
KOREAN DEMILITARIZED ZONE: PEACE AND NATURE PARK

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Since 1953 the DMZ has been part of a geopolitical vacuum and symbol of war, tension, and separation. During this period nature there has regenerated. The DMZ and contiguous Civilian Control Zone in South Korea contain five rivers and numerous ecosystems along with thousands of plant, mammal, fish and bird species, many of which are globally endangered. It provides a unique link to the entire East Asia flyway system for migratory birds from Russia down to Australia.

Safeguarding the DMZ as a transboundary nature and peace park can provide significant ecosystem service benefits.

It can symbolize peace and cooperation, be an opportunity to maintain habitats and reintroduce species largely extirpated from Korea and be a rare chance to study what happens when an area like this is left untouched for over fifty years.

INTRODUCTION

With the idea of dividing Korea into spheres of influence in 1896, Japan and Russia conducted negotiations that almost resulted in the partition of Korea along a mid-peninsula boundary line, though not at the thirty-eighth parallel, where the Demilitarized Zone (DMZ) is now nominally situated.¹ That division was not to take place for more than fifty years, and then as a consequence of World War II and the Korean War. Thus, the DMZ became a symbol of the US's Cold War containment policy. Now it is a stark remnant of that standoff but at the same time a reminder of nature's tremendous resilience and of the hope which that affords us.

Since the end of the Korean War in 1953, the DMZ has been essentially off limits to all but a few residents living in two showcase villages, one in North Korea and one in South Korea in the heart of the DMZ near Panmunjom. It has been part of a geopolitical vacuum and memory of war. It and the Civilian Control Zone (CCZ) on the south side also have been home to at least one million land mines, reinforcing the DMZ's barbed wire perimeter extending along much of its length. But, within the forbidden zone, nature has staged a renaissance during the last fifty plus years. The natural and cultural resources contained in the DMZ and CCZ represent millions of years of evolution, some of its species being found nowhere else in the world, and thousands of years of human history, at least 5,000 of which have been home to a people identified as distinctly Korean. The two zones offer us an urgent and unique opportunity for dialogue between the

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Koreas and other region stakeholders that can assist in creating peace on the peninsula. Properly managed for sustainability, these same resources also can garner billions of dollars for both Koreas and one day for a re-

united peninsula. This paper will address (1) the importance of the DMZ from multiple perspectives; (2) threats to preserving it; (3) current initiatives to preserve it; and (4) recommended steps to conserve its resources.

IMPORTANCE AND VALUE OF THE DMZ

The DMZ is four by 250 kilometers (2.4 by 150 miles). It and the contiguous Civilian Control Zone in the Republic of Korea (ROK)/South Korea, which is five to twenty kilometers (three to twelve miles) across the peninsula, contain rivers and many ecosystem types, supporting thousands of species. In the Democratic People's Republic of Korea (DPRK)/North Korea there is reported to be a similar zone adjoining the DMZ.

2.1. Biological Resources

There are reported to be as many as 3,514 species in the DMZ and CCZ. By one count, the species there represent 67 percent of all those found in



Looking north to the mountains of North Korea from Ice Cream Mountain in South Korea, where some of the Korean War's worst fighting took place, across rice fields in the Civilian Control Zone—now habitat for Red-crowned and White-naped Cranes, along with dozens of other migratory bird species. Photo by the author.

Korea;² and the DMZ is the only place where many of them still reside, having been extirpated from the rest of the peninsula due to development and industrialization in the south and deforestation in the north. From 1995 to the present, field and literature surveys have been conducted to assess biological resources of the area, which detail a wide range in the numbers of species: from 256 to 1,597 plants, 4 to 66 mammals, 143 to 939 animals other than mammals, 49 to 233 birds, 6 to 46 amphibians and reptiles, 13 to 98 freshwater fish and 50 to 535 insects.³ The estimates emphatically portray the vast richness of the area. They also are symptomatic of the lack of direct access to the DMZ itself. Until now, data has been collected mainly from observations inside the Civilian Control Zone, without ability to enter the DMZ.

