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Freshwater Springs Preservation in Jejudo: Reinterpretation of Springs as an Ethnological and Environmental Resource

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Freshwater Springs Preservation in Jejudo: Reinterpretation of Springs as an Ethnological and Environmental Resource

Abstract

On Jeju Island, there are many freshwater springs because it is a volcanic island with abundant precipitation and rainwater. While springs were once plentiful in the island, due to depletion and urbanization pressures, many of the traditional wood and rock structures and spaces surrounding springs have become severely deteriorated. Until the 1970s springs served as vital community resources for water provisioning for drinking and household use, agriculture and livestock. However, after most springs fell into disuse, hydraulic engineers have maintained Jeju's springs with a concern for springs with strong flow and good water quality but disregarding human activities such as social, cultural and landscape context in the springs. In this research study, I address the cultural context as well as an environmental value of freshwater springs. In addition, it is necessary for people in Jeju recognize their ethnological identity in studying how their ancestors function spatially in springs and recording the design and shape of original structures which takes into account the historical, cultural and social elements of Jeju in the past. Also, I describe how to categorize various landscaping shapes of springs on Jeju Island through case study.

Keywords

Landscape Preservation, Cultural Geography, Freshwater Springs, Jeju Island, Cultural Planning

1. INTRODUCTION

While Jeju Island has undergone important changes since becoming a special self-governing province, Jeju's many springs have suffered due to: depletion, poor location, neglect, and/or haphazard management. As of 2005, the existence of 911 springs had been confirmed (Koh, 2005). Additionally, due to their central locations, 182 springs have been covered by concrete for construction projects (Koh, 2005).

Up until the 1970s, springs served as a vital community resource in order to provide water for drinking, household use, agriculture use, and for livestock. People gathered daily at the springs—to both socialize and exchange information. Springs also served as sites for shamanic rituals (Park, 2008). During the Joseon dynasty, rights to water usage were allotted according to need (e.g., agriculture versus fishing) and based on the number of household members (Koh, 2005). However, after most springs fell into disuse in the late 1970's and early 1980's, hydraulic engineers have ignored the value of Jeju springs, which possess significant cultural/traditional value. Unfortunately, freshwater springs have been generally disregarded within urbanization of Jeju, which has excluded landscape restoration based upon both social and cultural factors of Jeju. In reality, community seniors aged 70 to 90 years old are still knowledgeable of the historical, medicinal, and social uses of the springs. Elderly women in particular have strong memories of the springs due to the water gathering and laundering responsibilities they performed in their youth (Figure 1). In sum, this research addresses the importance of Jeju springs as a cultural, historical, aesthetic and sustainable resource for the Jeju community.

Jeju Island is a semi-tropical volcanic island with an average temperature of 14.7°C (Koh, 2005). Jeju is Korea's largest island and is located about 140 km south of the Korean peninsula. Oval in shape, Jeju Island measures 64 km from east to west and 26 km from north to south. The island is widely thought of as Korea's most beautiful island. This island began to form over 100,000 years ago when lava spewed from a sub-sea volcano and surfaced above the waters (Koh, 2005). The last volcanic eruption took place approximately 25,000 years ago; creating a crater lake (Baekrok-dam) at the summit of Halla Mountain (Jeju Provincial Government, 2004). Tourism is important to the economy of Jeju Island and is fueled by its abundance of natural attractions. There are many parks, tourist sites, and privately established recreational spots; all of which bolster Jeju's image as a visitor's paradise. Since becoming a self-governing province in 2007, Jeju Island has prioritized developing itself as a business and tourist destination of international standing.

Like many volcanic islands, Jeju Island's freshwater sourcing system is different from water supply systems in landmasses with non-volcanic topography. In Jeju's case, a spring is any natural occurrence where water flows to the surface of the earth from below, i.e. where the aquifer surface meets the ground surface (Koh, 2005). A spring might be the result of karst topography; where surface water has infiltrated the earth's surface (recharge area) becoming part of the area groundwater. The groundwater then travels through a network of cracks and fissures with openings ranging from inter-granular spaces to large caves (USGS, 2014). Most springs tend to be located in coastal areas.



Figure 1. Coastal freshwater spring in the 1940s, Jeju City
Source: Jeju Self-Governing Province, 1999

To understand the situation of the springs in Jeju, four sample springs were selected for case study to evaluate the extent of preservation. Each spring has considerable strengths and weaknesses with respect to culture, history, and landscape. Hence, the springs can be related to community planning and tourism/educational efforts. This research will shed new light on Jeju springs and provide possible solutions for community engaged spring preservation.

