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Information Sheet on Ramsar Wetlands

1. Date this sheet was completed/updated: 1 August 2001

2. Country: Peru

3. Name of wetland: Lagunas de Mejía National Reserve (Santuario Nacional Lagunas de Mejía)

4. Geographical coordinates:

   17º 08´ 5" South latitude
   071º 51' West longitude

5. Altitude: Between 0 and 3.5 metres above sea level

6. Area: 690.6 hectares

7. Overview:

The Lagunas de Mejía National Reserve is formed by a group of brackish lagoons located near the mouth of the Río Tambo. Water accumulates in them due to the overflowing of the river and through infiltration from Irrigaciones Iberia, the bay and cultivated areas near the reserve.

There are three physiographic units: the aquatic landscape of marshland covered with halophytic and hydrophytic vegetation; the water-covered area; and a system of uniform lagoons with low elevations and scrub vegetation located on the margins of Río Tambo. According to Holdridge's system of classification, this life zone corresponds to the highly arid template-to-hot desert and the biogeographic province of the warm template Pacific desert. The average temperature is 19.8º C, relative humidity is 76 per cent, rainfall is scarce with an annual precipitation of no more than 20 mm and annual average evaporation is 5 mm. There is precipitation in the form of a fine, light rain during winter.

8. Wetland type:

Marine-coastal: E, F, H, J

Types of wetlands by decreasing order of importance: J, F, E and H

9. Ramsar criteria: 1, 2, 3, 4, 5, 6, 8

Criteria that best characterize the site: 2

10. Map of site included? Please tick yes -or- no

11. Name and address of the compiler of this form:

Jefatura del Santuario Nacional Lagunas de Mejía
Kilometre 32, Carretera Mejía-La Curva
E-mail: snlm@mixmail.com

12. Justification of the criteria selected under point 9, on previous page:

The Lagunas de Mejía National Reserve is the only coastal wetland protected by the government of Peru with a classification of intangible [sic]. In the past, there were several wetlands along the entire coast, however, because of pollution and agricultural and urban expansion, these have disappeared.

The reserve is the habitat for 28 species subject to some degree of threat (vulnerable, endangered, rare and undetermined status). In addition, several migratory species (*Calidris mauri, Pluvialis dominica* and *P. squatrola*) are listed as endangered by IUCN. As for ecosystems, the reserve protects eight types of habitats under different degrees of pressure, such as riparian vegetation, lagoons and grasslands.

The reserve is the habitat of 200 species of birds, which correspond to 59.5 per cent of the species recorded in the region of Arequipa. There are two endemic species, the *choca pico amarillo* (*Fulica rufifrons*) and the *fringilo apizarrado* (*Xenospingus concolor*). It is the only wetland in the coastal region that is the habitat of nine species of herons. This wetland has the largest population density in the world of *polla de agua* (*Gallinula chloropus*) and *pato colorado* (*Anas cyanoptera*). It is the only wetland on more than 2000 kilometres of Southern Pacific coast for migratory birds coming from the northern hemisphere, southern South America, the Amazon and the Andes, making it an important site on the migration route.

According to monthly surveys carried out in the wetland for several years, bird populations range between 15,000 and more than 120,000 specimens. For example, there are populations of more than 100,000 specimens of *gaviota de Franklin* (*Larus pipixcan*) during the summer, and the populations of *playero blanco* (*Calidris alba*) are the largest that occur in the Southern Pacific (9,000 specimens). This wetland sustains the largest populations of *polla de agua, pato colorado, gaviota de Franklin, playero blanco* and *rayador*.

The estuary in the reserve is the breeding site of many species of marine fish and freshwater shrimp (*Chriphiops caementarius*), being a reservoir for populations that are exploited commercially all along the extreme southern Peruvian coast and that provide the livelihood for nearby inhabitants and even the inhabitants of large cities such as Arequipa.

