4US016
designated 03/08/98

Information Sheet on Ramsar Wetlands

1. **Date this sheet was complete/updated:**

   July 1, 1998

2. **Country:**

   United States of America

3. **Name of Wetlands:**

   Sand Lake National Wildlife Refuge

4. **Geographical coordinates:**

   45°45′N and 98°15′W

5. **Altitude:** 1300 feet mean sea level = 396 m.

6. **Area:** 8,700 hectares (21,500 acres)

7. **Overview:**

   The area is characterized by the sandy bottom of an ancient lake, glacial uplands, and alluvial flood plains. Sand Lake NWR is located in the heart of the Prairie Pothole Region, bounded on the east by the Prairie Coteau and on the west by the Missouri Coteau physiographic regions. The refuge is comprised of a mosaic of different land types (Naugle et al. 1994.). Primary habitat types include 4,453 ha wetlands, 3,003 ha of grasslands, 1,045 ha of croplands, and 81 ha of woodlands. The area is a critical staging area for both spring and fall migrating populations of Canada geese and snow geese; and nesting area for numerous wetland dependent birds, and hosts the world's largest nesting colony of Franklin's gulls.

8. **Wetland type:**

   Marine-Coastal: A B C D E F G H I J K

   inland: L *M* N O P Q R Sp Ss *Tp* *Ts*

   U Va Vt W Xf Xp Y Zg Zk

   man-made: 1 2 3 *4* 5 *6* 7 8 9

Please now rank these wetland types by listing them from the most to the least dominant:

6, Tp, Ts, M, 4

9. Ramsar Criteria:

1a **1b 1c 1d / *2a* *2b* *2c* 2d / *3a* *3b* 3c / 4a 4b**

Please specify the most significant criterion applicable to the site:

1a

10. Map of site included? Please tick X *Yes* or ☐ *No*

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

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

1a. Sand Lake National Wildlife Refuge, which lies in the center of the Prairie Pothole Region (PPR), is an extremely good example of a large freshwater cattail marsh for this region. Large wetlands such as those found on Sand Lake NWR are primarily semi-permanent in nature, and provide critical nesting and staging habitat for multitudes of bird species, and literally millions of individuals. See Appendix A in the attached report, starting on page 14.

The PPR provides nesting habitat for approximately 50% of the continental duck population. The Sand Lake wetlands provide valuable habitat, in both wet and dry years, due to the riverine nature of its water source.

2a. Sand Lake NWR possesses suitable habitat for four federally listed species. Among these, the bald eagle (*Haliaeetus leucocephalus*) and the peregrine falcon (*Falco peregrinus*) occur at the refuge during different times of the year. A successful bald eagle nesting site (1994-97) is currently located on private land, 4.5 miles east of Sand Lake. Bald eagles are also present during the spring and fall migration. Nearly every year, in excess of 100 bald eagles use the refuge during the spring migration. The peregrine falcon

is also present during these migrational periods. In addition, black terns (*Chlidonias niger*) and white-faced ibises (*Plegadis chihi*) nest in substantial numbers on the refuge. During a recent vertebrate survey, black terns contributed to a 62% frequency of occurrence in wetland habitats (Meeks 1996). Furthermore, the refuge supports habitat for over 60% of the birds listed as a "rare species" monitored by the South Dakota National Heritage Program as either nesting or migratory habitats. Among these, 21 species have nested on the refuge in wetland or associated habitats (see Table 1 of the attached report, page 13). And lastly, Sand Lake wetlands provided habitat for the only confirmed nesting of a common moorhen (*Gallinula chloropus*) in the state of South Dakota (Meeks 1996).

2b. Presently, SLNWR, with its uplands and interspersion of emergent vegetation and water, represents a dynamic prairie-marsh ecosystem. In the continental United States, wetlands have been drained at alarming rates and continue to be destroyed. In South Dakota alone, 35% of the original acres of wetlands have been lost. Wetlands as large as Sand Lake are rare and continue to be the keystone foundation for a vast array of wetland complexes. Wetlands are important for the conservation of reptiles, amphibians, fish, mammals, and birds. The refuge contributes to the conservation of continental as well as global biodiversity.