2. LITERATURE REVIEW

2.1 HISTORIC PRESERVATION AS CULTURAL ASSETS

Each Jeju spring includes varied historical structures surrounding it. The term ‘preservation’ refers to the maintenance of a property without significant alteration to its current condition (Tyler, 2000). A structure changes over its lifetime, and each change represents a part of its history and integrity. Tyler (2000) recommends that, in the case of the preservation of a historic building or landscape, changes are acceptable but must maintain the building’s historic integrity and as many original features as possible. Also, collaboration between the government and citizens could lead to the establishment of a robust preservation movement.

2.1.1 Cultural landscape

The springs of Jeju can be a great indicator to measure and evaluate historic landscapes

reflecting the history of Jeju. Murtagh (1997) contends that the concept of cultural landscape has evolved over time. This concept is still relatively new to the field of historic preservation and, while it has made a substantial contribution, it remains misunderstood or marginalized in many quarters. Cultural landscapes are seen as “those that are altered through human interaction on the vernacular level, often related to a desired function and with a discernable pattern” (Murtagh, 1997).

Riesenweber (2008) argues that a cultural landscape is a geographic area—including both cultural and natural resources, as well as the wildlife or domestic animals—associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values (Riesenweber, 2008). Geographer Arnold Alanen and landscape architect Robert Melnick emphasize that such places may be found virtually everywhere that human activities have left an imprint (Longstreth, 2008). Scholars and public officials can identify the common goals in historic and cultural landscaping through: mapping, observing, analyzing, tracing landscape change and deciphering successive layers of residue created from human activities.

2.1.2 Preserving nature and culture in springs

Natural areas may be significant for historical reasons, as well as for biological, geological, and aesthetic ones (Stepenoff, 2008). The ecological and scenic value of natural areas deserves protection, but so do the historical qualities that arise from connections between the land and human activities. Three important principles should guide the preservation of wild and scenic places. First, as Frank Waugh (2007) urged, we must strive to treat the natural landscape with reverence. Second, we should behave like guests in these areas, remembering that polite guests do not invade someone else’s home and start moving the furniture. Third, we need to accept the fact that the natural world inevitably evolves with the passage of time (Waugh, 2007). Whenever possible, we should follow a hands-off policy, even if it possess historic and traditional values and other scenic qualities may disappear.

2.2 ETHNOLOGICAL VALUES OF JEJU SPRINGS

Ancient villages were settled along the coastal areas because of the frequent occurrence of springs. Women have forged a very close relationship with the springs based on Jeju’s culture and history. Traditionally, women carried water from the springs to their homes with water jars called *Mool-Pahng*. Moreover, springs provided a space for women to share news and information and take part in village social life. Springs also served as a site where villagers entreated the ancient Jeju goddess Seolmoondae for safety from natural disasters prior to embarking on fishing or diving expeditions related to their livelihood. In other words, springs were at the physical and social center of everything that happened in the villages or towns of Jeju.

2.2.1 Critical water resources of Jeju

Communities obtained water from the springs for drinking, laundry, washing, bathing,

and watering livestock and fields. Locals referred to the springs as 'living water'. Communities gradually developed a self-governing system regarding the usage of the springs. Izumi (1965) argues that people in Jeju traditionally used ground springs at the shoreline on the island, but that, out of reverence for the supposed sanctity of the streams, adhered to strict regulations while doing so. Furthermore, villagers performed specific rites to the creation goddess of Jeju Island, Seolmoondae, for the sufficient provision of water sources and clean drinking water. They believed that if they did not respect the goddess of creation, water shortages might occur (Izumi, 1965).

2.2.2 The cultural aspect of spring water

Jeju was also the historical center of international trade between China and Japan. Many historical sites or documents evidence this fact (Kim, 2002). Thus, preserving the distinctive culture of Jeju should be approached from a different perspective than it is on the Korean mainland. According to the Tamra Historic Record (Tamra was the name of the dynasty existing on Jeju from the fifth to fifteenth centuries AD and was later absorbed by the Joseon dynasty), Jeju had many springs along the coast and built local villages on sites favored with springs boasting large volumes of water flow (Jeju-do, 1999). Each spring was given a unique shape in harmony with its surrounding landscape, while also utilizing space-saving methods. Moreover, some villages established strict regulations regarding springs usage, believing the creation god resided within. In order to accurately understand and record Jeju's culture, springs should be regarded as a national or provincial heritage; however, officials and scholars have neglected these very important historical resources.