13. General location:

Region of Arequipa
Department of Arequipa
Province of Islay
Districts of Mejía, Deán Valdivia and La Punta de Bombón

14. Physical features:

The reserve has a landscape of flooded plains of the Peruvian coast, in addition to flat lands that can include topographic depressions very close to the ocean. The flooded area usually has a more or less uniform topography with slight variations in altitude. The soils have an almost uniform texture. The upper horizons are sandy and are slightly less than one metre in depth. Sandy-clay horizons are found in only one part near the lagoons. The soils have serious drainage problems, because in several parts the water table is very close to the surface (the level of the water table ranges between 0.30 and 1.60 metres). In some cases, the water level rises above ground level, forming sheets or temporary bodies of water.

Average annual temperature is 19.8º C, and total average annual precipitation is 10.8 mm. This is caused in large part by the influence of the Peruvian Current (former Humboldt Current), whose presence prevents the formation of rain, making this part of the coast an extremely desert area. Precipitation in the area is light, usually in the form of so-called *garúas*, produced by winter fog. The local climate is that of a dry desert life zone (warm temperate) (ds-TC) or highly arid desert (hot temperate) (ds-TC).

Lagoons of various dimensions and probably of different origins can be found on both shores of the mouth of Río Tambo. The lagoons located in the northern part at the mouth of the river are in reality seepage of returning water from the Pampas de Iberia. The water that creates these lagoons comes from infiltration and surface flows from the Irrigación Ensenada–Mejía-Mollendo, which dates from 1942. Río Tambo also constitutes an important source of water for these lagoons, because during its period of greatest discharge (December–April) part of the water floods the Pampas de Iberia feeding the lagoons there. This is evidenced in the lagoons south of the reserve by the presence of turbid water loaded with sediments. In addition, it is known that these lagoons receive water when the Río Tambo overflows and the water table of the basin.

The hydrological behaviour of the lagoons is a function of the balance between the supply of water to the lagoons and losses. Losses are through percolation towards the Pacific Ocean (about 30 per cent), through evaporation (50–60 per cent) and often a smaller loss (10–20 per cent) through percolation into the drainage system of Irrigación Iberia. The lagoons are surface lagoons because their average water level fluctuates between 80 and 150 centimetres in depth with wide seasonal variation.

15. Hydrological values:

The reserve is recharged by underground effluents coming from nearby irrigation, and its discharge goes directly to the drainage system of Irrigación Iberia and then into the sea.

The wetland has a habitat of riparian vegetation, which acts as a defence for Irrigación Boquerón and Irrigación Iberia, in addition to the rest of the habitats. Because the wetland has a lower level than the agricultural area, it acts as an impediment to the mixing of brackish and salt water that would prevent development of normal agriculture. Furthermore, it provides a barrier against possible natural phenomena such as tsunamis.

The wetland at the extreme end of the basin of Río Tambo is the final sump for sediments, especially in the estuary, which produces a wealth of nutrients and, as the result, a large diversity. Thanks to its physical and biotic characteristics, the wetland contains a high biological diversity that maintains high populations whose trophic relations make possible the continual renovation and balance of its cycles.

16. Ecological features:

Ocean in front of the reserve

The ocean is just west of the reserve. It is characterized by its high productivity and large biodiversity. It is the habitat for a large number of local or migratory birds.

Marine beaches

This environment is characterized by a lack of vegetation and is found throughout the reserve, being broken only by the mouth of the Río Tambo. The beaches can be divided into two areas: the intertidal zone, which extends up to the tide line and forms a feeding area for shore birds, and the surrounding area, which extends up to the grasslands that are characterized by marine and terrestrial vegetation thrown up by the ocean (about 150 hectares). Both areas have a predominantly sandy soil.

The lagoons

The lagoons are parallel to the ocean and are maintained thanks to surface runoff and contributions from the water table. They are formed by three groups of lagoons: Laguna Mejía, directly affected by the system of drainage, which is now a wetland with a small lagoon; Laguna Iberia, the main body of water, divided into three bodies of water by the invasion of reeds and Laguna Boquerón, a complex of small lagoons, including two main lagoons directly influenced by Río Tambo. Associations of *Ruppia* sp. can be found near the shore, and there is floating algae of *Chara* sp. in the central parts of the lagoons.