Mammals

Many charismatic mammal species, including Asiatic Black Bear, Musk deer, spotted seal, leopard and lynx inhabit and depend on the DMZ and CCZ. The Cultural Heritage Administration of South Korea has designated several DMZ species as “natural monuments,” including:

- Korea-Okhotsk Gray Whale, in waters off of the DMZ
- Otter, re-introduced just south of DMZ in Hwacheon County
- Chinese Water Deer
- Leopard Cat
- Amur Goral, a rare type of goat
- Korean Yellow-necked Marten

Reportedly, twenty years ago there were even tigers in the mountains around Seoul, the capitol of South Korea, and there has been anecdotal evidence of tigers in the DMZ, CCZ area since that time. However, to-date, no scientifically-based studies have been conducted to verify their presence.

Birds

The DMZ forms a vital link between ecosystems throughout Northeast Asia. Hundreds of bird species migrate twice a year through the DMZ going to and from Mongolia, China, Russia, Vietnam, Japan, the Philippines and Australia, essentially from the top to the bottom of the globe! If this green belt were destroyed, what would happen to this globe-spanning chain? Species include many that, according to IUCN (World Conservation Union), are endangered; these include the Black-faced Spoonbill, of which a majority of the total estimated world population of 1,679⁴ breed on the western coastal islands off the DMZ. Of the world's estimated 2,500 Red-crowned and 5,000 White-napped Cranes, about 25 percent and 50 percent respectively spend their winters in the DMZ.⁵ Two former DMZ inhabitants, the Oriental White Stork and Crested Ibis, are potential candidates to re-introduce to the area.

Spending part of their life cycle here are other species, many of which also are already endangered.

- Black Vulture
- Great Bustard
- Stellar's Sea Eagle
- Whooper Swan
- White-tailed Sea Eagle
- Chinese egret
- Mandarin Duck
- Tristram Woodpecker
- Broad-billed Sandpiper
- Ruddy Shelduck
- Bean Goose
- White-fronted Goose
- Swan Goose

“Red-crowned Cranes have a special place in Korean culture as symbols of long life and good luck and are frequently depicted in folklore and art. In historic times, Red-crowned Cranes, White-naped Cranes and Hooded Cranes wintered at many widespread lowland sites. Today the DMZ and CCZ provide a resting area for White-naped Cranes migrating to Japan. Satellite telemetry studies of these cranes have shown that during their long passage from wintering grounds in southern Japan to breeding grounds in northern China and southeast Russia, the DMZ is their major resting area. From October through March, the DMZ is a winter home for Red-crowned Cranes and for other White-naped Cranes that end their passage on the peninsula. Approximately one-third of the world’s 2,500 Red-crowned Cranes, and half of the world’s White-naped Cranes depend on the wetlands and agricultural fields in and near the DMZ. The most important areas are the Han River estuary in the west and the Cheorwon Basin in the central highlands. Hooded Cranes are now only found wintering at Suncheon Bay in the far south end of South Korea and in southern Japan.”⁶

Freshwater Fish

By current estimates, almost 100 freshwater, some of which are endangered, inhabit DMZ and CCZ rivers and their tributaries. These include perch, shiners, dace, “Golden Mandarin,” Bitterling, Asian Gudgeon and Manchurian trout. At least eighteen of them are endemics- found nowhere else in the world.⁷ The Chinese Mitten crab, now causing significant issues as an exotic species in San Francisco Bay, also naturally resides there.

Amphibians and Reptiles

With the area’s many waterways, lakes and reservoirs and relatively low levels of pollution, there are estimated to be up to forty-six amphibians and reptiles, including the Narrow-mouthed frog, Korean fire-bellied toad, Asian Keelback snake, Rat snake, Korean magpie viper and a freshwater turtle.