2.2.3 Historical usage of Jeju springs

Springs were the most significant water resource in Jeju before the modern water supply system was introduced through the direct intervention of former President Park Chung-Hee. Springs used to be famous for their medicinal purposes, which varied according to the qualities of each spring. In the early 1970s, President Park Chung-Hee ordered that heritage sites should be restored in Jeju since Jeju has its own distinctive culture. HahngPahDooRhi Historical Site was one of the restoration cases, chosen for its various diverse historical springs. One such spring is affectionately known as Yeo-woo Mool (Fox Spring), due to a legend that local foxes used to convince people to eat their own horses' livers in the vicinity.

2.3 UNIQUE DIVERSITY OF STRUCTURES AROUND SPRINGS

Springs should be researched on the basis of geological, environmental and aesthetic practices since spring preservation needs to weld the demands of administrative system development with scientifically efficient water resource management.

Springs may be formed in any sort of rock. Small springs are found in many places. Springs are formed in limestone and dolomite in the karst topography on the volcanic island of Jeju. Both dolomite and limestone fracture relatively easily. "When weak

carbonic acid (formed by rainwater percolating through organic matter in the soil) enters these fractures, it dissolves bedrock. When it reaches a horizontal crack or a layer of non-dissolving rock such as sandstone or shale, it begins to cut sideways, forming an underground stream” (USGS, 2009). As the process continues, the water hollows out more rock, eventually admitting an airspace, at which point the spring stream can be considered a cave. This process is supposed to take tens of thousands of years to complete (USGS, 2009).

The quality of the water in the local groundwater system will generally determine the quality of spring water on volcanic islands. Moreover, the quality of water discharged by springs can vary greatly because of factors such as the quality of the water that recharges the aquifer and the type of rocks with which the groundwater is in contact. “The rate of flow and the length of the flow path through the aquifer affects the amount of specific time the water is in contact with the rock, and thus, the amount of minerals that the water can dissolve.” (USGS, 2009)

2.3.1 Shapes of spring structure

The springs of Jeju have a distinctive shape at each site. The shape depends on the geography, community culture, and usages. In cataloging the shapes of springs, there are five representative structural shapes (described below), which are designated by landscape and functional purposes.

Natural Rock

Natural rock (Figure 2) might have been a symbol of inspiration for the ancient people in Jeju. This shape is composed of natural lava rocks and they used the natural topography of the ocean or mountain side as a model. More interestingly, the natural rock shape does not look stable but has proven to be very strong during natural disasters; providing sustainable structures to neighboring plants and animals. Thus, this type would be the best model when Jeju restores its spring sites.



Figure 2. Springs of natural rock shape
Source: Jeju Development Institute, 2009

Sea Wall/ Tidal Spring

The shape of the sea wall/ tidal spring (Figure 3) shows the distinctiveness of Jeju's springs. According to Park (2005), freshwater springs can flow under the ocean, so the location of springs can be anywhere in Jeju. In low tide, we can approach these spring areas by walking, but in high tide they are submerged in the water. This spring type has another function: creating banks from the waves or typhoons. To understand disaster management, e.g. flooding, this sea wall/ tidal spring shape will be the primary example to study.



Figure 3. Springs of sea wall/ tidal shape
Source: Jeju Development Institute, 2009

Round Structure

The round structure shape (Figure 4) is similar to the natural rock shape, but the material used is different. Concrete or marble materials are used to build these spring structures. In other words, most round structure springs were built during or after the twentieth century (Koh, 2005).



Figure 4: Springs of round structure shape
Source: Jeju Development Institute, 2009

Rectangle Structure

The rectangle structure shape (Figure 5) was built after the New Village Movement; since in the 1970's, rural villages were undergoing construction and renovations. The central government provided lots of materials for new renovation projects. This spring shape is

still very popular for rural communities, but it does not possess any traditional or historical aspects of Jeju. Some springs were recently renovated with plastic materials, very unlikely to portray a traditional appearance.



Figure 5. Springs of rectangle structure shape
Source: Jeju Development Institute, 2009

Terraced Structure

The terraced structure shape (Figure 6) is the most well-preserved and historical spring type in Jeju. For example, YusooCheon has this style of spring. When people visit this site, they can experience and see the traditional water culture of Jeju. Judging from the environmental design, the water usage patterns in the olden days were very sustainable in Jeju.



Figure 6. Springs of terraced structure shape
Source: Jeju Development Institute, 2009

Other Styles

There are other very unique spring shapes in Jeju (Figure 7). Moonsoo-Mul was located near the Jeju Airport; so many tourists or local villagers took rested and relaxed in this area. Each village built very distinctive spring sites with natural materials according to their own traditions and concepts from their ancestors. For now, the spring sites are used as natural swimming pools, or fishery fields for ocean plants.