2c. SLNWR supports large assemblages of flora and fauna, some for their entire life cycle, and others during critical periods of their life cycle. The wetlands of Sand Lake NWR support large populations of migrating snow geese (*Chen caerulescens*). Fall migrations may reach peaks of 250,000 individuals, whereas the spring migration was documented at over 1.2 million in 1991, a figure representing over 50% of the entire Midcontinent Population of snow geese in that year (Bill Schultze, pers. comm.).

Furthermore, the wetland also supports breeding habitat for the largest Franklin's gull (*Larus pipixcan*) colony in the world (J.Burger, pers. comm.). From 1994-96, the wetland habitat supported from 86,385-155,325 pairs of nesting Franklin's gulls. In addition, this wetland habitat supports other avifauna in association with the gulls, white-faced ibis, Forster's terns (*Sterna forsteri*), common terns (*Sterna hirundo*), black terns, black-crowned night-herons (*Nycticorax nycticorax*), cattle egrets (*Bubulcus ibis*), great egrets (*Ardea alba*), little blue herons (*Egretta caerulea*), snowy egrets (*Egretta thula*), and double-crested cormorants (*Phalacrocorax auritus*) all nest in the colony annually, as do eared grebes (*Podiceps nigricollis*), Western grebes (*Aechmophorus occidentalis*), and Clark's grebes (*Aechmophorus clarkii*).

The Sand Lake marsh has the distinction of having been the site of the first recorded nesting in the entire state for many species: Cattle egret (1977), great egret (1978), snowy egret (1977), little blue heron (1979), and white-faced ibis (1978) (SDOU 1991).
In addition, Sand Lake provided habitat for approximately 5,000 cattle egret nests in 1996. Also nesting in conjunction with the cattle egrets were white-faced ibises, which numbered greater than 100. Black-crowned night-herons, great egrets, and snowy egrets also nested in substantial numbers. In 1994, an estimated 1,500 Western grebe young

were produced in Sand Lake's wetlands.

3a. The number of waterfowl using Sand Lake wetlands commonly exceeds 20,000. During the spring migrations, hundreds of thousands of snow geese use the wetland and several tens of thousands of individuals of various other waterfowl species use the wetland. During the fall, estimates of peak migration of 250,000 mallards (*Anas platyryhnchos*) are not uncommon, along with many thousands of individuals of other species. In addition, this large wetland also affords protection for several thousand molting waterfowl during the summer months, with an uncommonly high number of wood ducks (*Aix sponsa*).

3b. The wetlands of Sand Lake NWR support well over one percent of the continental population of snow geese. The wetland provides a critical staging area for other spring and fall migrating geese [i.e., Canada geese (*Branta canadensis*), snow geese], which number over one million at times. In addition to waterfowl, Sand Lake NWR wetlands have provided nesting habitat for close to 50% of North America's population of Franklin's gulls.

13. General Location:

Sand Lake National Wildlife Refuge is located in Brown County in north-central South Dakota. The refuge is approximately 25 miles northeast of Aberdeen (population 24,927). Three smaller communities are located nearby. They include Hecla (population 398), Houghton (population 100), and Columbia (population 133).

14. Physical Features:

The area is characterized by the sandy bottom of an ancient lake, glacial uplands, and alluvial flood plain. Sand Lake NWR is located in the heart of the Prairie Pothole Region (PPR), and is bounded on the east by the Prairie Coteau and on the west by the Missouri Coteau physiographic regions (See Figure 2 in the attached report, page 4.)

The refuge is comprised of a mosaic of different land types (Naugle et al. 1994). Primary habitat types include 4,453 ha of wetlands (dominated by cattail [*Typha* spp.] and common reed [*Phragmites australis*]), 3,003 ha of grasslands (e.g., dense nesting cover, alfalfa [*Medicago sativa*], native prairie), 1,045 ha of croplands (e.g., corn [*Zea mays*]), and 81 ha of woodlands (e.g., shelterbelt plantings, riparian areas) (Sand Lake National Wildlife Refuge 1990).