Insects

An important component in the overall biologic system, according to a 1992-1993 survey there are the following insect phyla in the DMZ and CCZ, encompassing about 1,000 insect species some of which are protected.⁸

Plants

Most numerous are the vascular plants with estimates up to almost 1,600 species in the many and varied DMZ and CCZ ecosystems. Included are iris, violet, peony, lily, with many native Korean species. One variety of trillium has rounded leaves as opposed to their normal pointed ones. Research on another plant, *Epimedium koreanum Nakai*, has uncovered the fact that its extracts may have a potential salutary effect on osteoporosis.⁹ Perhaps this is an example of what Edward O. Wilson refers to in *The Future of Life*¹⁰ as substantial potential for pharmaceutical revenues from the world’s plants. Some of the lily, iris and trillium species are rare and endangered plants and protected by South Korean law. Distribution of these rare plants is mainly at Daeam Mountain and Yanggu in the mid-eastern mountainous area, Cheorwon in the mid-western region and Kanghwa Island on the west coast. In most regions, oak and pine are the dominant forest type, with oak second growth on the west coast, on islands and in the mid-west region, with Mongolian Oak in the mid-eastern mountains.¹¹

Fungi

A total of 282 species of mushrooms and fungi and 55 species of lichens have been surveyed in the DMZ and CCZ.¹²

Table 1: Arthropods (Insects) in the DMZ, CCZ*

Phylum	Number	Phylum	Number
Mantodea (mantids)	4	Blattaria (cockroaches)	4
Dermaptera (earwigs)	9	Neuroptera (net-winged insects)	13
Isoptera (termites)	1	Diptera (true flies)	38
Orthoptera (grasshoppers, crickets)	65	Lepidoptera (butterflies, moths)	78
Phasmida (leaf and stick insects)	2	Total	372
Hymenoptera (bees, wasps)	158		

*Kim, Ke Chung. “The DMZ Conservation in Global Climate Change.” *International Conference on Korea’s DMZ Conservation: Science and Impact Assessment*. 4 June 2007, K1-13.

Physical Resources

Total land area of the DMZ is 90,703 hectares, about evenly divided between North and South Korea. Forest occupies about 75 percent, grasslands about 20 percent, agricultural land about 3 percent, wetlands 1 percent, with water bodies and ‘bare land’ taking up the remainder.¹³ The DMZ and CCZ can be grouped into four regions: (1) east coast, including lagoons, wetlands and lowlands/valleys; (2) mid-eastern mountains and highland moors; (3) mid-west inland with the upper Han River watershed, farmland and a lava plateau; and (4) west coast and islands with hills and wetlands.¹⁴ A more detailed view of habitats is seen in Table 2 (next page).

Five major rivers and their watersheds run through the DMZ and CCZ: on the west side are the Imjin, Han, Bukhan, with Soyang and Nam to the north. Most tributaries and the main stems of these rivers run from north to south and empty into the West or China Sea. The Han and Nam Rivers originate in the DMZ. The Nam goes south through the DMZ and CCZ and finally flows into the East or Japan Sea. These rivers are “first quality streams”, with low levels of dissolved oxygen, at 11.0 milligrams/liter and suspended solids, at 2.5 milligrams/liter. Average pH is 7.26.¹⁵

Mountains

Mountain ranges include the Taebaek on the east end of the DMZ. As part of that range are the fabled Diamond Mountain, called Keumgang, in the north and Mount Seorak in the south. Both Keumgang and Seorak have been placed on the “Tentative List” of the United Nations by their respective countries for possible designation as UNESCO World Heritage Sites.

Forests

Forests occupy an estimated 1,525,840 meters³, with distribution considered poor in some areas due to frequent disturbances from military operations. Forest types include coniferous, deciduous, mixed and shrub forests. There are forest ecosystems in the western end of the DMZ and CCZ near Panmunjom, Dora and Baekhak Mountain and in Cheorwon. Mongolian Oak dominates these areas and can be seen at Keumgang Mountain, north of the DMZ, as well. Some pine species in the DMZ and CCZ appear to have been intentionally planted. In the Cheorwon area, intentional fires

