ithikkara-river-in-kerala-tampering-with-nature-a-recipe-for-negative-npv/

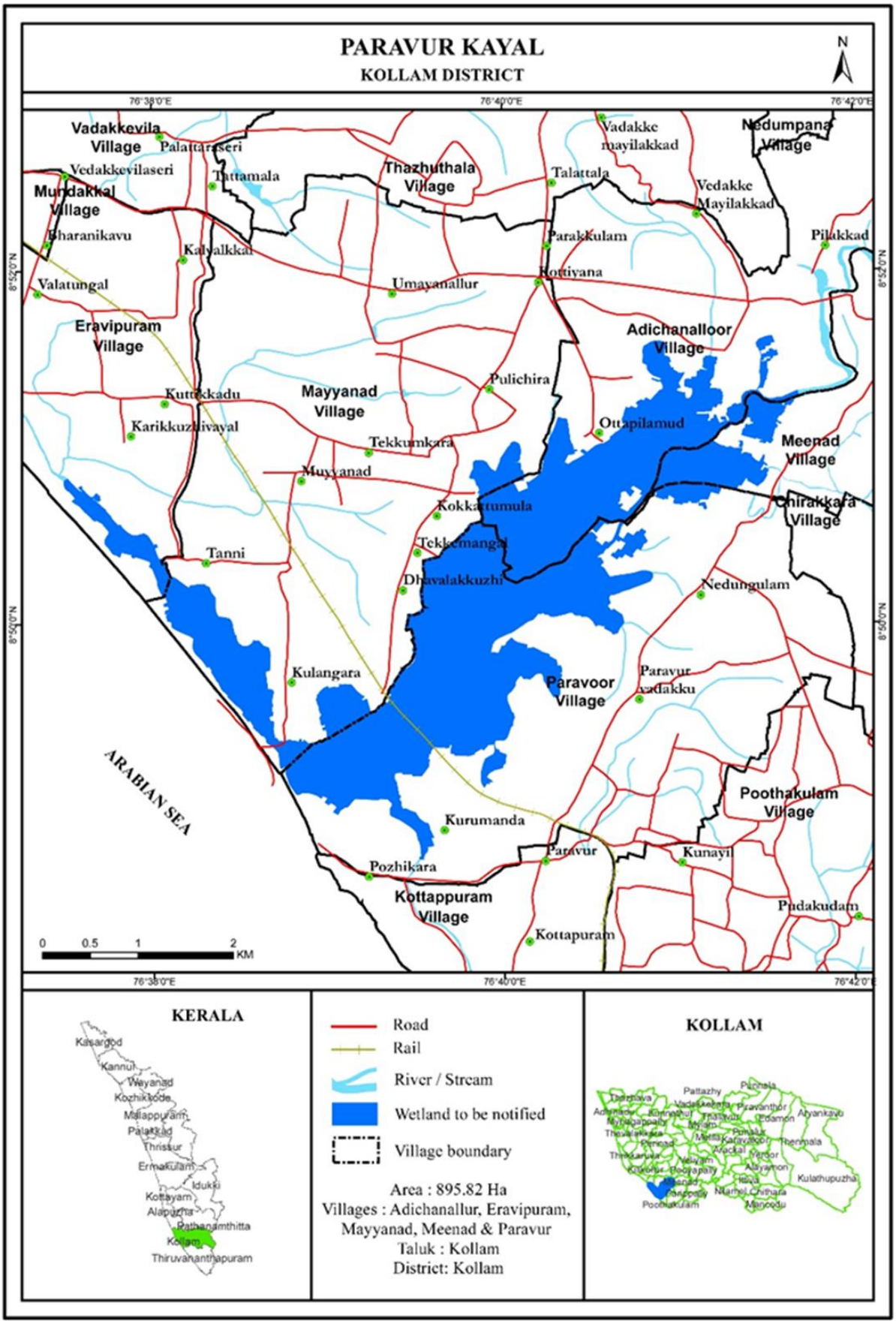
8. Biju Kumar, A., Ravinesh, R., Oliver, P.G., Tan, S.K. and Sadasivan, K., 2019. Rapid bioinvasion of alien mussel Mytella strigata (Hanley, 1843)(Bivalvia: Mytilidae) along Kerala coast, India: will this impact the livelihood of fishers in Ashtamudi Lake?. *Journal of Aquatic Biology & Fisheries*| *Vol*, *7*, pp.31-45.