The wetland component of SLNWR is comprised of two main bodies of water (Sand Lake and Mud Lake). Natural marshes existed prior to the establishment of the refuge, but two major dams, constructed shortly after the refuge was established, enhance the previously existing wetlands. Wetland habitat on the marsh is characterized by open water, submergent vegetation (*Potamogeton pectinatus*, *Ceratophyllum demersum*), emergent

vegetation (*Typha* spp., *Phragmites australis*) and shallow water/wet meadow vegetation (e.g. *Juncus* spp., *Carex* spp., *Spartina pectinata*).

Soil composition is strikingly different on opposite sides of the refuge. To the east, the soils are characteristically sandy and loamy similar to the lake plain. To the west, and beyond the refuge, are characteristically silty and sodium affected silty soils (USDA 1993). The respective soil types on either side of the refuge may affect vegetation composition and faunal associations.

Seventy-one percent of the area surrounding the refuge is intensively farmed. Land in permanent pasture constitutes 16.7% and idled land (i.e., Conservation Reserve Program) accounts for 11.7% of the areas (Naugle et al. 1994). Sand Lake NWR is an isolated riverine landscape in an agricultural setting.

Large seasonal fluctuations of climate in the region are the rule, rather than the exception. Extreme cold in the winter and hot, dry summers are common. Precipitation averages 44.6 cm annually, but cycles of drought and heavy precipitation are evident (USDA 1993). The mean annual temperature is 10.0°C (Spuhler et al. 1971).

15. Hydrological values:

The marshes of Sand Lake NWR provide a very productive wetlands habitat for native plant and animal species. Originally, the marshes were natural overflow areas associated with the James River. In the mid-30's, and after the refuge was established, two earthen dams were constructed across the James to enhance the already existing marshes. During the spring runoff period, the wetlands swell to a capacity of 4-5 times its normal volume which helps attenuate flooding downstream within the river valley. Also, since the soils to the east of the refuge are characteristically sandy, the hydraulic pressure associated with increased water elevations tends to push the water to the east through the sand, storing literally tens of thousands of acre-feet of water.

This has the tendency to raise the water table in the "sand country", greatly enhancing the glaciated wetlands found within the Lake Plain Region, and providing much needed moisture to meadow grasses and forbs which are "sub-irrigated" by this phenomenon.

As the water elevations on the refuge subside and return to near normal levels, the hydrologically-connected ground water comes back into the river from the "sand country" and continues on its way down the James River. This phenomenon occurs almost every year depending upon the volume of the spring run-off event.

16. Ecological Features:

The deeper parts of the marshes found in Mud and Sand Lakes are dominated by rooted aquatics such as Sago pondweed (*Potamogeton pectinatus)* and coontail *(Ceratophyllum demersum)*. The submergent vegetation known as bladderwort (*Utricularia vulgaris)* is also found within the open water zones of the refuge. The more shallow zones of the marshes are dominated by emergent aquatic vegetation such as cattail (*Typha* sp.) common reedgrass (*Phragmites australis*), with lesser amounts of bulrush (*Scirpus* sp.). The shallow water/seasonally flooded zones are dominated by various sedges (*Carex spp., Juncus spp., and* prairie cordgrass (*Spartina pectinata*).

Upland habitats on the refuge are characterized by the exotic cool-season grasses, smooth brome (*Bromus inermis)*, and quackgrass (*Agropyron repens*). Some of the uplands are dedicated to production of agricultural crops and some of the previously farmed uplands have been seeded back to a mixture of warm and cool season native grasses and forbs. Some of the grasslands are invaded by the noxious weed plants of Canada thistle (*Cirsium arvense)* and leafy spurge (*Euphorbia esula).*

The area surrounding the Sand Lake National Wildlife Refuge was once dominated by native tall, and mixed grass prairie. There are still remnants of the original prairie vegetation, but most of the upland areas adjacent to the refuge have been converted to agricultural production or been seeded back to cool season exotic grass species.

As stated above, the aquatic environments found on the refuge are very productive, and particularly in conjunction with the rooted aquatic vegetative zones, host tremendous populations of micro and macro invertebrates. The invertebrate species form the base for the trophic pyramid. These primary producers fall victim to primary consumers such as smaller fish species and the young of the thousands of marsh and water birds that nest at Sand Lake. Predatory fishes, wading birds, and fish-eating waterbirds form the next trophic level, followed by the ultimate consumers such as bald eagles, mammalian predators, and man.

17. Noteworthy flora:

There are only small tracts of unbroken, native prairie remaining on the refuge, since most of the upland has been previously farmed. But recently, over 200 acres of native grasses, consisting of switch grass (*Panicum virgatum*), Indiangrass (*Sorghastrum arvenaceum*), green needlegrass (*Stipa viridula*), and Western wheatgrass (*Agropyron smithii*) have been seeded. This conversion of tame or exotic grasses to native grasses will continue.

Emergent aquatic vegetation is dominated by cattail (*Typha* sp.) along with smaller stands of common reedgrass (*Phragmites australis*) and bullrush (*Scirpus* sp.). Areas of emergent vegetation within the Sand Lake marsh provide an important nesting substrate for large numbers of over water nesting colonial birds. The hundreds of acres of cattail in Mud Lake provide important winter cover for resident white-tailed deer and ring-necked pheasants.

Sago pondweed (*Potamogeton pectinatus*), along with lesser amounts of coontail

(*Ceratohpyllum demersum*) and bladderwort (*Utricularia vulgaris*) play a major role in the productivity of Sand Lake. The thick beds of submergent vegetation in both Mud Lake and Sand Lake provide food for waterfowl and other water birds through both seed and tuber production as well as providing a substrate for invertebrates to thrive.

18. Noteworthy fauna:

Certainly one of the more noteworthy faunal members is the Franklin's gull (*Larus pipixcan*) which nests in the Sand Lake marshes in great numbers. Many other rare species of birds are found at Sand Lake including 60% of the birds listed as a "rare species" monitored by the South Dakota Natural Heritage Program as either a nesting or migratory species (See Table 1 in the attached report, page 13).

Other bird species such as the federally-listed bald eagle migrate through Sand Lake in great numbers, and have successfully nested near the refuge; and snow geese have peaked at over 1 million birds during the spring migration. The Sand Lake marsh has the distinction of having been the site of the first recorded nesting in the entire state for many species: Cattle egret (1977), great egret (1978), snowy egret (1977), little blue heron (1979), and white-faced ibis (1978) (SDOU 1991). Additionally, the Sand Lake wetlands provided habitat for the only confirmed nesting of a common moorhen (*Gallinula chloropus)* in the entire state. (Meeks 1996).

Aquatic mammals such as muskrats and beavers are common on the refuge, as are furbearers such as coyote, red fox, badger, and striped skunk. Many species of small mammals are present, and the rich marsh and upland habitats support large populations of white-tailed deer.

19. Social and Cultural values:

Thousands of visitors come to Sand Lake every year to witness the tremendous migrations of waterfowl in the spring and fall. They come to record new bird species for their life lists, and to see the unique birds that nest at Sand Lake as mentioned above.

Public hunting is permitted on Sand Lake for waterfowl, upland game, and white-tailed deer, and hundreds of people participate annually. Fishing is permitted at the grade crossings, but not on the lakes proper.

Many scientific studies have been conducted on the Sand Lake National Wildlife Refuge. Some of them are outlined in Section 25 below.

Production agriculture is very prominent in the vicinity of Sand Lake. The marshes and uplands associated with the refuge represent a near natural community in the middle of a huge, intensively farmed and grazed landscape. Some lands on the refuge are farmed on a share basis to provide winter food for resident wildlife as well as for migratory waterfowl during their migrations; and the grass uplands are periodically managed by haying, grazing, or prescribed burning to recycle nutrients, and to keep the upland cover in a healthy condition.

Cultural values of the proposed site include the early development of the refuge in the mid-1930's. The infrastructure of the refuge was built by the Works Progress Administration (WPA) workers and the Civilian Conservation Corps (CCC), both of which have an historical significance in the United States. In addition, the site of the very first Catholic mass celebrated in South Dakota is on the proposed site, and occurred in 1845. In the early 1900's President Teddy Roosevelt came to the Sand Lake marshes to hunt waterfowl prior to becoming a national wildlife refuge.