Río Tambo

As mentioned earlier, Río Tambo, which is in the southern part of the reserve, is 276 kilometres long. This river has a hydrological regime similar to other coastal rivers of the

Pacific Ocean basin: abundance in the normal period of rains from December to March and low water marked by a deficit from August to December. Its water quality is not good for all crops, and in the critical period of deficit, water quality becomes worse, bringing as a result salinization and degradation of the soils.

Mouth of the Río Tambo

Río Tambo forms an estuary of varying width and changing outlet. Generally, it widens about two kilometres upstream from the mouth until reaching about 200 metres at the mouth. There, the slope is minimal, and water flow is very slow. On its right bank can be found areas under the influence of its flooding with gravel, mud and sand. In addition, certain low herbaceous species and reeds can be found, although in general vegetation is scarce and even non-existent in the last stretch.

Riparian woodlands

This area is located on both sides of the river and is characterized by a diversity of trees, shrubs and herbaceous species. The part corresponding to the reserve is visibly degraded by human activities. Even so, it is the area with the greater diversity of plant species. It is a very dynamic area because of the action of the river, which causes it to vary in size. It is wooded on both banks of the river in a strip from 40 to 100 metres wide. On the right bank of the river, its width varies from 5 to 100 metres. Its approximate area is 30 hectares.

Sand

This area is formed by strips of sandy soil 100 to 200 metres wide parallel to the lagoons and ocean beaches, extending seven kilometres in length. Birds of several species can be found here. The most characteristic are *Arenaria interpres, Cathartes aura jota, Charadrius alexandrinus* and *C. vociferus.*

Gramadales, totorales and *juncales*

In these plant associations, certain special characteristics dominate, which are responsable for their names: *grama salada* (*Distichlis spicata*), *totora* (*Typha angustifolia*) and the reed *Scirpus americanus*, which are located indistinctly along the shores of the lagoons and cover variable areas. The grasslands (*gramadales*) usually occupy large areas near the lagoons and cover an area of approximately 380 hectares. The *totorales* are found towards the southern part surrounding the lagoons in the eastern sector in a form that resembles patches on the shores of Río Tambo and cover an area of approximately 26 hectares. The *juncales* are found on flooded soils near the central and southern lagoons in the form of patches in the northern part, bordering the *totorales* and in several sectors between the grasslands and the riparian woodland.

Salicornial

As in the previous case, this is considered a plant association in which *verdolaguilla* (*Salicornia fruticosa*) dominates. It is not abundant. It is found in Laguna Mejía (bordering what remains of it) and in the grasslands that border the agricultural land. There is no uniform distribution. It covers an area of approximately 58 hectares.

Among the exotic plants in the wetland, there are *grama dulce* (*Paspalum vaginatum*), water hyacinth (*Eichornia crassipes*) and *lentejas de agua* (*Lemmna* spp.) distributed on the shores of the lagoons and in the surrounding drainage areas. These three have been controlled in their expansion in the lagoons. Native species such as the *junco* (*Scirpus* spp.) and the *matara* (*Typha angustifolia*) behave as invasive species in the lagoons within the normal cycle of the wetland, which is now accelerated by eutrofication and fluctuation in water level. In the adjoining area, the native species mentioned before prosper, depending on the water level and the degree of neglect of the area. Subsistence agriculture of alfalfa, maize, garlic, pepper, garlic and sweet potato, among others, dominates.