CHECKLIST

- ☑ Responsible agency has been clearly identified and details of contact person included
- ❒ Wetland/ wetlands complex boundary has been delineated using GIS and firmed up by adequate ground truthing
- ☑ Wetland/ wetlands complex map has been provided at required scale
- ☑ Zone of influence has been delineated and included in wetland map or a separate map
- ☑ Wetland zone of influence is sufficient to manage all activities
- ☑ Site's importance have been listed, and for major categories, justification is provided
- ☑ Site's biodiversity values are listed, and for major categories, justification is provided
- ❒ List of pre-existing rights and privileges is provided
- ❒ Consistency or inconsistency of pre-existing rights and privileges is indicated to be best of available knowledge
- ☑ Threats to site are listed, and for major categories details are provided

- ❒ Activities prohibited, beyond those already listed in Rule 4(2) have been mentioned
- ❒ List of activities to be regulated within wetlands and zone of influence is provided
- ❒ List of activities to be permitted is provided

Annexure I :


PARAVUR KAYAL
KOLLAM DISTRICT
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76°40'0"E
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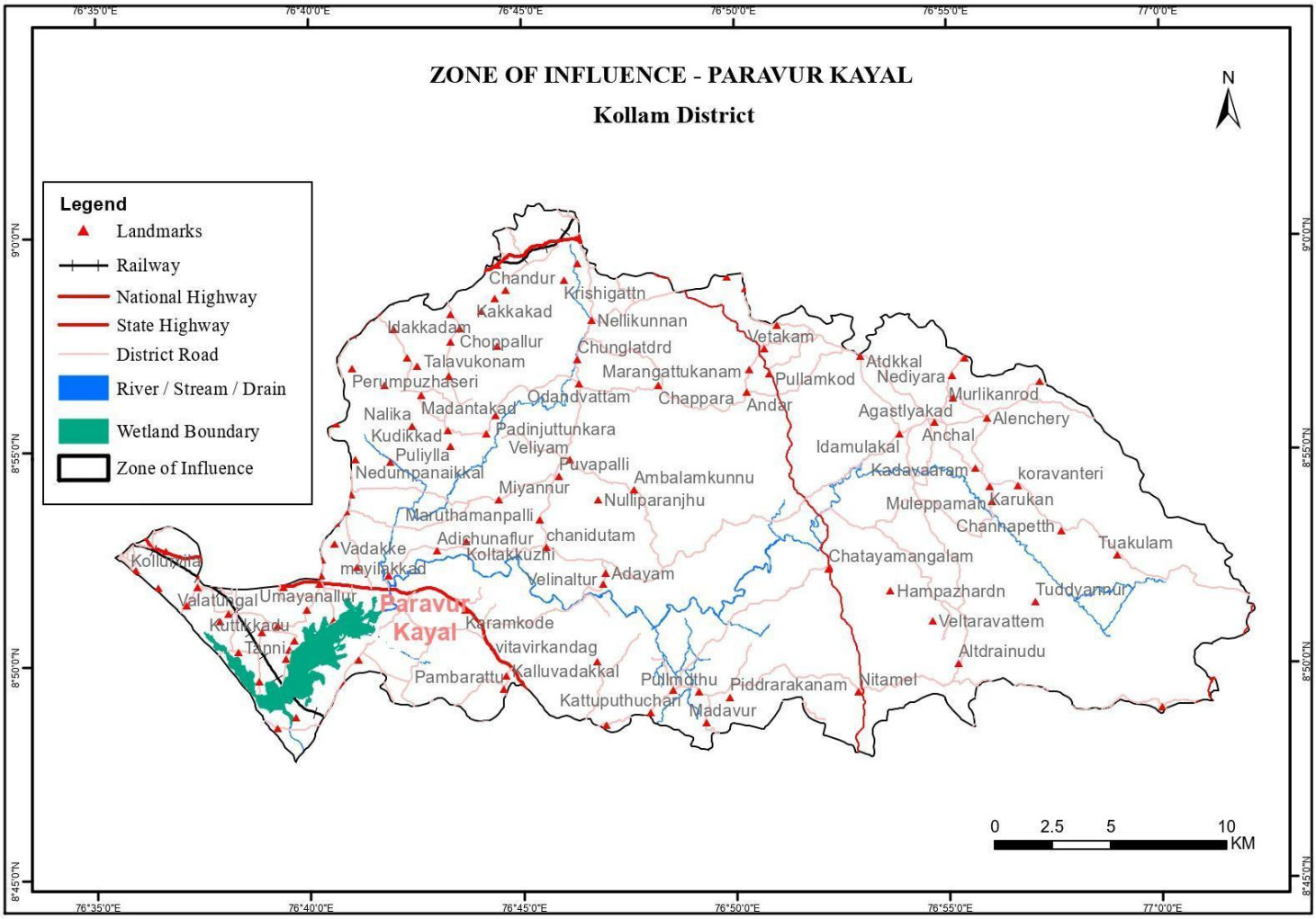
8°52'0"N
8°50'0"N
Vadakkevila Village
Palattarasseri
Vedakkevilaseri
Tattamala
Mundakkal Village
Bharanikavu
Kalyalkkal
Valatungal
Eravipuram Village
Kuttekkadu
Karikkuzhivayal
Thazhuthala Village
Umayanallur
Vadakke mayilakkad
Talattala
Parakkulam
Kottiyana
Nedumpana Village
Vedakke Mayilakkad
Pilakkad
Adichanalloor Village
Pulichira
Mayyanad Village
Tekkumkara
Muyyanad
Ottapilamud
Meenad Village
Chirakkara Village
Kokkattumula
Tekkemangal
Dhavalakkuzhi
Tanni
Nedungulam
Kulangara
Paravoor Village
Paravur Vadakku
ARABIAN SEA
Poothakulam Village
Kurumanda
Paravur
Kunayil
Pozhikara
Kottappuram Village
Pudakudam
Kottapuram
0 0.5 1 2 KM
KERALA
Kasargod
Kannur
Wayanad
Kozhikkode
Malappuram
Palakkad
Thrissur
Ernakulam
Idukki
Kottayam
Alapuzha
Pathanamthitta
Kollam
Thiruvananthapuram
Road
Rail
River / Stream
Wetland to be notified
Village boundary
Area : 895.82 Ha
Villages : Adichanallur, Eravipuram, Mayyanad, Meenad & Paravur
Taluk : Kollam
District: Kollam
KOLLAM