20. Land tenure/ownership of: (a) site (b) surrounding area

(a) The entire refuge is managed by the U.S. Fish and Wildlife Service, Department of the Interior. It was established under, and still perpetuates, the goals of the National Wildlife Refuge System. Furthermore, refuge personnel also manage an eight county Wetland Management District. Direct duties include grassland and wetland easement acquisition, and Waterfowl Production Area (owned in fee-title by the U.S. Fish and Wildlife Service) management.

(b) The surrounding area is held mostly in private ownership, but some of the lands are owned by various resource agencies and administered for the conservation and management of natural resources.

21. Current land use: (a) site (b) surroundings/catchment

(a) The refuge was established primarily as a migration and breeding area for migratory waterfowl. Historically, management on the refuge included tree planting, fire suppression, haying, predator control, agricultural operations, wetland vegetation planting, and creation of artificial nesting islands (SLNWR Narratives 1939-1941). At present, SLNWR implements many different management strategies. They include: water-level manipulations, prescribed burning (both wetlands and uplands), shrub planting, cooperative-farming programs, reseeding of native grasslands, grazing, haying, chemical and biological pest control (i.e., control of Canada thistle [*Cirsium arvensis*] via release of thistle weevils [*Ceutrohynchus littura*])(SLNWR 1990). Refuge staff also implements white-tailed deer (*Odocoileus virginianus*) harvest management strategies as well as furbearer management.

Cooperative management by other government agencies and private organizations also occurs. Organizations such as Ducks Unlimited, Inc. have constructed water-control structures, nesting islands, and a nesting exclosure on the refuge. Also, state government agencies maintain a giant Canada goose (*Branta canadensis maxima*) restoration program for the entire state of South Dakota at the refuge.

(b) The land use of the area surrounding the refuge is generally in some type of agricultural production. Both small grain and row crop production prevail along with rotated forage production crops such as alfalfa. Some lands provide pasture and hay production for livestock operations. A small percentage of the lands surrounding the refuge are in a form of government-supported set aside where the landowners are paid to provide a grass cover for up to ten years.

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

Concerns that have been raised in the past include the quality of the water within the James River, particularly nutrients, silt, and lack of dissolved oxygen. Just upstream of the refuge is an irrigation project that uses water from the James River and returns the unused water portion to the James River. The quality of the return flow water is carefully monitored to ensure that it meets state water quality standards.

Nutrient loading can sometimes be a problem, but the aquatic vegetation found in the marshes on the refuge help to take the nutrients out of the water. Silt deposition has been a concern in the past and for the present. Various entities of federal and state government are working for enhanced land stewardship within the James River watershed which will cut down on the silt reaching the river. Projects are ongoing, also, to encourage a no-till farming philosophy.

In general, the quality of the water within the refuge and the James River meets state health and water quality standards. Monitoring programs are in place, administered by the refuge, the South Dakota Department of Environment and Natural Resources, and by the North Dakota Department of Health to ensure that any decrease in water quality can be identified and corrected before it becomes a problem.

23. Conservation measures taken:

Presidential Executive Order 7169 established the Sand Lake National Wildlife Refuge as a "...refuge and breeding ground for migratory birds and other wildlife" in 1935. After the refuge was established, the early works constructed two low head dams across the James River to enhance and enlarge the already existing wetlands, and Sand Lake and Mud Lake were formed. Before the refuge was established, the area was primarily permanent pasture and cropland. However, in the 1930's, the area was devastated by wind erosion due to the conversion of vast areas to cropland and because of the soil types (USDA 1993). Conservation efforts were soon put into place to curtail the excessive erosion.

The entire refuge is owned and managed by the U.S. Fish and Wildlife Service, Department of the Interior. It was established under, and still perpetuates, the goals and objectives of the National Wildlife Refuge System. The size of this refuge is 8,700 ha. The wetland site is entirely within the boundaries of the national wildlife refuge.

Various management plans exist, but the primary one associated with the management of the wetlands is produced annually. It is known as the "Sand Lake National Wildlife Refuge Water Management Plan and Use Report". It is also approved annually by our Chief of Water Resources in Denver, Colorado.

24. Conservation measures proposed but not yet implemented:

Within the next two years, the Sand Lake National Wildlife Refuge will undergo a comprehensive conservation planning effort to develop updated goals, objectives, and

priorities. This planning effort will include the management of the water resources within the refuge. The plan will be developed in compliance with the National Environmental Policy Act (NEPA); it will include comprehensive public involvement; and it will be completed according to a procedure developed for all units of America's national wildlife refuge system.

25. Current scientific research and facilities:

Current research conducted at the refuge, in cooperation with the Cooperative Fish and Wildlife Research Unit at South Dakota State University, includes white-tailed deer movements and depredation patterns, and nongame vertebrate biota surveys. In addition, nest success studies are continually ongoing as well as a radio-telemetry study to determine wetland use and duckling survival of nests initiated within a predator exclosure. The refuge conducts annual avian block searches in woodland and grassland habitats.

Past research includes white-tailed deer home range studies during hunting and non-hunting periods and the refuge has also initiated nest success studies across the wetland management district. In addition, the U.S. Fish and Wildlife Service has conducted rough fish monitoring research. Numerous fisheries-related projects have also been conducted at the refuge (Clark and Willis 1989, Halseth and Willis 1989, Carlson and Berry 1990, Clark et al. 1991, and USFWS 1992).

Formal research on wildlife resources and their habitats is commonly practiced on the refuge in conjunction with the South Dakota State University. Future studies may include vertebrate surveys of the waterfowl production areas under management authority of the refuge. The refuge also contains facilities for researchers and annually houses graduate students with quarters located on the refuge.

26. Current conservation education:

The staff participates in a wide variety of environmental and conservation education activities throughout the year. These include activities for students, and training and curriculum development for teachers. The refuge hosts special educational events annually, including birding activities and open houses which attract hundreds of visitors annually.

Interpretation and environmental education are very important programs for this station, and the Sand Lake wetlands provide the foundation for the interpretive and educational programs that the refuge provides.

27. Current recreation and tourism:

Current recreational programs include waterfowl hunting, white-tailed deer hunting, and pheasant hunting; fishing; wildlife photography; interpretation; and wildlife observation. On-site facilities for recreation and tourism include a visitor's center with many

interpretive exhibits, interpretive exhibits on the refuge at strategic locations, a 15 mile auto tour route with a leaflet guiding visitors through the refuge, observation platforms, two interpretive information kiosks, and various leaflets describing recreational opportunities on the refuge.

The staff at Sand Lake work closely with local tourism development organizations, and the Aberdeen Convention and Visitors Bureau has recently paid for advertising Sand Lake in national birding magazines. Sand Lake was recently recognized at one of the top 50 birding hotspots in all of North America. Sand Lake was listed as 15th in North America.

The Sand Lake National Wildlife Refuge annually supports about 70,000 visitors. This includes both consumptive (hunting and fishing), and non-consumptive (birding, photography, etc.) forms of recreation.

28. Jurisdiction:

Sand Lake National Wildlife Refuge is under the jurisdiction of the U.S. Department of the Interior, Fish and Wildlife Service. This is known as a "Federal" jurisdiction. The employees who work at the refuge are civilian (non-military) government employees. The territorial jurisdiction and the functional jurisdiction are the same in this case.

29. Management authority:

Sand Lake is managed under the authority of the U.S. Fish and Wildlife Service, Department of the Interior. The address is:

Sand Lake National Wildlife Refuge Complex
39650 Sand Lake Drive
Columbia, South Dakota, USA 57433
Phone: (605) 885-6320
Fax: (605) 885-6401
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Management responsibilities for the area are authorized and promulgated through the National Wildlife Refuge System Improvement Act of 1997, an Act passed by the Congress of the United States as well as other Congressional Acts and Presidential Executive Orders.

30. Bibliographical references:

Bibliographical references are included within the attached proposal starting on page 11.

31. Other considerations:

Letters in support of the nomination are included in the attached report in Appendix B, starting on Page 22. They include letters from both United States Senators from South Dakota.