Figure 7. Springs of other styles
Source: Jeju Development Institute, 2009

3. CASE STUDY

3.1 INTEGRATING PRESERVATION PRACTICES WITH NATIVE JEJU STONE ARCHTECTURE AND SURROUNDING LANDSPACE

Preserving springs includes valuing the spatial components. This research is based on an analysis of spring preservation cases, which may contribute to better planning for springs in Jeju. Topics considered thus far have included: policies, cultural, historical data, issues related to implementation, and existing arguments regarding alternative approaches. At the community level, there is the consideration that planning research methods (such as Zoning Theory) and hydrologic engineering research methods (such as Artificial Recharge Technology) may need to be examined. In fact, Jeju is faced with losing many of its original traditional and historical sites surrounding springs, which are important elements of a water culture resource. In developing solutions for this issue; fostering community activities incorporating the cultural, historical, and educational aspects of the springs is one suggestion whose utility will be demonstrated.

The National Preservation Institute (NPI) has a specific conceptual foundation for recording, documenting and evaluating cultural heritage. This research used the NPI form for landscape assessment and the Jeju Development Institute form for evaluating the physical, cultural, and historical aspects of freshwater springs. The cultural landscape report of the NPI serves two functions: 1) it acts as the principle treatment document for cultural landscapes; and 2) it serves as the primary tool for long-term management (NPI Lecture Note, 2009). The NPI assessment provides a concise history of the landscape, its contents, and its changes over time, in addition to identifying its significant characteristics and features. Furthermore, this process guides treatment and management of the landscape by establishing the significance, integrity, and preservation goals for the resource. Thus, researchers benefit from the NPI landscape evaluations in that they promote the protection, preservation, and public education concerning the value of the

landscape.

The urban and environment planning team at the Jeju Development Institute also researched the four sample springs to identify desirable planning concepts for preservation. The strengths and weaknesses in current spring preservation practices are reviewed following the springs' introduction. Key factors having an impact on springs include urbanization, commercialization, and the estimated cultural and historical value of the springs. How can we approach these kinds of issues Jeju faces?

The four sample springs, each with its own distinctive characteristics, are: Goosit-Mul, Donsi-Mul, Gwa-Mul, and Geosurut-Mul. Goosit-Mul is located in a mountainous area; it has a very long history from the time of the Koryo dynasty, and has valuable historical structures surrounding the spring. Donsi-Mul is representative of the springs located in residential areas and the challenges they face. It has been renovated, but its structure has lost all of its original integrity. Gwa-Mul is located at a famous beach and is also in danger of losing its original structure due to the pressures of the commercial development process. Finally, Geosurut-Mul is located in the ocean and has been recently abandoned because of its isolated location from the villages.

3.2 FOUR CASE TYPES: CHARACTERISTICS AND PRESERVATION CONCERNS

3.2.1 Goosit-Mul (mountainous area)

Site history

Korean ancestors considered nearby water resources to be significant when they built castles. Goosit-Mul (Figure 8) was built for the purpose of providing access to fresh water for the local resistance movement warding off the Mongolian invaders during the Koryo Dynasty. The SamByolCho resistance, while originally formed on Kanghwa Island, made its way to Jeju and was the largest anti-Mongolian resistance group at the time. This spring was shaped like a trough, so people started to call it *Goosit* (trough). Also, the name *Goosit* possesses the meaning of wood and stone materials in the Jeju dialect (The Last, 1996). The reference to trough infers that Goosit possessed a high water flow sufficient in order to provide water for livestock and for horses used in military battles.

Goosit-Mul still flows with a sufficient quantity of water, which implies that the quantity of the water remains high. Neighboring villages used this spring as drinking water until the municipal water supply system was installed in the 1970s. During periods of serious drought, Goosit-Mul did not dry up and provided enough water for the villagers. According to village seniors, the water's taste was the best in the region. In 1270, SamByolCho came to Jeju and built a castle for defense against the Mongolian invaders near Goosit-Mul (The Last, 1996). The SamByolCho soldiers constructed walls to protect and hide this important spring. The remnants of the castle foundation are still well preserved and maintained by the Jeju Provincial Park Service. While this spring was originally used for the purposes of drinking, washing, laundry, and feeding animals; later it began to be used as pure water for village rites, where seniors prohibited the use of this water for any purposes besides rituals (The Last, 1996).