17. Noteworthy flora:

Figure 1: Vascular flora in the reserve with an indication of their respective habitats

Scientific name	Common name	Habitat						
		G	S	J	T	RW	Dr	CA
Ambrosia peruviana	*Marko*					X		X
Arundo donax	*Carrizo*					X		
Azolla filiculoides	*Lenteja de agua*						X	
Baccharis glutinosa	*Chilca*	X				X		X
Baccharis salicifolia	*Chilca*					X		X
Baccharis sp.	*Chilca, callacaz*					X		
Chenopodium ambrosioides	*Paico*					X		X
Chenopodium macrospermum						X	X	X
Cotula coronaphyfolia								
Cynodon dactylon	*Grama, pata de pajarito*					X	X	
Cyperus sp.						X		X
Distichlis spicata	*Grama salada*	X	X	X		X	X	X
Eichhornia crassipes	*Jacinto de agua*						X	
Eleocharis sp.					X	X		X
Eleocharis sp.						X		
Equisetum giganteum	*Cola de caballo*					X		
Flaveria videntis						X		
Gynerium sagittatum	*Caña brava*					X	X	
Heliotropium curassavicum						X		X
Heliotropium sp.		X	X			X		
Hydrocotyle bonariensis	*Matecillo*					X	X	
Lemna minuta	*Lenteja de agua*						X	
Ludwigia octovalvis							X	
Melilotus alba	*Alfalfilla*							X

Melilotus indica	*Alfalfilla*							X
Paspalum vaginatum	*Grama dulce*	X	X	X	X	X	X	X
Pennisetum clandestimun	*Pasto*							X
Phragmites australis	*Carricillo*				X	X		
Phyla canescens	*Tiquil-tiquil*					X	X	X
Pitraea cuneato-ovata								
Plantago major	*Llanten*					X		X
Plantago sp.						X		X
Poa sp.	*Pasto*							
Polypogon interruptus	*Rabo de zorra*					X		
Portulaca oleracea	*Verdolaga*	X	X	X	X	X	X	X
Rumex crispus	*Lengua de vaca*							X
Salicornia fruticosa	*Verdolaguilla*	X	X					X
Salix chilensis	*Sauce cimarrón*					X		X
Scirpus americanus	*Junco, chito, tuto*	X	X	X	X	X	X	
Scirpus olneyi	*Junco, chito, tuto*					X		
Scirpus sp.	*Junco, chito, tuto*	X	X			X		
Sesuvium portulacastrum		X			X		X	
Sonchus oleraceus								X
Spilanthes urens						X		
Sporobulus virginicus		X	X					
Tessaria integrifolia	*Callacaz*					X		
Typha angustifolia	*Totora, matara*			X	X	X	X	
Washingtonia robusta	*Palmero*	X						X

G=Grassland, S=*Salicornial*, J=*Juncal*, T=*Totoral*, RM=Riparian woodland, Dr=Drainage canals, CA=

18. Outstanding fauna

Fauna recorded at the site

Taxonomic Group	Order	Family	Genus	Species
Arthropods	20	54	?	?
Freshwater fish	4	5	6	6
Marine fish	11	17	25	28
Amphibians	1	1	1	1
Reptiles	1	3	4	5
Birds	-	46	134	200
Mammals	3	7	14	15
Total	40	133	184	255

Bird species subject to some degree of threat recorded in the reserve

Scientific name	Common name	D.S.013-99-AG	Frequency in the reserve

Ajaia ajaja	*Espátula rosada*	Vulnerable	O
Daption capense	*Paloma del Cabo*	Rare	O
Dendrocygna autumnalis	*Pato silbador*	Unknown	O
Dendrocygna bicolor	*Pato cara blanca*	Unknown	O
Diomedea irrorata	*Albatros de Galápagos*	Rare	O
Falco peregrinus	*Halcón peregrino*	Vulnerable	A
Fulica gigantean	*Fulica gigante*	Vulnerable	O
Fulica rufifrons	*Choca de pico amarillo*	Rare	A
Haematopus ater	*Ostrero Negro, Brujillo*	Rare	O
Haematopus palliatus	*Ostrero común*	Rare	A
Jabiru mycteria	*Jabirú*	Vulnerable	O
Larosterna inca	*Zarcillo*	Vulnerable	B
Larus dominicanus	*Gaviota dominicana*	Vulnerable	A
Larus serranus	*Gaviota andina*	Vulnerable	A
Netta erythrophthalma	*Pato cabeza castaña*	In extinction	O
Pelecanoides garnotii	*Potoyunco peruano*	In extinction	O
Pelecanus thagus	*Pelícano*	Vulnerable	A
Phalacrocorax bougainvillii	*Guanay*	Vulnerable	B
Phalacrocorax gaimardi	*Chuita*	Vulnerable	B
Phalacrocorax olivaceus	*Pato chancho, Cushuri*	Vulnerable	O
Phoenicoparrus jamesi	*Parihuana de James*	In extinction	O
Phoenicopterus chilensis	*Parihuana, Flamenco*	Vulnerable	A
Recurvirostra andina	*Avoceta andina*	Rare	O
Rhynchops niger	*Rayador*	Vulnerable	A
Spheniscus humboldti	*Pingüino de Humboldt*	In extinction	O
Sula nebouxi	*Camanay*	Vulnerable	O
Sula variegata	*Piquero común*	Vulnerable	B
Theristicus melanopis	*Bandurria*	Vulnerable	E