Annexure II :


ZONE OF INFLUENCE - PARAVUR KAYAL
Kollam District
N
Legend
Landmarks
Railway
National Highway
State Highway
District Road
River / Stream / Drain
Wetland Boundary
Zone of Influence
Chandur
Krishigattn
Kakkakad
Nellikunnan
Idakkadam
Chunglatdrd
Chappallur
Talavukonam
Perumpuzhaseri
Marangattukanam
Odandvattam
Chappara
Andar
Pullamkod
Vetakam
Atdkkal
Nediyara
Murlikanrod
Agastlyakad
Alenchery
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Kadavaaram
koravanteri
Karukan
Muleppaman
Channapetth
Tuakulam
Chatayamangalam
Hampazhardn
Tuddyannur
Veltaravattem
Altdrainudu
Nitamel
Piddrarakanam
Madavur
Pullmothu
Kattuputhuchari
Kalluvadakkal
Pambarattu
vitavirkandag
Karamkode
Paravur Kayal
Umayanallur
Valathungal
Kuttikkadu
Tanni
Kollupura
Vadakke mayilakkad
Adishunaflur
chanidutam
Koltakkuzhi
Velinaltur
Adayam
Maruthamanpalli
Nedumpanaikkal
Puliylla
Veliyam
Padinjuttunkara
Kudikkad
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Madantakad
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Puvapalli
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