Figure 8. Goosit-Mul
Source: Chang-Yu Hong (2009)

Existing conditions

Since Goosit-Mul is part of the Provincial Park of the Anti-Mongolian Resistance, workers at the park service periodically check the spring. Most of its landscape sites and structures are very well preserved, maintaining the original and authentic characteristics of the spring. For visitors, they provide an information pamphlet in Korean, English, Japanese, and Chinese. The provincial park service takes care of this spring as part of the larger park's historical importance. In particular, this spring has surrounding walls of black stone. The distinctive water flow style shows the wisdom of Jeju's people, who considered sustainable ways to use this water resource.

Analysis

The originality and appeal of the Goosit-Mul is very clear, as is its potential for community cooperative works since both villagers and visitors alike revere this historical freshwater spring. The greatest preservation strength of this spring is the fact that the provincial park service is primarily in charge of maintenance. With clear decision-making authority over the spring, there is good potential for the community and administration to work cooperatively for the spring's preservation.

3.2.2 Geosurut-Mul (ocean side, isolated from villages)

Site history

Geosurut-Mul (Figure 9) means 'to flow in reverse.' Indeed, the spring's flow heads towards the mountains rather than the ocean (whereas most springs flow from the mountains to the ocean). Geosurut-Mul has the unique characteristic of being located in the ocean. It was difficult to find any sources about Geosurut-Mul because there seems to be little local interest in this spring.



Figure 9. Geosurut-Mul
Source: Chang-Yu Hong, 2009

Existing conditions

Geosurut-Mul is surrounded by natural stonewalls. Although villagers and local authorities did not maintain this spring, its shape was still in very good condition due to the stone stacking skills of its builders. However, it required more scientific investigation and examination of water quality and flow. Villagers said that the spring does not have any value because they do not use the spring anymore. This means that there is little interest in making it better and investing in the preservation of this local site. The stone walls are exemplary of the distinctive original wall style in Jeju. It's likely the structures were built during the Joseon Dynasty or the Japanese occupation period because there is no record of it after the 1950s. However, the Japanese colonial government had recorded it, as they had thoroughly researched and investigated all springs for their potential to provide enough water to the Japanese military in the Pacific area during World War II.

Analysis

The originality of the Geosurut-Mul was good, but its maintenance condition was very poor, in part because of its isolation from the community. Villagers and officials were very negative in their comments regarding this historical freshwater spring; commenting on its lack of utility due to its location in the ocean. At low tide, the spring area can be approached, but during high tide it becomes partially submerged in water. The greatest strength of this spring is that the original structure remains intact, so that the original style of Jeju stone architecture remains evident. However, since it has not been maintained, the water flow is very weak and contaminated. The local community and administration in charge of the spring should be trained to recognize this spring as an important resource, and not just for its productive water capacity.

3.2.3 Donji-Mul (residential area)

Site history

Donji-Mul (Figure 10) is located in Suwon-Rhi. The name of the village, Suwon, originated from their water resource because there were many springs in the neighboring area. Donji-Mul is the most famous and popular spring among them because of its accessibility to the residential area of a nearby village. In addition, this spring has

historically been associated with the woman divers' association. In 1882, during the era of King Kojong of the Joseon Dynasty, villagers worried about the female divers dying from accidents. Consequently they performed rites in this spring's area, importuning the Gods to protect these divers. Suwon's name may have been derived from traditional rites intended to ensure adequate water resources.



Figure 10. Donji-Mul
Source: Chang-Yu Hong, 2009

Existing conditions

The Donji-Mul used to have two spring sites, but now one has been renovated with a modern structure while the other retains the original shape of the spring structure. Villagers were very enthusiastic in supporting the renovation of the spring, but the result was a modern-styled structure without any consideration of the aesthetic and historical aspects, nor harmony with the surrounding landscape. Even though the use of concrete in construction was much easier and cheaper, there should have been more consideration of the significance of the original and traditional spring landscape style (Park, 2008).

Analysis

The originality of the Donji-Mul was lost, but villagers seemed willing to maintain the spring because it had been an important water resource for the community and people were very eager to welcome the symbols of modernization and westernization into their village. Several years ago, villagers used funding from the government for the spring renovation. However, due to a lack of regulations and preservation guidance, they destroyed the original stone structure and replaced it with an unsightly concrete building. The strength of this spring is its proximity to the residential area, making it convenient for villagers' to participate in the restoration and preservation of their springs.

3.2.4 Gwa-Mul (beach side)

Site history

Gwa-Mul (Figure 11) was a main root of KwakJi-Rhi (village). The village had a long

and rich fishery history and was located on the coast near the spring of Gwa-Mul. This spring, Gwa-Mul, originates from Halla Mountain, located 30 km away from the spring. Villagers used the supposedly sacred water from Halla to bathe. For a long time, the spring was segregated into men and women's bathing areas. The women's spring area is much bigger than the men since women performed tasks like laundry and washing dishes. Men, on the other hand, fed livestock like horses, pigs, and cows. Thus, the men's side of the spring has a trough relic. The villagers of Gwa-Mul are said to have lived longer than other villagers due to the medical powers of this spring. According to the Tamra Historic Book, Qin Shihuang (the Yellow Emperor of China) sent people to Jeju to find a special medicine for eternal life. The delegation he sent recognized Gwa-Mul for its life-tending properties, and they brought this water to China for their king. Furthermore, there are said to be three or four seniors who are presently over 110 years old in the village, and many seniors who are in their 90s. This adds interesting weight to the legend (Halla Mountain, 1996). Moreover, there is a special water treatment event called '*Mul-Maji*,' or massage therapy from the falling water.



Figure 11. Gwa-Mul
Source: Chang-Yu Hong, 2009

Existing conditions

The conditions were very good and clean but had already been renovated with new architectural technology. Thus, the original *Mul-maji* event had an original construction of a stone waterway that allowed water to fall on people from above. The spring has an ugly plastic shade in the middle of the site, which looks like a bus stop roof. Only the drinking water box is original, but this was damaged by the concrete walls. Greater consideration of landscape and preservation concepts is needed to renovate and restore this local spring site.

Analysis

Gwa-Mul is one of the most famous springs in Jeju because of the legendary life-extending properties of the medicinal drinking water. The originality of Gwa-mul was not maintained, but the physical condition remains sound because it is located in a popular tourist beach area. The commercial beach area has a local committee that cleans and

maintains those areas. Villagers and local people are very proud of their spring as a historical site with attractiveness to tourists. Even though it is located along the beach, it is affected by neither low tide nor high tide. Its strongest feature is its tourist appeal, enhanced by its prime location. It was radically renovated because villagers and local businessmen wanted to attract tourists to the spring and beach for their vacations. In terms of educational purposes, schoolchildren may experience social cooperation by working on spring preservation activities.

3.2.5 Evaluation: Commonalities and differences

This case study possesses the value of each distinctive spring site representing a specific geographic region. The four sample springs were reviewed to identify desirable planning and geographical concepts for preservation (Figure 12). Goosit-Mul is located in a mountainous area and has a very long and significant history from the Koryo Dynasty. Its score on the JDI checklist is 11 out of 18 points. Donji-Mul is representative of residential area springs which have been renovated and, thus, lost their original design. In spite of this, villagers seemed to maintain the spring because it is an important communal water resource and since people were very eager for modernization and westernization to occur in their village. Its score on the JDI checklist was 8 out of 18 points. Gwa-Mul is located at a famous beach and is also losing its original structure due to the commercial development process. Its score on the JDI checklist was 16 out of 18 points. Finally, Geosurut-Mul is located in the ocean and has been abandoned recently because it is isolated from the village. Its score on the JDI checklist is 9 out of 18 points.

This research on the NPI (2009) form and JDI freshwater spring checklist describes the strengths and weaknesses in current spring preservation practices. Among those sampled, the Gwa-Mul scored highest due to the Kwakji Beach Business Committee's spring renovation and maintenance activities. The Kwakji Beach Business Committee is composed of local villagers who work towards village development, and its rules are based on the community's shared ideas. Consequently, each spring requires different approaches for effective spring preservation based on the communities' actions, but the common prerequisite condition was regular and consistent ordinances at the provincial level.

4. DISCUSSION AND CONCLUSION

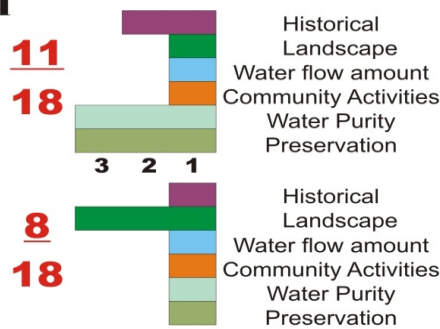
Worldwide, the pace of urbanization is accelerating; consequently, the threat to our environmental heritage is mounting (Murtagh, 1997). However, if, according to Lucas (1992), we prioritize the continuing use of a landscape, we also allow traditional ways of life and values to endure and evolve in harmony with the environment.

In June 2009, the ASEAN-Korea Summit was held on Jeju. At this time, leaders from various countries addressed the importance and roles of the Green Growth (2009). The summit's vision emphasizes the necessity of achieving environmentally sustainable economic growth in the Asia and Pacific regions by promoting effective environmental policies (Green Growth Korea, 2009). This movement will be able to change the

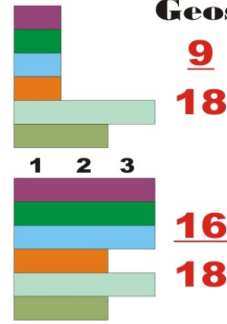
environmental management approach towards establishing sustainable and participatory water governance. Moreover, the master plan under the green growth aims to promote the positive role of the private sector like NGOs in supporting economic growth through environmental infrastructure investment, increasing demand for better-quality sustainable development. For example, flooding prevention technology through natural spring sites on Jeju will be a desirable case to show the efficiency of the sustainable growth. Thus, the spring preservation plan is one of the greatest catalysts for sustainable development.



Goosit-Mul



Geosurut-Mul



Donji-Mul



Gwa-Mul

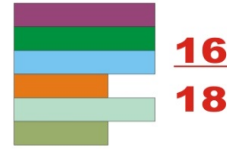


Figure 12. Evaluation of sample springs on Jeju

Springs in Jeju are considered to be part of the both historical heritage and cultural landscape, representative of the water culture of Jeju. During the process of modernization and infrastructure improvements, springs were overlooked and neglected in the land use plans by the central and local governments. Knowledge of spring maintenance and responsibility for the shared community upkeep of the springs had been

held by the elders of the community. However, most springs fell into disuse after the 1970s. Hydraulic engineers and public administrators have generally disregarded planning concepts that take into account the social, cultural, and landscape contexts of the springs. Fortunately, community seniors in their 70s, 80s, and 90s are still knowledgeable about the historical, medicinal, and social uses of the springs and have strong sentimental recollections of their childhood relationship with the springs. Moreover, the designation of scenic sites in Jeju's Natural World Heritage by UNESCO in 2007 is expected to generate many changes. Among these, it is expected that local residents' awareness of environmental conservation will increase, along with a heightened sense of pride in their island.

The number of domestic and foreign tourists is expected to rise, as will the value of Jeju's cultural and historical structures, contributing to the island's international reputation. Despite having a blissful natural and cultural environment, Jeju has a long way to go before turning its historical and cultural assets and splendid natural scenery into viable tourist resources. Much more debate and research is needed to draft systematic and sustainable plans in order to preserve and utilize these assets. Moreover, since Jeju has preserved its own history and culture, the community's shared knowledge also contributes to the new paradigm for preservation. Corburn (2003) also noted that community knowledge provides crucial political and technical insights, which are unknown to or not understood by professionals. Also, he argues that, on account of its epistemological and democratic contributions to professional policy making and planning, local knowledge must be included by administrators and scholars seeking to improve the lives of members of communities that are experiencing the greatest risks.

4.1 SYNTHESIS AND RECAPTURING THE IMPORTANCE OF PRESERVING SPRINGS

Topics considered in this research have included policy, cultural and historic data, issues related to implementation, and existing arguments regarding alternative approaches to the springs' administration issues. At the same time, the research also explored solutions for sustainable spring preservation at the community level. How can we approach these kinds of issues on Jeju? What are ways in which policy makers and engineers can motivate community interest and government investment in the springs, or use incentives to initiate a spring preservation movement in Jeju? After researching these Jeju springs' case studies, I concluded that each spring requires a different approach for effective spring preservation based on its community's actions, but that the common prerequisite condition was regular and constant ordinances at the provincial level. So far, direct stakeholders for springs in Jeju have been local villagers with an interest in maintaining their spring due to its historical or medicinal value, inextricably linked with local pride. They can make a system for spring preservation using traditional methods or by initiating a local residents' committee.

As discussed above, villages and local villagers need to follow common regulations from spring preservation committees, which should be composed of diverse professionals. Once local villages have a strong foundation for spring preservation at the local level, they can garner heightened interest in the springs, as well as elicit the participation of a wider range of stakeholders—especially those with a concern for Jeju's historical and

cultural heritage. Springs should be drawing the attention of archaeologists, developers, educators, geologists, historians, hydrologists, land conservationists, landscape architects, lawyers, planners, politicians, site managers for each spring, and regional volunteers. Indeed, Park (2008) argues that diverse professional contributions and cooperation in local communities and NGOs may be of potential benefit to spring preservation. To understand the situation of springs in Jeju, four sample springs were selected for evaluation of preservation methods and practices. Each spring showed considerable strengths and weaknesses in respect to its degree of cultural activity, historical value, and landscape aesthetics, and the spring restoration is directly related to community planning and tourism/educational efforts.

4.2 RECOMMENDATIONS

Jeju has been conducting community-planning projects according to the unique themes of each village (Koh, 2009). However, most projects are intended to generate physical renovation and material rewards. In particular, springs are not high priority areas for community development projects. Even though villagers may be interested in local springs, they may not be familiar with spring preservation concerns. It is time to recognize the value of the springs, review processes of spring preservation, and restore the historical and cultural integrity of the springs. Then, they may serve as foundations for other community and village making projects.

Currently, there is only one spring site registered as a provincial or national heritage site (Hyogamcheon). Perhaps more importantly, villagers and local authorities should have training in the significance of, and possibilities for, heritage preservation around sites of cultural and historical significance. Many villages and villagers have already lost a sense of spring-related identity, tradition, and culture from their ancestors (Koh, 2009). Moreover, a small number of village heads agree on the importance of local freshwater spring preservation for their community restoration. The Jeju government can support those villages that preserve their springs well with the profit from drinking water (*Samdasoo*) businesses. If there are policy pressure points needed to create a driving force at the local level, the synergy effect may be able to magnify the positive impacts of the spring preservation process. Therefore, the following suggestions for generating motivation for spring preservation at the village and local levels should be considered:

- *Spring governance mechanisms with spring development ordinances and regulations*
Jeju needs an oversight committee to control and regulate spring maintenance and preservation practices at the local level, in accordance with provincial or national regulations. The committee should be composed of stakeholders from diverse backgrounds. Also, they should come to a common agreement in their approach, and make a uniform policy of clear and simple rules to be followed by local-level groups.
- *Preservation programs and projects on spring sites*
NGOs and local institutes should take part in conferences and other opportunities to engage in a global dialogue about springs on islands. Around the globe, they can find many interesting cases and projects, and it would provide another motivation to have a spring preservation tool in Jeju. These activities would contribute to enlightening the public on spring preservation.

- *Documentation of historical records on springs*

Springs should be documented as official cultural heritage sites on the list compiled by the Cultural Heritage Administration of Korea. Without this action, little common recognition can be given to springs as important cultural and historical resources. Once there is an organized platform for springs, they may be developed as resources for educational, historical, and tourism entities. Many middle school and high school students from mainland Korea visit Jeju for their field trips, and they could also experience and learn about Jeju's local water culture and history through the flowing springs. Eventually, many students and future generations in all of South Korea may find the springs of Jeju to be rich educational resources.

- *Rational zoning systems for spring preservation*

The current local zoning system allows for the complete covering of spring sites, which are then categorized according to the surrounding land or buildings. Springs should be recognized as springs, and should not fall under the classification of residential buildings or agricultural fields. However, most springs still presently fall into residential or agricultural zoning.

- *Hydrological engineering research methods*

Jeju has been developing an artificial recharge system to collect sufficient water resources and to prevent flooding. Springs can contribute to this national project since they are generally located in downstream areas in Jeju.

- *Civic spaces for villagers and citizens*

Citizens need spaces to hang out and rest from their busy urban lives. Local springs can fulfill the same role of plazas in Europe. Although there is little likelihood that the majority of springs will return to their frequent usage of the past, there is the possibility for the sites to serve as social gathering spaces. Having a good community and social space will facilitate communication between residents. Springs also have the strength of providing drinking water and water for planting near the springs. People can drink and rest in the shade of the trees in the green spaces surrounding the water.

According to a recent news article on Jeju, there is a plan for Jeju to develop hiking trails alongside the shoreline springs to attract tourists (Jeju Bicycle, 2009). This is a very good start towards making good progress in spring preservation, because people should recognize the historical and cultural aspects of the springs. In addition Jeju province has planned bike paths along the circumference of the island, but it has yet to decide the placement of stations for bicycle rental kiosks and rest areas (Park, 2008). The springs can provide the answer for both of these considerations (water and rest space). This will make it a more desirable community development tool, as well as spur on the local economy. Moreover, springs may function as a tool of flood prevention, using artificial recharge technology that controls water release during the typhoon season (Park, 2008). These issues have never been discussed before in Jeju, but such ideas will contribute to improving Jeju's visitor and residential infrastructure, while maintaining its historical and traditional heritage.

Springs should be places that not only provide local heritage and historical landscapes for villagers, but also serve as favorite places for visitors and tourists. Then, people can consider the value of the springs and focus on preserving them for future generations.

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