A = Permanent species in the lagoons that directly depend on protection of the area.
B = Permanent species in the lagoons that benefit from protection of the area but also are protected in other areas.
O = Species occasionally found in the lagoons.
E = Extinct in the area, but previously found here.

19. Social and cultural values:

Agricultural activity

There is subsistence agriculture for which better technical assistance, orientation and training should be provided, leading to more environmentally aware systems.

Livestock raising

In the buffer area, there is livestock activity with cattle and sheep. In the surrounding area, there is grazing on private land. Usually, about 50 cows and between 150 and 200 sheep graze here.

Hunting

There is sport hunting around the reserve. Several farmers and nearby inhabitants hunt birds as food and to prevent damage by birds to their crops. This occurs primarily in the areas surrounding the lagoons (drainage canals and farmland near the protected area). There are very isolated cases of illegal duck hunting in the reserve.

Fishing

The fishing in the buffer area and the estuary of Río Tambo carried out by local inhabitants is for local consumption, and the means of fishing are primitive.

Extraction of reeds and other plant species

Rushes (*junco*) and the *matara* that grow in several sectors of the reserve have been used by the local inhabitants for decades for the manufacture of handicrafts (chairs, tables, floors, baskets, mats, rugs and hats), which are sold in the summer to tourists in Mollendo and Arequipa. In some cases, reeds are sold as raw material to buyers from the department of Puno.

20. Land tenure/ownership of:

The protected nature area has 690.6 hectares according to decree 015-84-AG. The area belongs to the Peruvian government. At the site, there are seven owners who are in the process of registering their land. Steps are being taken to possibly relocate these farmers or stipulate in their land title that they are in a nature area protected by the government. Surrounding the wetland, there is Irrigación Iberia (125 settlers) and Irrigación Boquerón, which are legitimate owners of their farmland.

21. Current land use:

There is small exploitation of livestock based on grazing (average of 50 head of cattle). In the extreme southern part of the area, there is extraction of firewood as a source of energy, and in some designated areas there is extraction of fibres for handicrafts.

Outside the area, there is faming and livestock raising, primarily in Irrigación Iberia and Irrigación Boquerón. In the buffer area in the south-western part, there is traditional fishing by local inhabitants, and in the drainage canals next to the wetland there is subsistence hunting and culling (primarily *pollas de agua*) in order to prevent damage to crops. The water level in the lagoons in the area is directly influenced by the frequency of normal irrigation in Irrigación Iberia. This occurs in the area of one of the main rivers in Peru, which because it is a typical coastal river has a volume that varies between four cubic metres per second to more than a thousand cubic metres per second.

22. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects:

Beginning in 1978, the government followed a mistaken policy and established the Plan REHATIC, which consisted in draining land with drainage problems and salinity along the coast in order to carry out agriculture. This project resulted in the drying-up of the Lagunas de Mejía. Thanks to institutions and persons interested in conservation, 690.6 hectares were protected in 1984. This created a conflict between the protected area and farmers, who considered that their low yields were caused by the wetland.

