

**GLOBAL ENVIRONMENT FACILITY
PROPOSAL FOR A PDF BLOCK B GRANT**

Country:	Republic of Korea		
Focal Area:	Biodiversity		
Operational Programme:	OP2 – Coastal, Marine and Freshwater Ecosystems		
Project Title:	Conservation of Globally Significant Wetlands in the Republic of Korea		
Funding:	PDF:	GEF	US\$ 349,500
		Co-financing: Govt. of ROK	US\$ 119,000
		Total	US\$ 468,500
	Full Project:	GEF	US\$ 2-4 million
		Co-financing	US\$ 2-3 million
Country Eligibility:	Convention on Biological Diversity (CBD) ratified on 3 October 1994		
Requesting Agency:	UNDP		
Executing Agency:	Ministry of Environment		
Block A Grant Requested:	No		
PDF B Duration:	12 months (estimated to start March 2000)		
Council Submission:	May 2001		

SUMMARY

The Republic of Korea possesses a variety of wetlands along the south and the west coast. These wetlands have tremendous global significance for conservation because they serve as breeding, resting and wintering sites for migratory and rare bird species in the East Asian region. Recognizing the importance of the wetlands, the Korean government has enacted relevant Acts including the Wetland Preservation Act and is setting up and implementing a number of policies.

However, due to mounting development pressure and contamination by human activities, the wetlands continue to be degraded. Without taking prompt and appropriate actions, these wetlands and migratory and rare bird species inhabiting them may face extinction.

The overall objective of this PDF-B project is to undertake the necessary preparatory work and lay a strong foundation for the successful implementation of the full GEF project on conserving globally significant wetlands and the biodiversity in the Republic of Korea. Through this PDF-B activities, threats to biodiversity in Korean wetlands will be identified and the actions required to address threats will be developed. Ultimately, the full project that will result from the PDF activities will contribute to conservation of globally significant wetlands in the Republic of Korea.

The full GEF Project shall strengthen the relation and cooperation efforts between government and local communities to protect and manage the selected globally significant wetlands. The project will develop mechanisms to involve local communities and NGOs in conserving and managing the wetland ecosystems, including education and training on the values of biodiversity. The project will also ensure the active participation of all stakeholders in the decision-making process for the protection and management of globally significant wetlands.

1. PROJECT OBJECTIVES AND DESCRIPTION

BACKGROUND

1. The Republic of Korea comprises the southern half of the Korean Peninsula and its numerous offshore islands. The Korean Peninsula has a humid, east Asian monsoonal climate. Winters are generally cold and dry, with northwesterly winds bringing cold, dry air from eastern Siberia. Mean temperatures in January in most of the country are just below freezing. Summers are warm and wet, with mean temperatures exceeding 20° Celsius. The western and southern coasts are mostly covered by mudflats, which support numerous living organisms. The tidal change exceeds 7-9 meters, especially in the western areas, and offers vast mudflats on which waders can feed. Many rivers, lakes, and reservoirs in the vicinity of paddy plains support flocks of waterfowl.

2. With the capacity to produce diverse organisms including algae, shallow water living organisms, and water-born invertebrates, the wetlands in the Republic of Korea have provided an important habitat for migratory birds in East Asia, such as the Spoon-billed Sandpiper, Spotted Greenshank, Wild Goose, Godwit, Crane, and Baikal Teal. However, the wetlands in the Republic of Korea have not been efficiently protected from the pressure of development during the last three decades.

3. The Korean government's policy on wetlands focused only on development before the government decided to withdraw the Fourth Reclamation Project on the Youngsan River in 1998. However, there are quite a few ongoing tidal flat reclamation projects and projects constructing international airports and industrial complexes near the wetlands which destroy the wetland ecosystems, reduce the number of species, and threaten the existence of species inhabiting and visiting the wetland ecosystems on the west coast. Now, we have to address this issue and prepare a new paradigm that recognizes the value and importance of these ecosystems.

4. In recent years, the Korean government has recognized the importance of its wetlands for the role they play in flood control, water quality control and nutrient flow. In addition, the global importance of wetlands has also been recognized and the government has endeavored to conserve wetlands that are important for waterbirds. As a result, the Republic of Korea became the 101st party of the Ramsar convention on 28 July 1997. To conserve migratory birds, Korea has strengthened its relationships with neighboring countries, signed an agreement on conserving migratory birds with Russia, signed a Memorandum of Understanding with China, and held a migratory birds conservation conference with Japan. Consequently, collaborative research on migratory birds is being conducted with China and Japan. To conserve significant migratory crane species of North-East Asia, the Republic of Korea hosted an international workshop in February 2000.

5. The Asian Regional Meeting of the Contracting Parties to the Ramsar Convention held in Delhi, India, in March 1995 established a strategic plan on international endeavors to conserve

migratory birds (Conservation Strategy for Migratory Birds in the Asia-Pacific Region 1996-2000). Implementation of the strategic plan is overseen by the Migratory Waterbird Conservation Committee (MWCC), which is currently chaired by the Director of the Wetlands Unit of Environment Australia and has additional government representation from Japan, Russia, India, Indonesia and China. Conservation networks for shorebirds, cranes, and Anatidae have been created in accordance with the strategic plan. Each species group has a technical Working Group (the Chair of which sits on the MWCC) and Flyways Officer. Wetlands International-Asia Pacific (based in Kuala Lumpur, Malaysia) hosts a Strategy Coordinator who reports to the MWCC.

6. Species-oriented networks have been launched as follows for the conservation of migratory birds in the Asia-Pacific region.

East Asian-Australian Shorebird Reserve Network

7. The first species-oriented conservation network to be developed under the strategy was launched at the 6th Meeting of the Conference of the Parties to the Ramsar Convention in Brisbane, Australia, on 26 March 1996. Ten countries located across the flyway from Russia to New Zealand, including Korea, have nominated 24 sites to the network to promote the conservation of shorebirds and their habitats.

Northeast Asian Crane Site Network

8. The second network was launched on 7 March 1997 at the International Workshop on Wetland and Waterbird Conservation in North East Asia in Beidaihe, People's Republic of China. Sixteen sites, including several Ramsar sites and two transboundary reserves, were nominated, and these provided a linkage between important breeding, staging, and non-breeding grounds for cranes in the region. Significantly, some of these sites support more than half the global population of some crane species.

Asia-Pacific Anatidae Reserve Network

9. The third species-oriented conservation network was inaugurated at the 7th Meeting of the Conference of the Parties to the Ramsar Convention in San Jose, Costa Rica, on 14 May 1999. Six countries located along the flyway from Russia to the Philippines, including Korea, have nominated 24 sites to the network to promote the conservation of shorebirds and their habitats.

10. The MWCC is currently preparing to develop a second strategic plan for 2001-2005, with complementary strategic plans from each of the three networks. To date, however, habitat conservation and the exchange of information and data has not been carried out effectively between the countries within the network areas. In support of the strategic plan and species group networks and recognizing the importance of wetlands conservation, the Korean government has registered Tongjin Estuary as a Shorebirds Reserve Network site, Cholwon and the Han River as Northeast Crane Network sites, and Chunsoo Bay, the world's largest wintering ground for Baikal teals, as an Anatidae Network site.

11. Based upon the results of the nationwide censuses on waterbirds from 1993, more than eleven major wetlands that are thought to be important according to the criteria of the Ramsar Convention, were selected and monitored. Since September 1993, the National Institute of Environment Research (NIER) has carried out bird banding and achieved significant results: eight recoveries (including Terek Sandpiper, Knot, Great Knot, Bar-tailed Godwit, White-naped Crane and Little Tern), 73 returns, and further 100 or so observations (re-sightings) of color

bands. Black Vulture's migration from the Korean DMZ to Mongolia via the Democratic People's Republic of Korea and China was recently investigated through satellite tracking.

12. In order to strengthen the conservation of wildlife and their habitats in the Republic of Korea, the Conservation of Wildlife Act and the Hunting and the Nature Conservation Act were amended by the Forestry Administration and the Ministry of Environment respectively, in July 1997. In accordance with joining Ramsar Convention, the Wetlands Conservation Act, which focuses on the conservation of wetlands and their wildlife, was formulated and came into force in February 1999.

13. The aim of the Act is to conserve wetlands and their biological diversity by stipulating the basic provisions for the efficient conservation and management of the wetlands and to contribute to international cooperation by reflecting the importance of international conventions for wetlands conservation. According to this Act, domestic wetlands are classified into inland wetlands and coastal wetlands. Inland wetlands are managed by the Ministry of Environment while the coastal wetlands are managed by the Ministry of Maritime Affairs and Fisheries.

14. In addition, in order to develop a national mechanism for integrated coastal management, the Korean government enacted the Coastal Management Act in 1999. This Act stipulates the provisions of defining coastal management boundaries, setting up national policies, formulating national and local plans on integrated coastal management, carrying out coastal zone improvement projects and setting up the Coastal Management Council at the national and local level.

15. Like many other developing countries, Korea has many conflicts between conservation efforts and development pressures, which are mainly caused by the ignorance of the value of wetlands and by demands on land use (this is exacerbated by the fact that 65% of the Republic of Korea is mountainous). Presently, making policies on development is done based on poor data or no data at all regarding the value of wetlands, leading to many cases of unnecessary wetlands destruction. The identification and assessment of wetlands resources are urgently needed for the management and conservation. In addition, global values need to be identified so measures can be taken to mitigate current and future threats.

16. For the purposes of this project, we have divided wetlands into the standard categories of inland wetlands, riverine wetlands, and coastal wetlands according to the Ramsar manual. These three categories generally represent the wetlands in the Republic of Korea. The categories have been further sub-divided into the classifications given in the Ramsar Convention Manual:

- **Inland wetlands:** includes *lacustrine* (associated with lakes) and *palustrine* (associated with marshes, swamps and paddy fields) wetlands .
- **Riverine wetlands:** includes wetlands along rivers and streams.
- **Coastal wetlands:** includes *estuarine* (associated with deltas, tidal flats) wetlands.

Table 1: Examples for the Three Wetland Categories

	Inland Wetlands (Lacustrine and Palustrine)	Riverine Wetlands	Coastal Wetlands (Marine and Estuarine)
Site 1	Woopo swamp	Nakdong River	Kanghwa Is.
Site 2	Chunam Reservoir	Kum River	Asan Bay
Site 3	Youngam Lake	Han River	Mankyung & Tongjin Estuary

GLOBAL SIGNIFICANCE OF BIODIVERSITY

17. The Republic of Korea has over 281,544 hectares of tidal flats, 13,000km of shoreline, 2,900 islands, and some of the world's most important and unique natural wetlands, which provide habitats for an extremely wide range of globally important biological diversity. In addition to serving as habitats for endangered or endemic plants and animals, these wetlands act as crucial staging and breeding areas for migratory bird populations, including many globally threatened species, in the East Asian-Australian flyway. These wetlands also supply rice, protein, medicine, energy, and raw materials for local communities.

18. More than 50 internationally important bird species were identified as migrating through the wetlands in the Republic of Korea. Among these, Black-faced Spoonbill and Chinese Egret, whose main breeding and resting grounds are located on the west coast of the Korean peninsula, are considered the most important species, since their world populations are estimated at 600 individuals and 2,500 individuals, respectively. If an immediate and appropriate conservation and management program is not implemented, many species may face extinction.

19. The wintering population and staging population of the Red-crowned Crane (*Grus japonensis*) and the White-naped Crane (*Grus vipio*) in the wetlands in the Republic of Korea exceed 30% of world population, and the wintering population of the Baikal Teal (*Anas formosa*) and the Bean Goose (*Anser fabalis*) in the wetlands of the Republic of Korea range from 50~90% of the world population.

20. Despite the measures currently planned or being carried out, the biodiversity of wetlands in Korea remain under a complex and diverse array of threats. While some of these threats are common to all or most wetland sites, others are more site-specific. Consequently, comprehensive methods to secure conservation of globally significant biodiversity will be needed to involve appropriate mechanisms at the central level to complement actions undertaken at specific sites.

21. Tidal-flats are one of the most productive eco-systems on earth. For example, researchers recorded 20,000-30,000 macrobenthos per 1km² at Wadden sea (Beukema, 1976) and over 45,000 macrobenthos individuals per 1km² at a west coastal flat in Korea (Koh and Shin, 1988). Due to such productivity, tidal-flats tend to be utilized by large numbers of specialized wetland bird species, especially shorebirds (Charadriiformes), and other groups of waterfowl, including Anatidae and Laridae - many of which feed on such macrobenthos.

THREATS TO BIODIVERSITY AND UNDERLYING CAUSES

22. Wetlands in the Republic of Korea and the biodiversity to be found in them are under constant threat of degradation, mostly due to pressures associated with human development such as habitat loss by reclamation and conversion to agricultural and other uses, drainage, unsustainable resource use, illegal hunting, and pollution. Coastal wetlands have also been subject to intense development pressure, resulting in the disappearance of about 36% of Korea's wetlands, especially tidal flats, over the past 50 years. Nearly 70% of the wetlands that have international importance for conservation (according to the Ramsar Convention criteria) in Korea are thought to be under moderate to high threats. Through reclamation, the land area in the Republic of Korea increased 1,151km² from 98,222km² in 1970 to 99,373km² in 1997. This increase in land area has caused decrease in tidal flats.

23. Following is a description of the important proximate causes.

Land Reclamation

24. One of the main cause of threats to Korean wetlands is reclamation. In the west coast, most places are disturbed by human interference. In the 1960's the main purpose of reclamation was to meet the needs of agriculture production, particularly rice. From the 1970's reclamation pressure was also a result of industrialization, urbanization and waste deposit needs – all occurring on a large scale. Reclamation of tidal flats crucially affects marine ecosystems, bentic invertebrates, fish and shorebirds population. Land reclamation projects either completed or currently being carried out revealed many anticipating problems, such as pollution from sewage, ecosystem function failure and economic impacts to the aquatic-products industry.

25. Recognizing the seriousness of the wetlands loss and their biodiversity caused by the land reclamation, the government enacted the Coastal Management Act in 1997 to stipulate the provisions for establishing an integrated coastal management mechanism which can comprehensively coordinate policies with regard to conservation, utilization and development of coastal wetlands. Currently, a draft plan on the integrated coastal management prepared by the Ministry of Maritime Affairs and Fishery is under consultation among relevant Ministries and local governmental bodies.

Hunting and Poaching

26. Wildlife population is declining due to illegal hunting and poisoning which is to fulfill the meat requirements and for sale. Indeed, some species are very expensive for oriental medicinal purpose and for the

27. Recently, there were many cases of poisoning rare species, Red-crowned crane, White-nape crane and Black vulture which were not direct target species but were injured by poisons spread to catch ducks in rice paddy and along the river. Farmers use unhulled rice soaked with pesticides (Pospamidone). The main purposes of poisoning by local farmers are to prevent the crop damage from pheasants and ducks or to catch ducks for food and for sale. Ducks are caught for medicinal purpose because people believe that duck soup has curative efficacy for hypertension.

Developmental Projects

27. Quite a few national and local development projects, which disregard the value of wetlands, have been carried out on the coastal and riverine ecosystems and have had significant

impacts on the coastal wetlands. Straightening the river for flood control disturbs the species inhabiting the riverine areas and affects negatively to the bio-diversity.

Exploitation of Resources

28. Faunal resources in wetlands have been exploited in Korea. Some marine fish species and crustaceans faced endanger from over-exploitation. During the breeding season, some fishermen use fishing nets that have the illegal size. For some species, most fish caught are exported to Japan rather than domestic consuming due to the big price difference. The willingness to catch fish has been growing until the government started regulation.

Introduction of exotic species

29. The introduction of exotic fish and amphibian species into the existing ecosystems has negative impacts on the indigenous species. Upo Swamp, the 2nd Ramsar site in Korea, is a good example where exotic bull-frogs are overwhelming and create disturbance to the existing marsh ecosystem.

PROJECT OBJECTIVES AND MAIN COMPONENTS

30. The broad objectives of the proposed full GEF project are:

- To develop and implement a well-defined strategic plan for the conservation and management of the biodiversity of globally significant wetlands in Korea. The plan will include the identification and classification of wetland biological resources and socio-economical assessments, review and analysis of present wetland conservation policies and related legal instruments. Education and public awareness campaigns for wetlands conservation and development of sustainable ecotourism plan for wetland conservation.
- To establish a wetlands management planning process and prepare management plans for selected sites, representing all three wetland ecosystems. The representative ecosystems would be the *Inland Wetlands Ecosystem*, the *Riverine Wetland Ecosystem*, and the *Coastal Wetlands Ecosystem*. These will serve as pilots, after which the plans will be refined and applied and replicated to major wetlands in Korea.

31. The essential elements of the project to achieve the aforementioned objectives would include:

Collection of primary data

32. Data on the flora and fauna of the wetlands and on the socio-economic conditions of the local communities will be compiled, using GIS. The information will be open to those who are interested in carrying out research in this site.

Development and implementation of management plans

33. To ensure conservation, restoration and effective management of the wetland ecosystems, national and regional scale management plans will be developed and implemented. These plans would take an important role as a pilot and model plans in effective natural resource conservation. Monitoring and evaluation systems will be strengthened on national scale.

Public awareness campaigns

34. Public awareness campaigns will be undertaken to facilitate the implementation of the wetlands management plans. Developing pools of educators will stimulate essential activities in the local communities. Programmes, tools and facilities will be developed at national and regional level.

Environmental regulation and land use plans

35. Existing environmental laws and institutional mechanisms will be reviewed and analyzed whether the existing laws and institutional mechanisms need to be revised or strengthened in order to enhance biodiversity conservation in the designated wetland ecosystems. Efforts will also be made to incorporate biodiversity conservation into provincial and local land-use development and zoning plans as they relate to the wetland ecosystems. The project will create biodiversity overlays which will identify the key areas where activities like land reclamation should be avoided, and provide input to the sectoral coordination mechanism discussed below.

Operationalization of an effective co-ordination framework

36. To ensure the effective implementation of the wetlands management project, an integrated coordination framework would be established at the federal, provincial and local level with the aim of strengthening the governance structures at all levels. By the Wetlands Conservation Act, the Ministry of Environment deals with inland wetlands and the Ministry of Maritime Affairs and Fisheries deals with coastal wetlands. The relationship and cooperation between the Ministry of Environment and the Ministry of Maritime Affairs and Fisheries will be established. The cooperative framework among the members of the National Project Management Committee will be formed and developed.

37. This cooperative framework will coordinate and steer positions from relevant Ministries and views from other stakeholders including private developers and community groups with regard to developing and implementing this project. In particular, the coordinating mechanism will be designed so as to permit mutually agreed resolution to instances where development priorities conflict with biodiversity conservation priorities.

38. At the moment, the Ministry of Environment represents the relevant international conventions such as the Ramsar, CBD and CITES.

2. PROJECT SUPPORT

INTERNATIONAL LEVEL

39. The Republic of Korea ratified the convention on Biological Diversity (CBD) in 1995 and the Ramsar Convention in 1997. The Korean delegates were closely involved in the development and discussion of tidal flats conservation at COP7 of the Ramsar Convention, which resulted in "Enhancing the conservation and wise use of inter-tidal wetlands" (Ramsar COP7 DOC. 15.22). The Republic of Korea also ratified CITES in 1994. The threatened species listed in the appendix 1, 2, 3 are strictly managed by the government.

NATIONAL PRIORITIES

40. Recognizing the importance of wetlands preservation, the Republic of Korea enacted many domestic regulations, including the Wetlands Preservation Act, the Natural Environment

Conservation Act, and the Coastal Management Act. The government set up diverse policies and measures to protect the wetlands in Korea.

41. These include a nationwide survey on the natural environment, including wetlands along the west coast, a consistent observation of changes in the major wetlands, an environmental impact assessment, and the designation of wetland protection areas. This project is consistent with these national policies and objectives for wetland preservation and will be implemented with full consideration of national policies and priorities.

ON-GOING SUPPORT (INCLUDING RELATED GEF PROJECTS)

42. This PDF-B represents the beginning of the first GEF project in the Republic of Korea for the Biodiversity Operational Programmes. However, the Republic of Korea is involved in the development of a Strategic Action Programme for the Yellow Sea through the PDF-B "Preparation of a Preliminary Transboundary Diagnostic Analysis for the Yellow Sea Large Marine Ecosystem". This International Waters PDF-B also involves China and will provide the framework and tools to sustainably managing the regional ecosystem. As most of the candidate sites lie on the west coast of the Korean peninsular, there is a strong relationship between the Yellow Sea ecosystem and the globally significant biodiversity of the candidate wetlands. Therefore, the two projects are highly complementary and linkages will be made to capitalize on this in the course of developing and implementing this project.

43. Another relevant project is the UNDP-GEF Full Project "Wetland Biodiversity Conservation and Sustainable Use in China" which is due to commence in 2000. Linkages will be made to this project to ensure best practice is replicated, mistakes are avoided and efficiencies are taken advantage of. Finally, the Democratic People's Republic of Korea has developed a Medium-Sized Project (MSP) for GEF funding titled "Coastal Biodiversity Management of DPR Korea's West Sea". This MSP also focuses on wetlands of importance for globally significant migratory waterbirds on the west coast of the Korean peninsular. This PDF-B, therefore, completes the coverage of the Korean peninsular wetlands around the Yellow Sea.

44. In addition, there are several UNDP non-GEF projects being undertaken through UNDP Seoul Office which have relevance to preservation of biodiversity in Korea. "An ESSD Model of the Rural Farmland and Agricultural Resources in Daeho Agricultural Tideland" aims to formulate proposals of environmentally sound and sustainable development for the rural farmland and agricultural resources in Daeho agricultural tideland. "A Detailed Study and Proposal for ESSD in Northern Kyonggi Province" conducts a detailed study and proposal for a long-term plan which fosters environmentally sound and sustainable development in Northern Kyonggi Province. "Development of Environmental Education Programmes on Trees and Forests" develops and produces a set of model programmes of environmental education and relevant teaching and learning materials on trees and forests in Korea.

SUSTAINABILITY

45. The Project Management Committee will explore ways to strengthen institutional and financial mechanisms to ensure the sustainability of the project results beyond its life. Each member Ministries of the Committee will consider ways and take steps to consolidate its function and role on conservation of wetlands allocated in accordance with individual Acts while maintaining cooperative relationships among them.

3. DESCRIPTION OF PROPOSED PDF B ACTIONS

MAIN COMPONENTS

46. The objective of this PDF-B project is to settle the groundwork for the full implementation of the proposed **Conservation of Globally Significant Wetlands in the Republic of Korea** Project. Specifically, it will undertake ecological, socio-economic surveys, education and public awareness campaigns, and development of sustainable ecotourism. The project brief will describe the framework, strategy, scope and activities and will define the financial and institutional mechanisms for implementation.

Activity 1. Organization of the National Project Management Committee and the Project Development Expert Team

47. A National Project Management Committee and a Project Development Expert Team will be formed. The members of the National Project Management Committee will include the Ministry of Environment, the Ministry of Foreign Affairs and Trade, the Ministry of Maritime Affairs and Fisheries, the Ministry of Construction and Transportation, the Ministry of Agriculture and Forestry, the Ministry of Planning and Budget, UNDP Korea Committee, NGOs, and other relevant organizations. The Project Development Expert Team will be organized by the experts from the research institutes affiliated with the Ministry of Environment and other relevant Ministries and from academia.

48. The National Project Management Committee will steer positions and views from relevant Ministries and from stakeholders including local residents in the project development and supervise the project implementation. The Project Development Expert Team will carry out activity 2 through activity 8 in this proposal and draft the project proposal based upon the results of the activities.

Output of Activity 1:

(i) Organization of the National Project Management Committee and the Project Development Expert Team

Activity 2. Selection of wetland sites for project implementation

49. The GEF project will work on a small number of unique wetlands which represent other wetlands in Korea. First stage, sites will be selected from the candidate project sites by rapid assessment of threats with existing avifaunal, aquatic and plant biodiversity data. This process will be carried out by the National Project Management Committee and the Project Development Expert Team.

50. The candidate project sites are as follows:

- Inland Wetlands: Daeho Lake, Seosan reclaimed areas, Woopo Swamp, Chunam Reservoir, Youngam Lake, and Kumho Lake
- Riverine Wetlands: Han River, Nakdong River, Youngsan River, Kum River
- Coastal Wetlands: Kanghai Is., Youngjong Is., Namyang Bay, Asan Bay, Mankyung Estuary, Tongjin Estuary, Suncheon Bay.

51. The following criteria will be applied in selecting the project sites.
- i) The sites must be a national priority for biodiversity conservation.
 - ii) The sites must be globally significant wetlands including endemic, threatened and species,
 - iii) representative habitats and/or significant within-species genetic diversity.
 - iv) The sites harbor a relatively large number of threatened or endangered floral and faunal species that have global significance for conservation.
 - v) The threat to the site should be significant enough that its removal is urgently needed.
 - vi) The project activities at the sites should have the full support and participation of the local community and other stakeholders.
 - vii) The sites represent functioning, natural wetlands ecosystems that can be sustainably conserved and managed within the scope of a GEF intervention (i.e. all threats faced at the site and underlying causes can be successfully mitigated by the GEF Full Project)

52. Also the Ramsar criteria for the selection of wetlands internationally importance will also be reviewed and be adopted. But, due to the lack of data on the fauna and flora in every wetland site, one of main criteria will be focused on the avifaunal importance of the wetlands - which represent the wetlands diversity index better than any other living creatures.

53. On completion, the National Project Management Committee will take the final decision on the selection of the full project sites based upon the recommendation from the Project Development Expert Team. The criteria for site selection will include the GEF criteria for global significance (high alpha, beta and gamma diversity, unique and globally important eco-systems, occurrence of endemic and globally important species), viability for conservation, etc. Other criteria would ensure that the selected sites are representative of the variety of threats faced by the wetlands enabling them to serve as the management models.

Output of Activity 2:

- (i) Selection of the project sites

Activity 3. Identification and analysis of the threats to biodiversity at the selected sites

(1) Resource inventory and need Assessment surveys

54. Comprehensive natural resource inventories will be developed on the globally significant wetland sites selected by the National Project Management Committee. The surveys will identify the existing baseline with respect to the environmental status of wetlands and their biological resources. The collected information will form the basis of a wetland resource database. Information from previous/current initiatives will also be a part of this database.

55. In coastal wetlands, especially at the tidal flat, field work will be carried out with special focus on the benthic invertebrates. The benthic invertebrates are essential for the support of avifauna and the purification and circulation of the tidal wetlands and also show a good index of the wetlands. Review, analysis and examination on the results of the field work will be carried out to identify the need for the protection of existing macrobenthic fauna.

56. Identification and assessment of aquatic and wetland plants will be carried out especially at the riverine and inland wetland, since not so many researches have been done at the wetlands. Review, analysis and examination will be carried out to identify the need for the protection of existing flora.

57. For avian species like Anatidae, and waders, many wetlands in Korea are linked together. From the geese neck ring survey, geese use wetlands from Cholwon to Cheonsu bay area, which is 200km apart, and Baikal teals use lots of wetlands from Namyang bay to Chunam reservoir, which is 270km apart. This is not only looking for available food resources but also for suitable habitats without human interference. The linkage of wetlands is essential for the conservation of avifaunal diversity and ultimately for the conservation of the entire wetlands. Thus, information on the migration routes of migratory birds (especially globally significant or rare species such as the Black Vulture, Swans, Chinese Egret, etc.) will be gathered using the techniques of banding, color flagging, and satellite tracking. Due to technological advancements, medium-sized birds can be tracked with PTT by satellite. Recent international studies have focused on Cranes, Black-faced Spoonbills, and Far Eastern Curlews, and they have produced very good results and identified key habitats for conservation.

58. The three existing networks (the Shorebird, Crane, and Anatidae networks) will be further developed and strengthened. Activities to build the capacity of local researchers and NGOs will be explored and an appropriate assessment and management plan will be formulated.

(2) Identification and analysis of ecological threats to biodiversity

59. Various kinds of intensive examinations will be carried out to investigate the cause and extent of the threats to biodiversity loss in each project site:

- Investigation of potential threat to existing fauna.
- Habitat diversity, Biological uniqueness, the existence of globally important species, biological value of the existing flora and fauna.
- Habitat and species value assessment, ecological monitoring for assessment
- Biological diversity assessment for each habitat, investigation of competition between species and individuals and their ecological niches
- Investigation on habitat degradation.
- Habitat manipulation techniques for migratory bird species in degraded ecosystems will be developed, focusing on making the habitats along their flyway safer and healthier and on increasing the carrying capacity of confined areas.

(3) Identification and analysis of the socio-economic threats to biodiversity

60. Although the coastal wetlands in Korea provide valuable resources and serve various important functions, there are problems in socio-economic aspects that threaten the biodiversity in the wetland ecosystems. Vast areas of the wetlands especially those along the west coast have been devastated due to many national development and reclamation projects. Conflicts frequently arise between the local communities and stakeholders over whether to protect or develop the wetlands. Local governments tend to promote competitively coastal tourism in order to increase revenue, which leads to construction of buildings and recreational facilities that impose negative impacts on the wetland ecosystems. Absence of securing alternative income

sources for local residents and lack of their awareness act as an obstacle against the wetland protection.

61. In order to address such problems, the following activities will be conducted to analyze the threats to wetland biodiversity and their underlying causes in socio-economic aspects.

- evaluation of economic functions of wetlands
- evaluation of wetlands in the perspectives of cultural and social heritage of local communities (i.e. traditional uses, cultural activities)
- analysis of use-conflicts (i.e. conflict pattern, causes, stakeholders relationship, causes & impacts) associated with wetland conservation with special focus on local fishermen and residents
- assessment of the national land use policy and plan with special focus on coastal reclamation and infilling
- assessment of coastal development plans of provincial and local governments with special focus on tourism development
- comparative analysis of preservation and development of the wetlands, and exploration of alternative income generation for the local communities

Based upon the results of analysis, an appropriate management strategy and policy recommendation to address each of identified threats and causes will be suggested.

Outputs of Activity 3:

(i) Threats matrix of sites and threats analysis

- Description of threats and underlying causes for each site with a general section on what are the common underlying causes that need to be dealt with at the institutional, policy or regulatory level

(ii) Information on the ecological assessment of wetlands and their biodiversity

- Information on the detailed status of the globally significant biodiversity in each site
- Ecological assessment including a list of the stock of natural resources and a survey of biodiversity and endangered or threatened species
- Identification of the mechanism between environment changes and the stock of natural resources
- Database of natural resources using Geographic Information System
- Trends and causes of wetland biodiversity loss in Korea
- Ecological options for wetlands restoration and rehabilitation
- Plans for increasing public awareness of the importance of wetlands biodiversity and the participation of the public and stakeholders in wetlands conservation

(iii) A proposal for improving and restoring the wetlands

- Basic information for ecological restoration and rehabilitation plan of wetlands

(iv) Information on the socio-economic assessment of wetlands

- Identification of the value of the wetlands in terms of socio-economic functions
- Obstacles and challenges for the wetlands conservation both at the national and local level and policy recommendation to address them
- Benefit and cost analysis between wetlands conservation and development
- Strategies for stakeholder involvement in the wetland conservation
- Strategies for improving institutional arrangements for the wetland conservation

Activity 4. Review and analysis of present wetland conservation policies and related legal instruments

64. Recognizing the importance of wetlands preservation and aiming to increase the efficiency of land use, the Korean government enacted the Wetlands Preservation Act, which went into force in September of this year. But, legislative and institutional mechanisms among the relevant ministries, local governments and local communities have not yet been established that can effectively prepare and enforce conservation policies and regulations. This may lead to conflicts in implementing conservation policies and to the exclusion of local communities and stakeholders in formulating and implementing conservation policies.

65. In order to address the threats to biodiversity conservation, policies and plans on the wetland conservation (federal or provincial) need to be examined. Therefore, review of the existing legislative and regulatory framework will be performed to determine their effectiveness and identify gaps. This activity will review current conservation policies and relevant acts, identify their shortages and suggest supplementary options and recommendations for establishing an efficient regulatory mechanism and encouraging the participation of the local community and stakeholders.

Outputs of Activity 4:

A report on participatory appraisals outlining, inter alia:

- The role of the current legislative and regulatory framework in wetlands conservation
- Gap analysis to identify and assess present conservation policies and regulations
- The attitudes of local communities towards conservation of wetlands biodiversity
- The role of local community participation in wetlands conservation
- Recommendations toward updating national and technical conservation policies and regulations
- A plan for further in-depth studies on the policies

Activity 5. Preparation of management plans, stakeholder participation plan and action plan for protecting and managing globally significant wetlands

66. Based on the results of Activities 3 and 4, a comprehensive management plan, stakeholder participation plan and action plan for protecting and managing wetlands will be suggested. Investigation of the construction of a network for conserving biodiversity and

wetlands will be included in the plans. The components of the action plan will be ultimately included in the project brief as the proposed project activities.

67. The design should be able to include governmental, regional and local participation to present the overall approach for effectively addressing the threats to biodiversity conservation. And it will also respond to the needs of the communities for improved economic well being through sustainable ecotourism. A comprehensive Logical Framework Analysis would be conducted to establish the project's outputs and activities, and set up indicators for performance evaluation. Stakeholder participation in the preparation and implementation of the management plans will be developed.

Outputs of Activity 5:

- (i) Management plans, stakeholder participation plan and action plan for protecting and managing globally significant wetlands.
- (ii) Project Logical Framework; preliminary structure for project implementation, indicative management and stakeholder participation plans.

Activity 6: Preparation of Education and Public Awareness (EPA) Campaigns for Wetland Conservation

68. Success of the wetland conservation not only requires setting up well designed policies at the governmental level, but also active and voluntary participation of the local residents, stakeholders and citizens in implementing policies. For example, if the government is to designate a wetland protection zone in accordance with the relevant Act, consensus and understanding should be formed among interested groups including the local residents prior to the designation. Developing an appropriate education and public campaign program is one way to attract public understanding and awareness and to encourage broader participation in the wetland conservation.

69. In this context, activities will be carried out for developing the education and public campaign programmes. First, basic investigations will be conducted to explore the applicability, accessibility, operational possibility and the expected effects of the program to be developed. Based upon the results of these activities, the scope and the target group of the program will be determined. Research on traditional culture and heritage on wetlands and also on the status of the existing programs (type, operational method, target group, effects, etc.) will be conducted.

70. Second, research and investigation will be conducted to develop the contents and operational methods of the program and to establish a strategy for education and instruction of the program. These will include investigation on the awareness, willingness and demand for the program by target groups, case study on the foreign programs and analysis of their applicability, and research on wetland-related tradition and culture and analysis of its applicability.

71. Third, a model program will be developed both on the contents of the education and public campaign activities and on training guides and instructors. The program will be rehearsed and evaluated. The finalized program that reflects the evaluation results will be included in the project brief.

Outputs of Activity 6:

- (i) Scope, operational methods, target groups of the program
- (ii) Contents of the program activities on the education and public campaign and a strategy on training guides and instructors of the program
- (iii) The finalized education and public campaign program on the wetland conservation

Activity 7: Development of Sustainable Ecotourism Plan(SEP) for wetland conservation

64. Success of wetlands conservation is not only a matter of biodiversity conservation but also an issue of socio-economic development. Recently, local governments in the coastal region competitively promote coastal ecotourism development as a way to increase revenue. This may lead to construction of recreational facilities, land reclamation and discharge of pollutants, which result in destruction of the wetlands. In addition, as the government designates the wetland protection zones where fishery and breeding are prohibited, the nearby local residents will lose their jobs and living grounds.

65. Development of a sustainable ecotourism plan for the wetland conservation can be one of effective and safe means to conserve wetlands by preventing land development and contamination and by encouraging the local residents to voluntarily participate in the wetland preservation through provision of alternative income sources.

66. For the preparation of a well developed SEP, various threats and underlying causes to wetland biodiversity losses will be examined including wetland abuse for economic gain, shift cultivation, exploitation by tourists, poaching, low awareness of local residents and institutional constraints. The appropriateness of the SEP for addressing these causes will, then, be determined.

67. Several activities will be carried out to develop indicators and criteria for the SEP and to determine the appropriateness of the SEP. Indicators and criteria will be used to continuously monitor the environmental changes caused by human interaction. An inventory of every possible resource in the wetlands will be prepared. Local residents will be interviewed in-depth on the awareness level and the recognition level on the wetland significance. Population survey and an on-site survey will be conducted to estimate the latent demand for ecotourism. Based upon the interview and survey results, a participatory workshop on ecotourism planning can be organized. Agreements on a logical framework for sustainable ecotourism including objectives, processes, and results will be drawn up among the local residents and stakeholders. The participants will include local residents, local governments, representatives from industries, and NGOs.

Outputs of Activity 7:

- (i) Inventory of sites' natural and cultural resources
- (ii) Review of socio-economic characteristics of the sites, including major economic activities, industrial structure, and requirements for the ecotourism development
- (iii) Analysis of latent demands for ecotourism in the traditional market
- (iv) A report on participatory appraisals, outlining, inter alia:
 - Establishment of baseline for the selection of wetland sites for the SEP
 - Current status and potential of each selected site in terms of ecotourism attraction

- Assessment of local community's need for the SEP
 - Potential for ecotourism program development
- (v) Plan for establishing site-specific criteria and indicators for the SEP
- (vi) Plan for monitoring the impact of ecotourism (socio-economically and environmentally)
- (vii) Review of potential market mechanisms for sustaining long-term ecotourism management and the equitable distribution of benefits
- (viii) Review of potential models for ensuring local community participation in the SEP

Activity 8. Information gathering for baseline activities

75. Information will be gathered on the baseline activities concerning wetlands and biodiversity preservation at the project sites. Gathered information will be used to calculate the incremental costs of the project and to determine the full range of GEF interventions required to address all the threats and their underlying causes in the project sites.

76. An analysis of the incremental costs associated with the full project will be carried out as a part of the PDF activities, and a realistic baseline will be determined. The sustainable development baseline developed during the PDF-B will be used to calculate the incremental funding required to remove barriers against the effective application of sustainable structures and measures for preserving globally significant wetland sites in Korea.

Activity 9. Preparation of the draft project brief

77. The project brief, the main outputs of PDF B, will be drafted based upon the results of activities 3 through 8. The project contents and the implementation range will be determined, and proper baseline activities will also be determined by the results of activity 8. The project brief will be prepared and developed through consultation with all the major stakeholders. A stakeholder workshop will also be held to finalize the Project Document. The Project Brief will clearly distinguish the baseline from the incremental activities needed to conserve biodiversity of globally significant wetlands. Finally, incremental costs will be submitted.

Output of Activity 9:

- (i) Draft project brief

Activity 10. Finalization of the project brief and co-funding

78. The National Project Management Committee will examine and review the draft project brief, seek other available funds and finalize the project brief. The National Project Management Committee will arrange co-funding from other sources, if it is necessary.

Output of Activity 10:

- (i) Finalized project brief

IMPLEMENTATION ARRANGEMENTS

79. The Project Management Committee will supervise the Project Development Expert Team carrying out the PDF activities and developing the project brief, endorse the finalized project brief and make administrative arrangements for implementation of the project. The Ministry of Environment will coordinate the overall operation of the Project Management Committee and the Project Development Expert Team.

80. The Project Development Expert Team will carry out the PDF activities (activities 2 through 8). It will brief the Project Management Committee periodically with the results of the PDF activities. Policy inputs related to wetland conservation will be suggested in the briefing sessions. The Project Development Expert Team will draft the project brief after completion of PDF activities. The Project Management Committee will review the draft project brief, make any other necessary arrangements and endorse the finalized project brief.

JUSTIFICATION FOR PDF-B GRANT

81. Extensive efforts, such as national surveys and research on migratory birds and the ratification of international conventions, have been made to preserve the globally important wetlands in the Republic of Korea. But, these efforts may not succeed and result in a consequent loss of biodiversity of global importance unless the threats to biodiversity in the wetlands are systematically analyzed, and conservation measures and a coordinating structure for effective management are prepared based upon the results of analysis.

82. The PDF-B grant will make it possible to systematically analyze the threats and causes of biodiversity loss in the wetlands in various aspects and to design activities that can effectively address them. It will also enable a comprehensive plan to be drawn up for conservation, harmonized management, wise use and sustainable development of the wetlands. The full GEF project will devote itself to realizing the concepts and techniques produced in the PDF-B and play a leading role in wetlands conservation.

83. The project is eligible for GEF funding based on the following criteria:

- The wetlands at the project sites are important for the conservation of globally significant biodiversity. (see Annexes)
- The project is strongly country-driven and will be coordinated by the relevant government Ministries.
- The project is consistent with the priorities, national policies, the Wetlands Conservation Act and the Coastal Management Act that have been set up and implemented by the Korean government.
- The project will be designed and implemented with the participation of NGOs, the public, local communities and other stakeholders.
- The threats of biodiversity loss at the project sites will be identified systematically at the PDF stage, and the project components will be designed such that the project will address all the threats and their underlying causes.

4. WORK PLAN AND BUDGET

WORKPLAN

Activity	1	2	3	4	5	6	7	8	9	10	11	12
1 Organization of the National Project Management Committee and the Project Development Expert Team	o											
2. Selection of wetland sites for project implementation												
• Rapid assessment of threats		o	o									
• Final selection for full GEF project		o	o									
3. Identification and analysis of the threats to biodiversity at the selected sites												
• Resource inventory and need Assessment surveys			o	o	o	o	o	o	o	o	o	o
• Identification and analysis of the ecological threats to biodiversity			o	o	o	o	o	o	o	o	o	o
• Identification and analysis of the socio-economic threats to biodiversity			o	o	o	o	o	o	o	o	o	
4. Review and analysis of present wetlands conservation policies and related legal instruments			o	o	o	o						
5. Preparation of management plans, stakeholder participation plan and action plan for protecting and managing globally significant wetlands					o	o			o	o	o	
6. Preparation of education and public awareness campaigns for wetlands conservation			o	o	o	o	o					
7. Preparation of sustainable ecotourism plan for wetlands			o	o	o	o	o	o	o	o	o	o
8. Information gathering for baseline activities			o	o	o	o	o	o	o	o	o	o
9. Preparation of the draft project brief											o	o
10. Finalization of the project proposal and co-funding												o

BUDGET

(US \$)

Description	R. of Korea	GEF	TOTAL
1 Organization of the National Project Management Committee and the Project Development Expert Team	500	500	1,000
2 Selection of wetland sites for project implementation	1,500	2,000	3,500
3 Identification and analysis of the threats to biodiversity at the selected Sites	59,000	171,500	230,500
• Resource inventory and need Assessment surveys	34,000	84,000	118,000
National experts	10,000	-	10,000
Project personnel	-	12,000	12,000
Travel costs (including training)	5,000	10,000	17,000
Field survey	5,000	15,000	21,000
Consultation and meetings	1,000	3,000	4,000
Satellite tracking	3,000	27,000	30,000
Production of final report	-	2,000	2,000
- Equipment	10,000	15,000	25,000
• Identification and analysis of the ecological threats to biodiversity	15,000	34,500	49,500
Project personnel	14,000	-	14,000
Travel costs (including training)	-	10,000	10,000
Field survey	-	10,000	10,000
Satellite image analysis	-	6,500	6,500
Consultation and meetings	1,000	3,000	4,000
Production of final report	-	5,000	5,000
• Identification and analysis of the socio-economic threats to biodiversity	10,000	53,000	63,000
International expert	-	7,500	7,500
Project personnel	10,000	13,000	25,000
Travel costs (including training)	-	8,000	10,000
Field survey	-	8,000	10,000
Consultation and meetings	-	6,000	6,000
Operational costs	-	5,000	5,000
Production of final report	-	3,000	5,000
Equipment	-	2,500	2,500

Description	R. of Korea	GEF	TOTAL
4 Review and analysis of present wetlands conservation policies and related legal instruments	25,000	44,000	69,000
National legal expert	25,000	5,000	30,000
Two (2) National consultants	-	8,000	8,000
Project Personnel	-	10,000	13,000
Consultation and meetings	-	4,000	4,000
Official travel	-	5,000	5,000
Information gathering/processing	-	8,000	8,000
Reporting/miscellaneous	-	4,000	4,000
5 Establishment of an action plan for protecting and managing globally significant wetlands	-	35,000	35,000
National consultants	-	15,000	15,000
Consultation and meetings	-	8,000	8,000
Information gathering/processing	-	12,000	12,000
6. Preparation of education and public awareness campaigns for wetland conservation	-	20,000	20,000
• Basic investigation to determine the scope of the program	-	4,000	5,000
• Research and investigation to develop the contents of the program and to establish a strategy for training guides and instructors	-	4,000	5,000
• Developing, rehearsing and evaluating a model program on the education and public awareness campaign and on training guides and instructors	-	12,000	12,000
7. Preparation of SEP for wetlands conservation	30,000	65,000	95,000
International expert on SEP	-	7,500	7,500
National consultants (3 months)	-	7,500	7,500
Project Personnel	30,000	-	30,000
National expert input	-	5,000	5,000
Field travel	-	8,000	8,000
Local roundtables/workshops	-	12,000	12,000
National survey of market demand	-	13,000	13,000
On-site survey of needs assessment	-	12,000	12,000
8. Information gathering for baseline activities	1,000	1,500	2,500
9. Preparation of the draft project brief	1,000	9,000	10,000
10. Finalization of the project proposal and co-funding	1,000	1,000	2,000
TOTAL	119,000	349,500	468,500

5. ANNEXES

ANNEX 1: DETAILS OF GLOBALLY THREATENED MIGRATORY BIRD SPECIES IN THE REPUBLIC OF KOREA

There are 32 threatened bird species in Korea according to IUCN's 1996 Red List of Threatened Animals. Among these 32 threatened species, 26 species inhabit wetlands. Two species are categorized as Critically Endangered (Black-faced Spoonbill (*Platalea minor*) and Crested Shelduck (*Tadorna cristata*)), four species as Endangered (Chinese Egret (*Egretta eulophotes*), Oriental White Stork (*Ciconia boyciana*), Nordmann's Greenshank (*Tringa guttifer*), and Saunders's Gull (*Larus saundersi*)), and 12 species as Vulnerable (Japanese Night-Heron (*Gorsachius goisagi*), Baikal Teal (*Anas formosa*), Swan Goose (*Anser cygnoides*), Baer's Pochard (*Aythya baeri*), Steller's Sea-eagle (*Haliaeetus pelagicus*), Red-crowned Crane (*Grus japonensis*), White-naped Crane (*Grus vipio*), Swinhoe's Rail (*Coturnicops exquisitus*), Spoon-billed Sandpiper (*Eurynorhynchus pygmeus*), Crested Murrelet (*Synthliboramphus wumizusume*), Fairy Pitta (*Pitta nympha*), and Yellow Bunting (*Emberiza sulphurata*)).

The following 14 bird species are classified as "Lower Risk: near threatened: Swinhoe's Storm-Petrel (*Oceanodroma monorhis*), Schrenck's Bittern (*Ixobrychus eurhythmus*), Mandarin Duck (*Aix galericulata*), Black Vulture (*Aegyptius monachus*), White-tailed Eagle (*Haliaeetus albicilla*), Hooded Crane (*Grus monacha*), Band-bellied Crake (*Porzana paykullii*), Long-billed Plover (*Charadrius placidus*), Far Eastern Curlew (*Numenius madagascariensis*), Relict Gull (*Larus relictus*), Japanese Wood-pigeon (*Columba janthina*), Japanese Waxwing (*Bombycilla japonica*), Japanese Paradise-flycatcher (*Terpsiphone atrocaudata*), and Ochre-rumped Bunting (*Emberiza yessoensis*).

Eurasian Oystercatcher (*Haematopus ostralegus osculans*)

Since the first breeding population on Daesong Islet was found in 1971, breeding populations have been found on small islets along the western coast of the Korean peninsula ranging from northern Kyonggi Province to Mokpo, South Cholla Province. Recently, a wintering population of 2,700 birds was observed at Kum Estuary. Although the breeding pairs have been observed limitedly on Daesong Islet near Kanghwa Island and Unkyum Islet off the northern coast of Yongjong Island, the breeding population size is estimated at 300-700 pairs, based on the wintering population size in the Republic of Korea. More detailed study is required to calculate a reliable breeding population size.

Namyang Bay and Kum Estuary are the two most important areas for conservation of the Eurasian Oystercatcher. More than 1% of the flyway population of this species arrives in these areas (220 birds at Namyang Bay, Sept. 1998, and 389 birds at Kum Estuary, March 1996 : the Ministry of Environment 1998). The number of the wintering population of Eurasian Oystercatchers at Kum Estuary is the greatest in East Asia, and the migrant population was recorded as the largest among the major stopover sites along the western coast of the Korean peninsula.

Spoon-billed Sandpiper (*Eurynorhynchus pygmeus*)

The Spoon-billed Sandpiper is a rare passage migrant species, found in coastal mudflats, estuaries, and salt pans. They are found in the flock of Red-necked Stint. The worldwide population is only 4,000 to 6,000 birds, and the species is designated as a "vulnerable species" in the IUCN rare bird category (Collar et al. 1994). Major stopover areas of the species are Yongjong Island (one bird in October 1993), Namyang Bay (one bird in October 1994 and one in October 1996), Asan Bay (one in October 1996), the Mankyung Estuary (the maximum count in September 1998 was 180, which is 3-4.5% of the world population), and the Dongjin Estuary (the maximum count was three in April 1998).

Most of the observations occurred in SMP (Southern Migration Period), and the counts in the Mankyung Estuary are the greatest recorded in South Korea, since 215 birds were observed in the Nakdong Estuary on 18-20 September 1970. Thus, the Mankyung Estuary is an internationally important site for the conservation of the Spoon-billed Sandpiper. There have been no additional observations in most of the stopover areas since 1997, except in the Mankyung and Dongjin Estuaries.

Nordmann's Greenshank (*Tringa guttifer*)

The Nordmann's Greenshank is very rare species, occurring in mudflats, salt pans, and rice-fields. The worldwide population is estimated only at 1,000 birds, and it is categorized as the "endangered species" in the IUCN rare bird category (Collar et al. 1994). The migratory population sizes in South Korea are 54 in NMP (Northern Migration Period) and 144 in SMP. Their peak migration periods are in April and October. Major stopover areas are Kanghwa Island (five observations between 1993 and 1998; maximum counts were 2 in NMP and 40 in SMP), Yongjong Island (three observations; one bird in NMP and 9 in SMP), Namyang Bay (nine observations; 38 in NMP and 28 in SMP), Asan Bay (seven observations; 12 in NMP and 2 in SMP), Kochang (five birds in SMP), the Mankyung Estuary (two observations; one in NMP

and 52 in SMP), and the Dongjin Estuary (two observations; eight birds in SMP). Most of the observations occurred in SMP, except those in Namyang Bay.

Yearly variations in NMP were similar each year (About 40 to 50 birds were found in major stopover areas), but the total number in SMP decreased in most sites: the maximum count (70 birds) occurred in October 1994 and numbered 8 in October 1997 and 2 in September 1998. The number of the population decreased remarkably in Namyang Bay (from 28 in October 1993 to one bird in October 1998) and in the Mankyung Estuary (There has been no observation since 8 birds were recorded in October 1994 in the Dongjin Estuary).

All of the known breeding populations were found in Sakhalin, Russia, and the size of migratory populations in East Asia are 2-8 birds in Japan (Fujioka et al. 1998) and 4 birds at 3 sites on the east coast of China (Barter et al. in prep.). The wintering population of the EAA flyway was 10 birds in 1994 (6 in the Philippines and 4 in Thailand; Lopez and Mundkur 1997).

Internationally important areas in South Korea for the conservation of Nordmann's Greenshank are the Mankyung Estuary (maximum counts during the survey period is 52; 5.2% of known worldwide population), Kanghwa Island (40; 4%), Namyang Bay (38; 3.8%), and Asan Bay (12; 1.2%). Although the maximum counts in Namyang Bay and Asan Bay are relatively fewer than in other areas, their conservation priorities are higher, because of the regular observations in NMP and SMP since 1993 and the overall numbers during the survey period.

Eastern Curlew (*Numenius madagascariensis*)

The Eastern Curlew is a common passage migrant species, found in western and southern coastal mudflats and estuaries. A few numbers remain in the Nakdong Estuary and some southern coastal areas in winter. The migratory population sizes in the 11 major stopover areas are 6,000 (NMP) and 3,500 (SMP). The minimum national population is estimated at 6,500 in NMP and at 3,800 in SMP, which are 18 to 31% of the world population.

In April and September, major migratory populations are found in most of the stopover areas, while the largest populations are found in August, especially on Kanghwa and Yongjong Island. The total population sizes in the major stopover areas in NMP and SMP increased in 1997 (3,945 in April; 2,491 in September) and in 1998 (2,959 in April; 2,058 in September), compared to the number during same period in 1996 (1,746 in April; 650 and 1,088 in September and October, respectively).

The worldwide population size of Eastern Curlew is estimated at 21,000 birds (AWB 1993; Watkins 1993; Collar et al. 1994), and this species is designated as a "near-threatened species" by the IUCN (Collar et al. 1994). Based upon the survey results and estimation of the minimum population, seven internationally important areas were identified in South Korea: Kanghwa Island, which holds the largest population (2,120 birds; 10% of known flyway population), followed by Asan Bay (1,003 birds; 4.7% of flyway population), Yongjong Island (1,000 birds; 4.7%), the Dongjin Estuary (886 birds; 4.2%), the Mankyung Estuary (625 birds; 3%), the Kum Estuary (422; 2%), and Namyang Bay (280 birds; 1.3%).

The majority of the population (71 to 76% of the total number in major stopover areas) are concentrated in the northern part of west coast, ranging from Kanghwa Island to Asan Bay.

ANNEX 3: LIST OF CANDIDATE WETLANDS FOR CONSERVATION OF MIGRATORY AND RARE BIRDS AND THEIR HABITATS

1. Inland wetlands

1) Cheonsu Bay (Seosan Reclaimed District)

Cheonsu Bay is a reclaimed area that is formed by two large reservoirs and a vast agricultural field in its surroundings, where large-scale, mechanized farming takes place. The importance of this area began to be recognized as a crucial site for migratory birds in 1990.

It is currently the largest wintering site for migratory and rare bird species. 400,000 - 500,000 duck and goose species migrate to this wetland during November and December. Since the later part of the 1980s, the number of individual species migrating to this site has been steadily increasing.

The most representative species migrating to this area is the Baikal Teal. 200,000 individual species migrate to this area in November and December. In addition, 300,000 Pintails, 200,000 Spot-billed Ducks, 5,000 Baikal Teal, and hundreds of Whopper Swans migrate to this area. More than 10,000 Bean Geese also come to this area. Major wintering populations in this area include the Oriental White Stork, Hooded Crane, Eurasian Spoonbill, White-tailed Sea Eagle, Hen Harrier, and Peregrine Falcon.

This site also serves as a stopover site for endangered species like the Black-faced Spoonbill and Chinese Egret in spring and fall, and more than 100 Saunder's Gull winter in the mudflat in front of the reclaimed area.

The threats to biodiversity in the area include worsening water quality, exploitation of fish, and environmentally unfriendly farming.

2) Woopo Swamp

Woopo Swamp consists of a small water storage reservoir and associated marshes on the plains on the east bank of the Nakdong River. The reservoir retains water throughout the dry season, and extensive flooding occurs in surrounding areas during the rainy season. The maximum depth of water is five meters, the mean depth is about 1m, and the pH value is 7.8. This area was designated as a Natural Ecosystem Conservation Area by the Ministry of Environment in 1997 and designated as the second Ramsar site in Korea in March 1998.

168 species of vascular plants, 71 species of aquatic vascular plants, 7 orders 28 families 55 species of aquatic insects, 62 species of birds, 12 species of mammals, 7 species of reptiles, 5 species of amphibians, 42 species of fishes, 10 species of shellfishes, 299 species of phytoplanktons and 82 species of zooplanktons have been identified and recorded in Woopo swamp. Wintering waterfowl (in January-February 1997) included *Egretta garzetta*, *Ardea cinerea*, *Egretta alba*, *Cygnus cygnus*, *Vanellus vanellus*, *Anas strepera*, *Anser fabalis*, *A. Platyrhynchos*, and *A. acuta*.

The changes of land use in the catchment areas will affect this swamp's physical, chemical and ecological characteristics. Manure and sewage affect water quality and biodiversity.

3) Chunam Reservoir

The Chunam Reservoir consists of three small water storage reservoirs and associated marshes in close proximity to one another on the cultivated plains south of the Nakdong River. Sannam was constructed in 1922, Ch'unсан in 1944 and Tongp'an in the 1970s. The reservoirs receive inflow from the Nakdong River, and the water levels remain almost stable throughout the year. The middle and largest reservoir (Ch'unasan or Junam) has a maximum depth of four meters and a pH value of 7.3.

This area was famous as a wintering ground for the Baikal Teal. Huge flocks had been recorded on migration in the past, but the last such flock was one of at least 10,000. Some 5,000 *A. formosa* were reported in February 1984 at Ch'unсан, and in January 1988, about 20,000 were again present, mostly at the Tongp'an Reservoir. The birds roost on the reservoirs and fly out to feed in rice paddies around the Daepyeong, Jilnal, and Yujeon Marshes, some 30 km to the west. But due to the expansion of city and habitat degradation, this population changed their wintering ground to western areas like the Seosan Reclaimed area, Youngsan Lake, and Kocheonam Lake.

Despite the absence of Baikal Teal, this area still supports many waterbirds. Threatened species recorded here include the White-naped Crane, Red-crowned Crane, and Spoonbill. Counts of other waterfowl in recent years have included swans (mainly *Cygnus cygnus* with some *C. columbianus*) and 5-10 White-naped Crane (*Grus vipio*), 1-5 Spoonbill (*Platalea leucorolia* and *P. Minor*), 3,361 Bean Goose (*Anser fabalis*), 650 White-fronted Goose (*A. Albifrons*), up to 12,000 (*Anas penelope*), 1,250 *A. falcata*, 2,460 *A. crecca*, 5,300 *A. platyrhynchos*, 950 *A. poecilorhyncha*, 2,100 *A. acuta*, and 5,400 *Aythya ferina*.

The main threats to this area are the expansion of Changwon City and the reduction of rice paddies. Sewage from livestock flowing into the reservoirs causes severe problems, such as eutrophication. Human activities, such as fishing, affect roosting behavior. Poisoning by farmers to prevent harvest loss directly affects the avian community.

4) Youngam Lake

Reclamation of the lands surrounding Youngam Lake was completed in the 1990s. Adjacent to this lake are Kumho Lake, Gocheonam Lake, and Youngsan Lake. In November and December, Baikal Teal migrate to Cheonsu Bay and move onto Youngam Lake in December through January.

In January, more than 100,000 duck species, including mallards, the Tufted Duck, and the Greater Scaup migrate to this lake. Endangered species like the Oriental White Stork, Hooded Crane, and Eurasian Spoonbill winter in this lake.

The biggest potential threats to this area are worsening water quality and the poaching that may occur around the lake. Currently, fishing occurs within the lake, which may disturb the species resting at the lake.

5) Kumho Lake

Reclamation in this area was completed in the 1990s. Youngsam Lake, Gocheonam Lake, and Youngsan Lake are adjacent to this lake. The dominant species in this area are the Mallard and Spot-billed Duck. Currently, the wintering population in this area reaches over 200,000 individual species, which exceeds the criterion for being classified as globally significant

wetlands. The wintering population is expected to increase greatly as crop yields will increase after the readjustment of arable land in this area is completed.

The biggest potential threat in this area is the aggravation of water quality and poaching that may take place around the lake.

2. Riverine wetlands

1) Nakdong River

The area of the Nakdong River and Estuary is composed of the Nakdong channels, Juklim channel, tidal flat, sand dune, and delta. Some part of this area was designated as Natural Monument No. 179 in 1966. 28,400 waterbirds of 46 species were recorded in Jan. 1998. Dominant waterbird species are the Mallard (10,153), Bean Goose (2,136), and Herring Gull (2,091).

The delta and estuarine system of the Nakdong River includes numerous tidal channels, low-lying islands and sand bars, about 3,000 ha of intertidal mudflats, and extensive brackish to saline marshes. Large areas of former marsh and mudflats have been reclaimed for agriculture, and many of these diked areas are subject to seasonal flooding. The western marshes and mudflats (4,500 ha) are almost entirely surrounded by the steep hills of the mainland and the large island of Kadog-do. The eastern marshes and mudflats (4,560 ha) are protected from the open sea by a chain of low sandy barrier islands which are covered with reed-beds, patches of dunes, and cultivation.

The largest island, Eulsuk Do, lies between the two main branches of the Nakdong; most of the island is cultivated for onions and rice, but there are extensive reed beds at the south end. In 1984-86, a barrage was constructed across the two main channels of the Nakdong at Eulsuk Island, converting these channels into multi-purpose freshwater reservoirs with a water level of about one meter above sea level.

An important staging, wintering, and breeding area for migratory waterbirds. Dominant wintering waterfowls are: *Anser albifrons*, *A. fabalis*, *Cygnus cygnus*, *C. columbianus*, *Tadorna tadorna*, *Anas platyrhynchos*, *A. poecilorhyncha*, *A. falcata*, and *A. penelope*. Dominant staging waders are: *Calidris ruficollis*, *C. alpina*, *C. tenuirostris*, *Crocethia alba*, and *Numenius arquata*. Dominant breeding waterbirds are: *Charadrius alexandrinus*, *Sterna albifrons*, *Fulica atra*, and *Nycticorax nycticorax*.

Internationally threatened species or subspecies are the Spoonbill, Red-crowned Crane, White-naped Crane, Black Vulture, Saunders' Gull, Relict Gull, Whooper Swan, and Whistling Swan. Total waterbird numbers in the Nakdong Estuary has been decreasing since the dam was constructed.

The main threats to this area are the expansion of Pusan City, which needs more land for development, human dwellings, agriculture, and factories. Salinity changes after the dam construction have affected the composition of flora and fauna of this area very much. Egg collecting by fishermen, fishing nets, and flooding in summer also affect the avian community.

2) Han River

The Han River runs through Seoul, capital of the Republic of Korea. The river is 0.8-1.4 km wide and rather shallow in metropolitan area. Bam Island which located in the center of river support large number of Mallard, Spot-billed duck, Merganser, Pochard and etc. Since this river runs in the metropolitan area, many citizens visit for bird watching. The downstream area of the Han River is a very important wintering area for waterfowl, including the White-naped Crane (max. 820 in February 1997).

Since the Han River, except some areas, already lost its naturalness by the injudicious development, many specialists have raised the issue of eco-friendly restoration.

3) Kum River

Kum River is located adjacent to Kunsan City. Vast crop fields expand from the river. Huge populations of Baikal Teal, Bean Geese, White-fronted Geese, and mallards migrate to this area. Snow Geese, Swans, Pintails and Pochards are the following dominant species regularly migrate this area. The Baikal Teal population that migrate to this river seems like moving north and south for food and more safe roosting area.

The threats which Kum River facing is dredging for the flood control, recreational complex project, propelled by Kunsan City.

4) Youngsan River and Lake

Youngsan River and Lake are located adjacent to Mokpo City. Vast crop fields expand from the river. Conservation of this area became crucial as land was reclaimed in the adjacent Hanam area. Huge populations of Baikal Teal, White-fronted Geese, and mallards migrate to this area. The populations that migrate to this lake also winter in adjacent lakes, including Youngam Lake, Kumho Lake, and Gocheonam Lake.

Youngsan River and Lake are prone to water contamination because the Youngsan River passes through Mokpo City, where restaurants, boating areas, and recreational facilities are located along the river.

3. Coastal wetlands

1) Kanghwa Island

The mudflats in the south of Kanghwa Island include Yocha-ri, Sondu-ri, and the shore east of Tongdom Islet, which is connected to the southeast corner of Kanghwa Island by a causeway. At low tide, the mudflat areas are separated by a channel about one kilometer wide. Approximately 10 km of the coast are embanked by a stone sea-wall, backed by rice paddies and one fish pond. The tidal range is very large, varying from 5.0 m at neap tides to 9.2 m at spring tides. These mudflats are two of the few remaining patches of the formerly very extensive mudflats to the south of the Han River Estuary; most other areas have been reclaimed for agricultural and industrial development.

The tidal mudflats in the south of Kanghwa Island are a very important staging area for migratory shorebirds, especially *Numenius madagascariensis* and *Calidris alpina*. The mudflats also provide a very important feeding area for the Chinese Egret (*Egretta eulophotes*) from the breeding colony at Shin Islet (located near the DMZ) to the west. Other rare species present at

this time included 60~90 Black-faced Spoonbills(*Platalea minor*). Kwanghwa Island is also a wintering area for several hundred ducks and geese and the Red-crowned Crane (*Grus japonensis*). The area seems to be have increased in importance for waterfowl since the vast mudflats at Buk-Gu near Inch'on and Yongjong island were reclaimed for agriculture and a new airport.

Peak counts of shorebirds during 1993~1998 were 28,700 in NMP(Northern Migration Period) 1998 and 15,300 in SMP(Southern Migration Period) 1993. Dominant shorebird species are the Dunlin (17,000 in NMP; 5,600 in SMP), Kentish Plover (3,500 in SMP), Great Knot (3,300 in NMP), Black-tailed Godwit (2,915 in SMP), Bar-tailed Godwit (2,200 in NMP), and Eastern Curlew (2,120 in NMP).

The ratios of small shorebird species, such as the Dunlin, Kentish Plover, and Mongolian Plover, have shown a continuous decrease since 1993. Suggested main cause of the decreases of small-sized shorebird species is related to the decreases in the density of their invertebrate prey species, such as snails, shellfish, and small crabs, possibly resulting from the new airport construction on Yongjong Island.

There is no major threat to this area at the moment, but the reclamation of wetlands for aquaculture and development plans are the main threat.

2) Yongjong, Yongyu, and Sammok Island

The main area of mudflats extends from south of Yongjong Island around Sammok Island and Sinpul Island to Yongyu Island, the westernmost of this group of islands. The mudflats along the eastern and western sides of Mui Island to the south are separated from the main area of mudflats by a narrow channel. The tidal range varies from 5.0 m at neap tides to 9.5 m at spring tides.

Vast mudflats of Yongjong , Yongyu, and Sammok Island have been reclaimed for the construction of the Inchon International Airport. Due to the reclamation, the number of species and waterbirds on Sammok Island significantly declined over past five years.

Peak counts of shorebirds during 1993~1998 were 22,886 in NMP 1998 and 21,038 in SMP 1993, and the sum of maximum counts of each species were 27,500 in NMP and 32,500 in SMP. Dominant shorebird species include the Dunlin (11,500 in NMP and 5,500 in SMP), Great Knot (3,300 in NMP and 6,000 in SMP), Bar-tailed Godwit (2,980 in NMP), and Mongolian Plover (2,060 in SMP).

The worldwide threatened species or subspecies to be found on Yongjong Island are the Nordmann's Greenshank (maximum count on Yongjong Island: 9 birds) and the Eurasian Oystercatcher (maximum count: 7 birds; estimated breeding population: less than 10 pairs). Endangered species were also recorded, such as the Chinese Egret (*Egretta eulophotes*), Black-faced Spoonbill (*Platalea minor*), Far-eastern Curlew (*Numenius madagascariensis*), and Saunders's Gull (*Larus saundersi*).

The Inchon International Airport construction, which reclaimed about 5,000 ha between Sammok and Yongyu Island, is ongoing in the area. Since 1993, the salt pans and the tidal flats in this region disappeared due to the reclamation. As a result of this habitat destruction, the total number of shorebirds in Yongjong Island decreased to a half of their previous numbers. Remarkably decreased species include the Dunlin (NMP, 23,000 in 1988 to 11,500 in 1998; SMP, 12,110 in 1993 to 5,500 in 1998) and the Kentish Plover (SMP, 3,048 in 1993 to 1,800 in 1998).

Compared with the decreasing of previous dominant small species, the following medium or large shorebird species increased: the Grey Plover (From 1988 to 1994, the number was between 290 to 567 birds, but a total of 2,280 birds was recorded in 1998), Great Knot (SMP, 2,200 in 1993 to 6,000 in 1998), Bar-tailed Godwit (1,010 in 1988 to 1,406 to 2,980 from 1996 to 1998), and Eastern Curlew (NMP, 65 in 1993 to 871 in 1998; SMP, 381 in 1994 to 1,000 in 1997).

The main threat to this area is the construction of the airport and the expansion of facilities.

3) Namyang Bay

Namyang Bay is a large bay, about 13 km long and 10 km wide at the mouth, aligned along a northeast-southeast axis. At Yihwa-ri in the south a small river has been dammed with a coastal barrage to form Namyang Lake. There are large areas of tidal mudflats, especially along the south side of the bay. Much of the south shore has been embanked with a stone sea-wall, which is backed by salt pans and rice paddies. The tidal range varies from about 5.2 m at neap tides to 8.5 m at spring tides.

Peak counts of shorebirds during 1993~1998 were 45,505 in NMP 1998 and 18,564 in SMP, and the sums of maximum counts of each species were 53,000 in NMP and 26,500 birds in SMP. The dominant shorebird species are the Great Knot(21,000 in NMP and 6,000 to 9,000 between 1993 and 1997), Dunlin (12,000), Bar-tailed Godwit (5,800), Kentish Plover (SMP, 4,600 birds in 1998; about 1,600 birds from 1993 to 1997), Grey Plover (2,200) and Black-tailed Godwit (2,020).

The total number of shorebirds in Namyang Bay was 54,956 birds in NMP 1988 (Long *et al.* 1988), but the number decreased to 18,000-28,000 birds between 1993 and 1997. This is possibly due to the Hwaong District Reclamation Project, a large-scale project covering most of mudflat area within the inner part of the bay that has had detrimental effects on the main roosts and feeding sites for the shorebirds migrating to Namyang Bay. So the range of decreased number in Namyang Bay was one of the largest figures among the major stopover areas on the west coast of South Korea.

The decreased number of Black-tailed Godwit was the greatest; their number decreased about 9,000, compared with 1988. The only species that increased during the survey period was the Great Knot. Their number was between 2,000 and 4,000 birds from 1993 to 1997, but increased remarkably in NMP 1998 (21,000 birds).

The main threats to this area are the ongoing reclamation project and the conversion of salt pans to shrimp ponds, which causes the disappearance of roosting areas for waders.

4) Asan Bay

Asan Bay is large, about 15 km long and up to 15 km wide, adjoining Namyang Bay (Site 5) to the north. Two rivers have been dammed with barrages at the head of the bay to form large freshwater lakes: Asan Lake in the east and Sapkyo Lake in the south. The barrages also facilitated reclamation of the head of the bay off Kwonkwon-ri and in the southeastern corner between Soma-ri and Chaka-ri. The tidal range varies from 5.2 m at neap tides to 8.5 m at spring tides.

The peak counts of shorebirds during 1993~1998 were 32,876 in NMP 1998 and 8,983 in SMP 1996; and the sums of the maximum counts of each species were 79,000 in NMP and 10,500 in SMP. The dominant shorebird species are the Great Knot (14,000 in NMP 1998 and 2,000 to

3,500 birds between 1994 and 1997), Dunlin (6,000 to 8,000 birds from 1996 to 1998), Black-tailed Godwit (4,500 birds), Grey Plover (2,400 birds), Whimbrel (1,310 birds), and Bar-tailed Godwit (1,200).

The total number of shorebirds in Asan Bay was 48,608 in NMP 1988 (Long *et al.* 1988), but the number decreased to 8,231 birds in NMP 1994. Between 1996 and 1998, the numbers increased slightly (15,058 to 32,876 birds), but overall shorebird numbers in Asan Bay decreased about 15,000 to 33,000, compared with 1988. Remarkably decreased species include the Red-necked Stint (NMP: 1,473 in 1988 to 715 in 1996), Dunlin (NMP: from 13,000 in 1988 to 6,000-8,000 between 1996 and 1998), Great Knot (NMP: from 22,450 in 1988 to 2,000-3,500 between 1994 and 1997; 14,000 birds in 1998), Black-tailed Godwit (NMP: 15,200 in 1989 to 2,400-4,500 between 1997 and 1998), and Bar-tailed Godwit (NMP: 5,942 in 1993 to 1,000-1,200 between 1996 and 1998).

The total number of shorebirds in SMP was 1,400 to 4,000 birds between 1989 and 1994, but the overall number of shorebirds was 6,000 to 8,000 between 1996 and 1998, which showed no remarkable yearly changes in the dominant species.

The main threats to this area are reclamation projects and illegal hunting.

5) Mankyung Estuary

The combined estuarine system of the Mankyung and Tangjin Rivers lies about 10 km to the southeast of Kum Estuary. There is a large area of salt pans (2,700 ha) on the north shore of the Mankyung Estuary. River flow has been constructed by cannibalizing the head of the two estuaries. The tidal range is about 2.8-5.7 m.

The Mankyung Estuary is the second important stopover area for the migratory shorebird population. Peak counts of shorebirds during 1993~1998 were 60,859 in NMP 1998 and 48,842 in SMP 1998, and the sum of the maximum counts of each species from 1996 to 1998 were 74,000 in NMP and 49,000 in SMP.

Dominant shorebird species are the Great Knot (35,000 in NMP and 8,021 in SMP), Dunlin (19,100 in NMP and 11,005 in SMP), Black-tailed Godwit (8,008 in SMP), Kentish Plover (6,216 in SMP), and Red-necked Stint (5,020 in NMP and 4,500 in SMP). Among the species, the number of Red-necked Stint (both in NMP and SMP) and Black-tailed Godwit (in SMP) are the greatest in the major stopover areas.

Internationally threatened species or subspecies include the Eurasian Oystercatcher, Spoon-billed Sandpiper, Nordmann's Greenshank, and Eastern Curlew. The number of Spoon-billed Sandpiper (maximum count: 180 in SMP) and Nordmann's Greenshank (maximum count: 52 in SMP) were the greatest recorded in the Republic of Korea.

Increased species are the Dunlin (NMP: 7,917 in 1996 to 19,100 in 1998), Great Knot (NMP: 6,500 in 1996 to 35,000 in 1998), and Kentish Plover (SMP: 1,201 in 1996 to 6,216 in 1998). Considering the expanse of mudflat area and the habitat conditions, total shorebird number will increase continuously, as the survey progresses.

The most serious threat to this area is the Saemankeum project, which will reclaim the Mankyung estuary as well as the Tongjin estuary. The mudflats will be lost if the proposed reclamation schemes are implemented. This project is world's largest ongoing reclamation: a 40,100 hectare reclamation project at the mouth of the Mankyung and Tongjin Rivers, in

Chollabok Do, west of the Republic of Korea (centered at approximately 35 Deg 50'N, 126 Deg 45'E). It is suggested that such a reclamation, entailing a 33 km long seawall, will expand the national area, help the supply of agriculture and industrial water, lead to better drainage of adjacent land, and allow development of an international harbor. This reclamation project, a part of the 1970s' long-term project of the reclamation of the west and south seashores, was planned in detail just before the 13th national election in 1986 and launched in 1991. It is scheduled to be completed in 2004, but the time schedule is expected to be extended due to the anticipated environmental and budgetary problems. This project was also originally intended to extend the land and to acquire farmlands. However, while this project was in progress, the municipal bodies concerned (the North Cholla Province) designed a new plan that included an industrial complex. The environmental contamination and the waste of finances are so worrying.

Presently, evaluation team was formed and recommendations from the team will be come out this June.

Table 2: The Density of Benthic Invertebrates in Mankyung Estuary

Class	Species	Ind.	Density (/)
Nemertini	Nemertina unidentified	21	111
Polychaeta			
	<i>Eteone longa</i>	2	11
	<i>Eteone sp.</i>	5	26
	<i>Glycera chirori</i>	1	5
	<i>Neanthes virens</i>	3	16
	<i>Perinereis ahibuhitensis</i>	16	84
	<i>Nephtys caeca</i>	4	21
	<i>Nephtys sp.</i>	1	5
	Opheliidae sp.	1	5
Bivalvia			
	<i>Potamocorbula amurensis</i>	1	5
Crustacea			
Decapoda			
	<i>Macrophthalmus japonicus</i>	2	11
	<i>Hemigrapsus penicillatus</i>	5	26
Total	12species	62	326

6) Tongjin Estuary

The combined estuarine system of the Mankyung and Tangjin Rivers lies about 10 km to the southeast of Kum Estuary. The main area of mudflats is on the north shore of the Tangjin Estuary. Much of the coast in this region has been embanked, with rice paddies and other agricultural land behind the sea-wall. The tidal range is about 2.8-5.7 m.

The combined estuarine system of the Mankyung and Tangjin Rivers lies about 10 km to the southeast of the Kum Estuary. There is a large area of salt pans (2,700 ha) on the north shore of the Mankyung Estuary. River flow has been constructed by cannibalizing the head of the two estuaries. The tidal range is about 2.8-5.7 m.

Among the major stopover areas in South Korea, the largest number of shorebirds occurred in the Dongjin Estuary: especially in NMP, 38% of the total number of shorebirds in 11 major stopover areas. The peak counts of shorebirds during 1993~1998 were 126,145 in NMP 1998 and 26,919 in SMP 1998, and sums of maximum counts of each species were 127,872 in NMP and 43,157 in SMP.

Dominant shorebird species are the Great Knot (60,000 in NMP and 5,200 in SMP), Dunlin (38,850 in NMP and 8,500 in SMP), Kentish Plover (8,850 in SMP), Bar-tailed Godwit (8,430 in NMP and 4,845 in SMP), and Red-necked Stint (5,000 in NMP and 3,100 in SMP). And the number of Kentish Plover (SMP), Grey Plover (NMP), Great Knot (NMP), Dunlin (NMP), and Greenshank (SMP) are the greatest in major stopover areas.

The peak count of 60,000 Great Knots is the largest count recorded during the survey period, and the Tongjin Estuary holds 19% of known flyway population. This area, together with the Mankyung Estuary, holds international importance for the conservation of the Great Knot.

The most serious threat to this area is the Saemankeum project, which will reclaim the Mankyung Estuary as well as the Tongjin Estuary. The mudflats will be lost if the proposed reclamation schemes are implemented.

7) Suncheon Bay

Suncheon Bay is famous for its vast reed bed and as the unique wintering site of Hooded Crane in Korea. The annual Reed Festival since 1998 shows this sites' potential for eco-tourism. Peak counts of shorebirds during 1993~1998 were 6,028 in NMP 1997 and 1,017 in SMP 1997. The sums of the maximum counts of each species were 14,000 in NMP and 2,800 in SMP. Dominant shorebird species are the Dunlin (NMP 9,300), Bar-tailed Godwit (NMP 1,868), Terek Sandpiper (NMP 1,046), Common Greenshank (SMP 548), and Whimbrel (NMP 528). Internationally threatened species or subspecies are the Eurasian Oystercatcher (3 in NMP), Spoon-billed Sandpiper (2 in SMP), Nordmann's Greenshank (22 in SMP), and Eastern Curlew (104 in NMP).

Total number of shorebirds in Suncheon Bay is relatively fewer than other major stopover areas on the west coast, but large-scale development has not been conducted in this area and the natural mudflat area is intact. Suncheon Bay has the conservational importance as the major wintering ground in South Korea for the large wintering populations of the Saunders' Gull, one of the most internationally threatened gull species, and the Common Shelduck.

The main threats to this area are city expansion, a dredging project to prevent flooding, illegal hunting, and the increase of green house gases.

8) Daebu Island

Three occasional counts were conducted at the tidal flats of Daebu Island (June and September in 1993 and September in 1998). Shorebird numbers recorded in each survey were 84 birds of 4 species in June 1993, 595 birds of 5 species in September 1993, and 1,459 birds of 6 species in September 1998 (The major species were Dunlins (700), Kentish Plovers (300), and Grey Plovers(300)).

A large parts of the natural tidal flats in this area were reclaimed and the normal tidal currents were altered or stopped by the development of Shihwa Lake, an artificial lake for the adjacent reclaimed agricultural fields, so the area of the remaining tidal flats was not sufficient for the shorebirds' feeding sites.

It is considered that the possible number of shorebirds is about 2,000 to 3,000 birds and that the number of flocks briefly stopping over in this area could be larger than the 3 survey results, but a reliable estimation of the population is not available because of the scarcity of survey frequency. Therefore, further survey is called for. Two Eurasian Oystercatchers were observed in June 1993, but it was uncertain if they were breeding at the site.

9) Kum Estuary and the outer region of Kunsan Port

This area is the upper estuary of the Kum River, with tidal brackish marshes in the lower reaches (near Kunsan), and freshwater riverine marshes in the upper reaches (near Kangkyong). Salinity ranges from 15-33.6 ppt in the Kunsan area and from 0-5.1 in the Kangkyong area is 3 m, while the pH values range from 6.7-6.9. There are approximately 3,000 ha of intertidal mudflats in the outer estuary of the Kum River.

The main area lies to the south of the river mouth, between the mainland and Oshig Island, and the Kunsan City industrial area. The small island of Yubu lies in the center of the river mouth and is surrounded by mudflats and salt pans. Peak counts of shorebirds during 1993~1998 were 5,176 in NMP 1998 (whereas 34,198 in 1998; Moores 1999) and 3,887 in SMP 1998 (5,360 in Moores 1999). Sums of maximum counts of each species were 35,600 in NMP and 7,400 in SMP.

Dominant shorebird species are the Great Knot (18,850 from Moores, 1999), Dunlin (7,128 from the MOE in 1996: 1,800 to 2,000 between 1997 and 1998), Bar-tailed Godwit (1,400), and Black-tailed Godwit (800). Internationally threatened species or subspecies are the Eurasian Oystercatcher (maximum count: 389) and Eastern Curlew (maximum count: 90). The number of Eurasian Oystercatchers is the greatest recorded in their major stopover areas, and the wintering population around Yubu Islet is the greatest in East Asia. So this area is internationally important for the conservation of the Eurasian Oystercatcher.

The main threat to this area is the reclamation projects for big ports and new towns.

10) Han River Estuary

The estuarine system of the Han River from about 25 km downstream of Seoul to its confluence with the Imjin River is well protected. The river is 2-3 km wide and rather shallow; there are extensive salt marshes on both banks, and large areas of mudflat are exposed at low tide. The adjacent alluvial plain and reclaimed land are largely under cultivation for rice. Salinity ranges from 6.9-22 ppt and the pH values from 6.7-7.0. The tidal range is one of the highest in the world.

Part of the Han River Estuary in Kuoha-Myon, Paju County, was designated as a Natural Monument (No. 250) for White-naped Cranes in 1975. The protected area was extended to include Haseon-Myon in Kimpo County on the west side of the estuary in 1977. The protected area should be extended to include the Han River in Seoul. The downstream area of the Han River is a very important wintering area for waterfowl, including the White-naped Crane (max. 820 in February 1997).

The estuary is a very important staging and wintering area for geese, ten species of ducks, and the White-naped Cranes (*Grus vipio*). Several thousand geese (*Anser fabalis*, *A. cygnoides* max. 667 and 1,858 on 7 March 1994), and ducks (mainly *Anas platyrhynchos* and *A. poecilorhyncha*) used the area in spring, autumn, and winter.

Since this area is located near the DMZ (De-militarized Zone), human activities are limited.

Annex 4: Migration Routes Identified by Means of Satellite Tracking, Band Recovery and Flag Re-Sight NIER During 1993-1998

Species	Country of ring or flag attached	Recovery or re-sight country and region
Black Vulture	Cholwon, Yeoncheon, Korea (Satellite tracking)	Mongolia
Red-crowned Crane	Khanka reserve, Russia	Cholwon, Korea
White-naped Crane	Izumi, Japan	Korea
Bean Goose	Anadir, Russia	Korea
White fronted Goose	Colima, Russia	Korea
Little Tern	Nakdong river, Korea	Philippine
Mongolian Plover	Mankyung river, Korea	Japan
Stint	Mankyung river, Korea	Taiwan
	Taiwan	Korea
	Australia	Korea
Terek Sandpiper	Korea	Taiwan
	Korea	Australia
	Korea	Yakutia, Russia
	Australia	Korea
Bar tailed Godwit	Australia	Korea
	New Zealand	Korea
Black tailed Godwit	Australia	Korea
Knot	New Zealand	Korea
Great Knot	Mankyung River, Korea	Australia
	Australia	Korea
Broad billed Sandpiper	Australia	Korea
Turnstone	New Zealand	Korea
Far eastern Curlew	Australia	Korea

ANNEX 5: MINIMUM ESTIMATES OF WADERS MIGRATING TO THE MAJOR STAGING AREAS
ALONG THE WESTERN COAST OF KOREA, 1993-1998

Species	Minimum Estimates					
	EAA Flyway	1% Flyway	Northward Migration	(%)	Southward Migration	(%)
<i>Haematopus ostralegus osculans</i>	<10,000	100	446	4.46	487	5
<i>Charadrius alexandrinus</i>	25,000-100,000	250-1,000	6,628	6.63	28,705	28.71
<i>C. mongolus</i>	27,000	270	11,336	41.99	14,150	52.41
<i>C. leschenaultii</i>	99,000	990	1	0.00	22	0.02
<i>Pluvialis fulva</i>	90,000	900	4	-	64	0.07
<i>P. squatarola</i>	16,000	160	15,456	96.60	10,197	63.73
<i>Arenaria interpres</i>	28,000	280	1,135	4.05	465	1.66
<i>Calidris ruficollis</i>	471,000	4,710	21,269	4.52	9,974	2.12
<i>C. acuminata</i>	166,000	1,660	2,411	1.45	28	0.02
<i>C. alpina</i>	> 130,000	1,300	131,536	101.18	54,905	42.23
<i>C. ferruginea</i>	250,000	2,500	42	0.02	12	0.00
<i>C. canutus</i>	255,000	2,550	4,300	1.69	1,246	0.49
<i>C. tenuirostris</i>	319,000	3,190	140,688	44.10	25,821	8.09
<i>Eurynorhynchus pygmeus</i>	4,000-6,000	50	23	0.46	184	3.68
LIMICOLA FALCINELLUS	16,000	160	195	1.22	829	5.18
<i>Tringa nebularia</i>	40,000	400	3,407	8.52	5,008	12.52
<i>T. guttifer</i>	1,000	10	54	5.40	144	14.40
<i>T. cinereus</i>	36,000	360	4,629	12.86	6,433	17.87
<i>Limosa limosa</i>	162,000	1,620	14,491	8.95	16,047	9.91
<i>L. lapponica</i>	330,000	3,300	31,002	9.39	10,695	3.24
<i>Numenius arquata</i>	75,000-100,000	750-1,000	2,371	0.24	5,076	0.51
<i>N. madagascariensis</i>	21,000	210	6,019	28.66	3,546	16.89
<i>N. phaeopus</i>	40,000	400	5,721	14.30	814	2.04
Total number of waders	-	-	331,250		106,229	
(maximum single day counts)						
Sum of the estimated maximum counts	> 4.4 mil.*	> 440,000*	405,502		195,588	



MINISTRY OF FOREIGN AFFAIRS AND TRADE
REPUBLIC OF KOREA

Mr. Tim Boyle
Biodiversity Regional Coordinator
for Asia and the Pacific
UNDP/GEF
New York, USA

15 March 2000

Dear Mr. Boyle :

As National GEF Focal Point of the Republic of Korea, I would like to inform you that the Korean government has endorsed the project proposal for "Conservation of Globally Significant Wetlands in the Republic of Korea(PDF Block B)".

I would also like to take this opportunity to express my sincere gratitude for your valuable assistance and support in preparation of the proposal.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'Choi Jai-chul'.

Choi Jai-chul
Director
Environment Cooperation Division

c.c. : Mr. Tim Clairs
GEF Regional Advisor
UNDP/GEF
Kuala Lumpur, Malaysia