Table 2: Habitat Types in the DMZ and CCZ*

Coastal	Wetland
• Open sea, sub tidal	• Forested
• Islands	• Reed bed
• Rocky shore	• Peat land
• Sandy shore, estuary	Grassland
• Lagoon	Woodland
• Sand-dune	• Coniferous
• Salt marsh	• Deciduous
• Sea cliff	Coppice (young tree stems, small growth)
River	Scrub succession
Lake, reservoir	Urban areas
Farmland	

*Kim, Kwi-gon, Dong-Gil Cho. “Status and ecological resource value of the Republic of Korea’s Demilitarized Zone.” *International Consortium of Landscape and Ecological Engineering and Springer-Verlag, Tokyo 2005*. Vol. 1, No. 1. 19 March 2005, 17.

have been set to maintain visibility for many military exercises. The result is domination of these areas by broad-leaved shrubs.

Grasslands

Grasslands exist in low, flat areas, on rice paddy levees and at the edges of agricultural areas in the west, on hill and mountain sides on the eastern side and in bottom lands in the central and eastern portions of the DMZ and CCZ. Some are restricted due to intentional and natural fires. On sloping lowlands are geranium among other species.¹⁶

Wetlands

Due to the presence of lowlands, there are extensive wetlands at the western end of the DMZ and CCZ, especially in the Cheorwon Plain, which serves as a wintering site for globally endangered Red-crowned and White-naped Crane. Riverine wetlands are present near the Imjin, Han and Sachon Rivers on the west coast, along with palustrine-generally small, shallow and inland-wetlands near Yeoncheon. At the eastern end are valley and lacustrine wetlands, those that are located at the same elevation as a lake and

influenced by lake water levels and waves. Extensive tidal flats exist on the western coast, near Kanghwa Island and Gimpo. A unique habitat, the tidal flats are under pressure to be developed, as some are being at the present time. At the summit of Mount Daeam there is a high moor, reportedly the only one in Korea.¹⁷ The Yong neub peat land on Daeam Mountain is a registered Ramsar Site and has been designated a wetland protection district, ecosystem conservation area *and* a natural monument by the ROK Ministry of Environment.

Cultural Resources

The DMZ contains numerous historically and archeologically significant sites. On the east, Mountain Keumgang has four Buddhist temples, including the remains of one from 519 A.D. Kaesong on the west, at the northern border of the DMZ in North Korea, was the capitol of the Koryo dynasty (918-1392) and has numerous archeological locations. It is now the scene of a large development being established to create an estimated 600,000 to 700,000 jobs for North Koreans. On the southern side of the DMZ is Panmunjom, where armistice negotiations took place at the end of the Korean War. Battle sites like ‘Ice Cream Mountain’ and the ‘Iron Triangle’, graveyards and museums dedicated to commemorating war dead are plentiful throughout the region and attract thousands of visitors annually. In recent years, MIA searches also have drawn significant attention in the area.

Ecosystem/Economic Services

Ecosystem services are defined as any service or product of nature that benefits humankind. There are numerous techniques for placing a monetary value on those services, including travel cost, contingent valuation, contingent choice or conjoint analysis, hedonic pricing, market price and the productivity method.¹⁸ The above discussion of DMZ and CCZ biodiversity emphasizes the resources that are clearly available. When managed sustainably, they can provide billions of dollars to the Korean people far into the future.¹⁹ These ecosystem services can include: food, eco-tourism, water purification, carbon sequestration and many more. Table 3 (p. 71)

depicts some of the services the DMZ and CCZ can, and to some extent already do provide, whether we are aware of them or not. Tangible monetarily significant values can be attached to and derived from them. Table 4 demonstrates other services also being provided by the DMZ and CCZ.

One way to visualize potential of the DMZ is to look at it as having a mosaic of uses, something like a Central Park in New York City, including woodland, sport facilities, restaurants, walking and running paths, and much more, to serve a wide variety of needs and interests. Another way to see its potential is through the example of Yellowstone Park in the US, where for a \$40 million budget per year, \$1.5 billion is generated annually by the area around the park in terms of eco-tourism and related activities.²⁰ That is the power of looking at the DMZ and CCZ in terms of the ecosystem services they can create when managed sustainably. Included among these revenue and job creating ecosystem opportunities are the features mentioned in Tables 3 and 4.

Laboratory

A significant value of the DMZ and CCZ is that of examining the effects of leaving such a large area virtually untouched for more than fifty years. What other place in the world, where humans have been present for thousands of years, can we determine what a 50-plus year hiatus can do to help restore the land? One aspect of that examination can be to study what the natural succession process is when left largely uninterrupted by humans. In this “laboratory,” of course, there could be numerous schools and universities for research, training and educating of Koreans and people from all around the globe, as is being done in South Africa.

Tension Reduction, Improved Relations

A major potential value and benefit of devising ways to sustainably manage the DMZ and CCZ can be in the reduction of tension between the two Koreas and nations with a stake in the region, such as others now involved in the Six Party Talks-US, China, Russia and Japan. In the context of these talks and the Working Groups, conservation of DMZ and CCZ habitats and species would be a constructive topic to address, with identifiable

Table 3: DMZ Ecosystem Services and Ecosystem Types

Ecosystem Service	Ecosystem Types								
	Coastal, Marine	Island	Mountain	River, inland Water	Wetland	Grassland, dryland	Farmland, cultivated	Forest	Urban
Freshwater			+	+	+		+	+	
Food	+	+	+	+	+	+	+	+	+
Timber, fuel, fiber	+		+			+	+	+	
Products	+			+		+	+	+	
Biodiversity regulation	+	+	+	+	+	+	+	+	+
Nutrient cycling	+			+	+	+	+	+	
Air quality, climate	+	+	+	+	+	+	+	+	+
Human health	+			+	+	+	+	+	+
Detoxification	+			+	+	+		+	+
Natural hazard regulation	+		+	+	+	+		+	
Cultural, amenity	+	+	+	+	+	+	+	+	+

Table 4: Ecosystem Service Features Already in South, North Korea

Ecosystem Service Feature	South Korea	North Korea
Exhibits, museums	+	+
Observation towers, decks	+	+
Sports facilities	+	+
Resorts, hotels	+	+
Archeological, historical sites	+	+
Souvenir shops	+	+
Underground tunnels	+	+
Cruises	+	+
Agriculture	+	+
Local conservation groups	+	+
Parks	+	unknown
Local nature and wetland centers used for education, outreach, training	+	unknown

and attributable economic, social, cultural and biological benefits for all Koreans. In fact, these talks and working groups already are addressing economic subjects, which if they do not include discussion of impacts on the peninsula's environment, inside and outside of the DMZ and CCZ, could significantly exacerbate the existing environmental conditions in the two Koreas.

DMZ THREATS AND OPPORTUNITIES

Numerous threats exist in the path of conserving DMZ and CCZ ecosystem service resources. But, each threat can give rise to an opportunity. We will focus here on two of the highest priority threats, development and pollution. Some solutions can be leveraged and help address more than one threat area.

Development

Development is potentially the largest threat to sustainably conserving DMZ and CCZ natural and cultural resources. It comes in many forms and is already present:

- May 17, 2007 re-opening of rail and road links on both ends of the DMZ.
- Increasing encroachment on the CCZ, with, for example, the ROK Ministry of Defense proposal to reduce the size of the CCZ by five kilometers, from twenty to fifteen.
- Discussion of building large ports on the Han and Imjin Rivers.
- While not in the DMZ, filling in the Saemangeum tidal flats, southwest of Seoul in the Yellow or West Sea, sets a potential precedent for, and is prompting discussion of similarly filling in other tidal flats, a globally rare type of ecosystem, near the DMZ.
- Pressures from over twenty million people in the Seoul metropolitan area.
- Recent plans to build several entirely new cities between Seoul and the CCZ, DMZ.

- Discussion of expanding Inch'on airport.
- Increased road building in the area. Before the Korean War there were six national and six local roads and four important railways that passed through the DMZ area.²¹
- Industrial developments like Kaesong, in North Korea.
- Discussions of dams on some rivers that run through the DMZ.

These activities provide many benefits to the Korean people. In and of themselves, they don't have to be destructive. Much depends on *how* they are implemented. The opportunity comes in looking at development and conservation from a systems perspective, holistically, with an eye towards societal values. The Korean culture has always placed a high value on nature and things natural with, for instance, "quite remarkable attachment to the pine tree and to the many pine-covered mountains that range across the peninsula." King Wang Kôn, who re-united the country under the Kory dynasty in 935 AD, is quoted as saying in one of his *Ten Injunctions*, "I carried out the great undertaking of re-unifying the country by availing myself of the latent virtue of the mountains and streams." Koryô, which Wang Kôn shortened from Koguryo, itself means "high mountains and sparkling waters" and became the basis for the country's name.²²

These long-standing values can be the foundation of planning that involves all stakeholders and a systems approach to finding the right balance in the right places between development and conservation. The ROK government used that tack when looking at the feasibility of the proposed Tong Dam and determined it was not economically feasible after conducting a contingent valuation of the project.²³ Another opportunity to minimize development effects is to require environmental impact assessments (EIA) before construction, as was done prior to rebuilding the rail line and roads between North and South Korea. Also mitigating development is the use of structures to accommodate wildlife, as was done by putting animal bridges over the western DMZ rail link. Additional approaches to manage and minimize detrimental development impacts can include:

- Determine the most critical habitats to preserve through studies, some of which already have been conducted.

- Conduct valuation studies like that of the Tong Dam and those in the US to determine the value and extent of ecosystem services which the DMZ and CCZ can support sustainably.
- Transparently involve all stakeholders in the area to ensure their voices are heard.
- Develop national, regional and local legislation and regulations, including appropriate enforcement, to ensure preservation.

Pollution and Contamination

There are already numerous forms of pollution and contamination which have impacted or could adversely affect the DMZ and CCZ:

- Over one million land mines present in the DMZ (970,000) and CCZ (38,000), though there is a report of the south beginning to clear three areas of mines in the CCZ.²⁴
- Ordinance from military testing grounds and exercises in the CCZ.
- Air emissions from nearby Inch'on airport and cars from Seoul residents and from intentional and accidental fires.
- Agricultural chemicals used in rice fields near the DMZ.
- Deforestation, particularly in North Korea, that has prompted extensive erosion and flooding in that country.
- Runoff into the East and West seas from agricultural operations.

According to the annual Yale University Sustainability Index, the South and North Koreas rank 122 and 146 respectively out of 146 countries.²⁵ But, therein lies the opportunity presented by sustainably managing the DMZ and CCZ. Preserving critical habitats of these two areas can enhance linkages between other existing natural areas within Korea and in North Asia, improving all of them in the process, and enhancing ecosystem services available for all. There is a governmental agreement to allow protection of the DMZ for two years after reunification; however planning needs to occur before that time. Safeguarding the DMZ will depend on the political will to develop and enforce legislation and regulations governing its use.

Developing baseline data will be of significant assistance in managing the effects of pollution, global warming, military operations, fires and deforestation. These data will help determine changes that have taken place in the DMZ over the past fifty plus years, *and* in assessing impacts from future changes. To develop the data, installing strategically placed monitoring stations will be required and could be done collaboratively between North and South Korea. Other monitoring stations also could assist both countries in weather forecasting and predicting upcoming potentially serious storms.

The over one million land mines in the DMZ and CCZ offer an opportunity to work collaboratively with the world community towards a safer, more cost effective solution to remove mines that is not destructive of surrounding habitat. Currently, they can cost up to \$1,000 each to remove, which for the DMZ and CCZ would amount to about \$1 billion.²⁶ Numerous organizations, like Roots of Peace in the US, are dedicated to safe removal of mines in Afghanistan and other war torn countries.

Military operations also create the potential for contamination, with ordinance, both exploded and unexploded. As has been the case with transboundary parks in South Africa and neighboring countries, military personnel can be trained in conservation stewardship to provide future job opportunities as game wardens and guides. Such local jobs and a micro loan program also could help alleviate income disparities for North Koreans near the DMZ.

Other potential threats to the DMZ and CCZ include: deforestation, legal claims to land, costs of implementing plans, river channelization, unsustainable farming practices, intentional and natural fires, balance of power among stakeholders, increasing population, exotic species and income disparities in and near the areas being conserved.

4. INITIATIVES TO SAFEGUARD DMZ RESOURCES

A number of mechanisms to help preserve DMZ and CCZ species and habitats already have been suggested, including some studies to identify species and possible actions steps:

- Valuing the DMZ through the microscope of the World Conservation Union (IUCN) 1997 Red Data Book criteria for assessing sites,

there are at least twenty species at risk of extinction, including the Red-crowned and White-naped Cranes.

- The DMZ contains a number of resources that satisfy United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site criteria, including: endangered animals like the Amur Goral; natural habitats like the wetlands; earth's evolutionary processes such as rice paddy wetlands and peat lands; physical and geological formations such as the limestone caves in Cheorwon; and reserves for large numbers of animals like the Han, Imjin and Nam Rivers.
- According to criteria of the Ramsar Convention, an international agreement to protect wetlands, there are numerous important wetland areas, including: Yong neub area of Daeam Mountain, already a Ramsar designated site, wetlands in Paju and Cheorwon, and the island of Kanghwa with its adjoining tidal flats and estuary wetlands.
- The DMZ can meet all UNESCO Transboundary Biosphere Reserve (TBR) program criteria: ecosystem representing a biogeographic region, containing a variety of species and habitats to be conserved, where sustainable development can be applied and where public institutions, regional communities and the private sector may participate.²⁷
- Mt. Keumgang and Mt. Seorak of North and South Korea respectively are on the so-called "Tentative List" of UNESCO for potential designation as biosphere reserves under UNESCO's World Heritage Site program.
- Man and Biosphere (MAB) programme of UNESCO-the DMZ also possesses several features which would make it a candidate for MAB, whose "main lines of action" are: (1) minimizing biodiversity loss through research and capacity-building for ecosystem management, including research, training and education; (2) biosphere reserves-promoting sustainability, including the concept of using biosphere reserves as a platform for conflict prevention, increasing knowledge of environmental sustainability and involving young people; and (3) enhancing linkages between cultural and biological diversity, including local level sustainable use of biodiversity and raising awareness of

the role that cultural landscapes play in ecosystem management.²⁸

- A Green Belt like the one replacing the Cold War wall between East and West Germany. A similar concept is being explored for East European borders with former Soviet bloc countries and another was established in Kenya that is spreading to other parts of Africa.

Numerous Korean non-government organizations (NGO) are active in DMZ conservation, including the Korean Federation for Environmental Movement (KFEM), the nation's largest conservation NGO. There also are several government initiatives, including:

- Korea Environment Institute (KEI), a government research organization, conducting research on the DMZ.
- National Institute of Environmental Science (NIES)-work on DMZ species.
- National Museum of Biodiversity Resources.
- Forestry Administration.
- Presidential Commission on Sustainable Development, including work on a river estuary project.
- Gyeonggi and Gangwon Provinces-planning activities.²⁹ *In addition, individual counties that border the DMZ, such as Cheorwon, are conducting their own planning activities.*
- Ministry of Maritime Affairs and Fisheries-promoting designation of an international marine peace park in the marine borders of South and North Korea.
- Ministry of Administration-conducting a land survey in the southern portion of and inside the DMZ.
- Ministry of Defense-creating and publicizing audiovisual materials on ecosystems for officer training programs.
- Office for Government Policy Coordination-operating the National Council of the Master Plan for DMZ Ecosystem Conservation.³⁰

Dozens of conferences have been held on the subject in Korea and the US over the last several years. They have promoted dialogue on the global

uniqueness of the DMZ and CCZ and on potential ways of preserving these habitats and species, including the possibility of designating the DMZ as a Transboundary Biosphere Reserve (TBR) under UNESCO. Participants, including the Peace Park Foundation of South Africa, have shared their experiences in creating such parks. Visionaries like Nelson Mandela and CNN founder Ted Turner, have lent their support. Mr. Turner has helped to sponsor conferences and traveled to North and South Korea to discuss DMZ preservation with high ranking government officials.

In the US, The DMZ Forum, Inc., was founded in 1998 as a non-profit organization to devote itself solely to DMZ conservation. The Forum has conducted numerous conferences in the US and Korea, twice with sponsorship from Gyeonggi Province. It also recently formed a DMZ Coalition, patterned after numerous such groups in the US and elsewhere and now composed of over thirty individuals and organizations in Korea, Japan, South Africa, and the US, to provide assistance to the Korean people in preserving DMZ resources.

CONCLUSION AND RECOMMENDATIONS

The following are some recommended steps to assist the Korean people in preserving the globally unique assets of the DMZ and CCZ, although there are many others, to be sure.

Diplomacy

- As recently done by South Korea in the case of migratory birds, tie into existing international conventions and treaties, such as the Migratory Bird Treaty and the Ramsar Convention for wetlands. These will aid in establishing standards, obtaining funding and creating linkages with natural areas in the region, thus enhancing the ecosystem service value of these resources.
- Collaborate in all activities with the Six-Party Talks process.
- Create a bi-national commission to oversee conservation planning and implementation.

Education

- Develop and implement a program to enhance public and decision-maker awareness regarding values and benefits of DMZ and CCZ resources.
- As has been done in South Africa, establish educational institutions to train people who will work in and benefit from sustainable use of the DMZ and CCZ, such as technical schools, a university/universities or a ‘virtual’ institution, like the Great Rivers Partnership initiated with a grant from the Caterpillar company in the state of Illinois, US to bring together and disseminate information learned on four continents about protecting rivers, under auspices of The Nature Conservancy.

Legislative, Legal

- Conduct a study of ownership claims for DMZ and CCZ lands, some of which may pre-date even the Korean War to facilitate compensation and ensure fairness for local land holders.
- Develop legislation and regulations with funding, enforcement and verification, including clear and transparent standards of protection.

Planning

- Develop a coordinated plan, including all stakeholders on an open and transparent basis with “free, prior and informed consent” to minimize disputes, conflict and disenfranchisement at a later date.
- Develop a plan for land mine removal, providing funding for experimental technology and research to identify or create lower cost methods that do not destroy surrounding landscapes.
- Develop re-introduction programs, now under consideration, for species that once were prevalent in Korea and that could live successfully in the DMZ/CCZ, such as the Oriental White Stork and Crested Ibis.

- When planning, it is suggested that holistic concepts be used in assessing DMZ value by looking at them from a watershed and ecosystem or eco-regional point of view. Many species in the DMZ and CCZ live throughout Asia. Cranes migrate from Russia. Large fauna, such as leopard, travel throughout the peninsula. Tigers, once common in mountains outside of Seoul, live in the Russian Far East. With a watershed and ecosystem perspective, it also is easier to involve and motivate people living in the area.

Studies

- Conduct coordinated, systematic surveys and assessments of habitats and cultural assets to determine critical areas for conservation, using Geographic Information Systems (GIS).
- Conduct ecosystems services studies to value resources used on a sustainable basis.
- Identify legal and administrative mechanisms for land conservation from around the globe, including conservation easements and special tax incentives.

It is important in any of these efforts to obtain the perspective of all stakeholders, especially the Korean people. North Koreans do not want to “protect the DMZ” in its present state. It is a symbol of war, suffering and separation. The emphasis here is on *preserving* resources *in* the DMZ and CCZ that are irreplaceable and globally unique for the ecosystem service benefits to Koreans and people around the world.

Extremely important cultural, biological and financial benefits can accrue to the Korean people and the world from preserving the natural and cultural resources of the DMZ and CCZ. Due to a host of potential threats to these areas, there is obvious urgency to the preservation process. In Korea and the US, vital initiatives already have begun to assist preservation. More very specific and positive steps can and will be taken to ensure future sustainability of DMZ and CCZ resources as well as the people who depend on them.

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