One of the current and future problems is deviation of part of the flow from the Río Tambo basin to a new irrigation project (Pasto Grande). Deviation of this water has reduced the flow and changed the water quality, which now has a high salt and boron content, which is influencing the trophic chains in the wetland.

Nearby agriculture uses technology based on the intensive use of pesticides (phosphates, chlorates, carbonates, among others), which pollute the wetland and, in some cases, accelerate eutrofication and as a result normal plant succession, accelerating losses of lagoons and biodiversity.

The exotic plants present in the wetland are *grama dulce* (*Paspalum vaginatum*), water hyacinth (*Eichornia crassipes*) and *lenteja de agua* (*Lemmna* spp.) distributed on the shores of the lagoons and in the surrounding drainage area. Their presence in the wetland is the result of the ignorance of the local inhabitants, but they are a source of pasture spread by cattle.

23. Conservation measures taken:

Because of the importance already described, this wetland was declared a national sanctuary by the government of Peru on 24 February 1984 by Decreto Supremo 015-84-AG, assigning it the classification of intangible [sic]. The area has 690.6 hectares and has a management plan that is oriented along the lines proposed by the Ramsar Convention. There is direct participation in the execution of the management plan for natural resources, especially vegetable fibres (reed and *matara*) and fishing through an association of El Santuario fishermen and an association of traditional fishermen using *chinchorro de hombro* at the mouth of the river. There is a database of monthly surveys of birds recorded in the wetland, and water in the system of lagoons is monitored in order to find the water balance in the wetland. This includes measurement of water level, water table level, flows, temperature and evaporation.

24. Conservation measures proposed but not yet implemented:

The law of protected nature areas, the national strategy for the conservation of wetlands in Peru and the regulation of nature areas apply to the management of this area. There are management plans for natural resources that have not been implemented or that are being prepared. The wetland is associated with a system of lagoons in the extreme

southern part of Río Tambo, known as the Punta de Bombón lagoons, where greater support is needed for the institutions linked to conservation of wetlands in order to promote their conservation.

25. Current scientific research and facilities:

The wetland has infrastructure left from a research project that ended in 1999 and minimal indispensable equipment and basic installations for visitors where research can be carried out. Currently, there are surveys and studies restricted to the resources available in the area. In addition, there is a programme of voluntary park wardens who carry out basic research during the summer following a research plan for the wetland.

26. Current conservation education:

The wetland has a visitors' centre, five watchtowers and two observation platforms, pamphlets, posters, a guide to the reserve, a list of birds found in the wetland, a Web site (www.lagunasdemejia.com) and a series of cards that are published for commemoration of conservation called "Juan la Choca". These cards are sent to the inhabitants living in the area influenced by the wetland. The area has an environmental education programme that consists of an agreement with the provincial educational service to train teachers and teach basic English and handicrafts in two schools near the wetland related to conservation of the wetland. Visits by schoolchildren to the wetland have increased during the past two years as the result of this programme. In 2000, there was an increase of 47.23 per cent.

27. Current recreation and tourism:

The wetland is used for low-scale tourism, primarily local inhabitants and visitors interested in observing birds in the wildlife area. A plan is being prepared for tourism, which provides for tourist and recreational activities, a study of the carrying capacity and tourist classification, maintaining the intangibility [sic] of the wetland as a reference point.

28. Jurisdiction:

The reserve is part of the Sistema Nacional de Areas Naturales Protegidas por el Estado (SINANPE), which is under the jurisdiction of the Instituto Nacional de Recursos Naturales (INRENA), specifically under the Dirección de Areas Naturales Protegidas y Fauna Silvestre. INRENA is under the Ministry for Agriculture.

29. Management authority:

Instituto Nacional de Recursos Naturales (INRENA)
Dirección de Areas Naturales Protegidas y Fauna Silvestre
Urbanización el Palomar, Calle Diecisiete, 355
San Isidro, Lima 27
E-mail: inrena.dganpfs@terra.com.pe

30. References: