Sustainability Strategy for Wudalianchi, China

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Sustainability strategy for Wudalianchi, China

by

Jingfen Guo

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

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Major: Architecture

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Iowa State University
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Abstract

This thesis develops a situated sustainability strategy for Wudalianchi, China, which has been nominated as World Heritage natural site. After reviewing related research on World Heritage; tourism and urban planning; social space, sense of place, and social sustainability; and sustainable design in the built environment, this thesis establishes a method for analyzing sustainability that features both standard and situated criteria, based on the unique aspects of the physical and built environments, as well as those of the social environment, involving spatial practice and sense of place. Using these criteria, this thesis then analyzes plans for the transformation of Wudalianchi as a host city for a World Heritage natural site and articulates where the plans might need to be further situated to achieve environmental and social sustainability. The thesis concludes with a sustainability strategy for Wudalianchi.
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Chapter One: Introduction to Situation and Issues

In 2010, the area of nature at Wudalianchi in China was nominated as a natural World Heritage site\(^1\). The World Heritage nomination serves as an impetus for a government-induced transformation of the town, which is currently attracting tourists mainly from China and Russia.

Although the use of the Wudalianchi area will not really be changed in the planned town transformation, its redesign as a World Heritage site may well involve reappropriation.\(^2\) Reappropriation in this case is a little bit different. That is, Wudalianchi as a town will be reappropriated not by its own citizens but by the global community. As Michael Di Giovine points out, “a place is inscribed as a World Heritage site not because it is something, but rather because it is representative or exemplary of something that can be understood, in part, through touristic interactions with the place” (39). Through international tourism, Wudalianchi will attain an identity as a World Heritage natural site. In the process, the sense of the place will be transformed, with the heritage of Wudalianchi belonging not only to town residents, but also to the “imagined community” defined by the world’s idea of what constitutes World Heritage (see Ashworth and Graham, 3-6).

The World Heritage concept itself grew out of a meeting of United Nations Educational, Scientific and Cultural Organization (UNESCO) in Paris in 1972. Nation state participants noted that the cultural heritage and the natural heritage of the world are

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\(^1\) According to the World Heritage Convention "cultural heritage" includes monuments, groups of buildings, and manmade works including archeological sites that are of outstanding universal value. Natural sites include physical and biological as well as geological and physiographical formations that have outstanding universal value (Articles 1 & 2).

\(^2\) Reappropriation usually involves a cultural process whereby terms or artifacts that were originally used in a way disparaging to a group are reclaimed and given a positive turn by that group.
“increasingly threatened with destruction not only by the traditional causes of decay, but also by changing social and economic conditions which aggravate the situation.” As a result, the convention adopted a manifesto pledging national and international protection of cultural and natural heritage <http://whc.unesco.org/en/conventiontext>. The driving force behind the charter is establishing the sustainability of existing cultural and natural properties. The World Heritage Convention couples sustainability in the environment with tourism in Article 5, where ensuring the protection and conservation of cultural and natural heritage sites is linked to their “presentation.” Such presentation inherently involves people, and the “World Heritage Information Kit” establishes “sustainable tourism” as a goal of World Heritage sites. Inherent, then, to Wudalianchi’s anticipated identity as a World Heritage site is not only conservation but also sustainable tourism.

The nomination of the Wudalianchi area as a World Heritage natural site is based on the unique character of its landscape. More specifically, the nomination rests on the Wudalianchi volcanic field, named for 5 lava-dammed lakes and featuring 14 cinder cones. The nomination also includes the fact that Wudalianchi is one of three sites in the world that has cold mineral spring water belts <http://www.volcano.si.edu/world/volcano.cfm?vnum=1005-03->. These springs have long been used for the perceived health benefits from drinking and from bathing in the water. Due to the springs, the town is currently well known in the area as a health resort <http://www.at0086.com/Wudalianchi/>. The town itself actually straddles a lava flow, which divides it into western and eastern sections.

Wudalianchi’s nomination as a natural heritage site invites a reexamination of Lefebvre’s idea that, with the social production of space, natural space is “disappearing” (30). Lefebvre states:
Everyone wants to protect and save nature; nobody wants to stand in the way of an attempt to retrieve its authenticity. Yet at the same time everything conspires to harm it. The fact is that natural space will soon be lost to view. (30-31)

That is, the natural is destroyed through our perception of it. The natural heritage of Wudalianchi will be politicized through making it a World Heritage area. As Di Giovine points out, the production of space at World Heritage sites always involves issues of authenticity and invites the question, to what extent will the transformation of Wudalianchi make it a representational space that “the imagination seeks to change and appropriate” (see Lefebvre 41-52; DiGiovine 38-39).

With the World Heritage nomination, Wudalianchi as a town is subject to new urban planning and updated physical identity in its city design, even though the town itself is not a heritage site. The town already established a “low-carbon city” as one of its main goals <http://houshan.wdle.com.cn/640.shtml >. The plans for Wudalinachi, in fact, feature aspects of sustainable development. This thesis explores the question: what are the site-specific sustainable strategies most appropriate to Wudalianchi’s transformation as a town site in close proximity to a natural World Heritage site?

This question assumes that strategies for sustainable development are situated, or embedded in a specific environment, setting, or situation. Of course, the idea that sustainable development should be situated is not new. For example, the editors of Sustainable Development: Principles, Frameworks and Case Studies point out the transient nature of interpretations of sustainability over time. Sustainability involves openly discussing, challenging, and debating ideas and perceptions of what constitutes sustainable development (Ukaga, Maser, and Reichenbach, ix-x). However, the situation faced by Wudalianchi is new
to the area and the community, and what constitutes sustainable development of the town must be rooted in the unique features of the site and must be allowed to influence sustainability criteria for development.

In providing context for exploring the research question “What are the site-specific sustainable strategies most appropriate to Wudalianchi’s transformation,” this chapter subsequently contains sections dealing with background of the Wudalianchi area and town, methodology, scope and limitations, and definitions.

**Background of the Wudalianchi area and town**

The Wudalianchi area currently has a population of 56,700, dominated by Han Chinese. Historically, the population in the Wudalianchi area involved nomadic Mongolian ethnic groups. Over time, the area has experienced a succession of influences, including those of the Chinese, Russians, and Japanese.

A map of the land topography of the Wudalianchi area captures the unique nature of Wudalianchi’s landscape, which includes various volcanic field features (Figure 1.1).

![Figure 1.1: Wudalianchi Area Topography](source)

**Source:** Whole Area Plan
These features are immediately adjacent to and north of the town, and suggest an important context for any urban planning that strives to include the natural and the social environment. The plains and wave-platform lava plateau also indicate a context important to the town in that these forms are used as cultivated land. The configuration represented by the area topography contributes to a sustainable agricultural system and defines a unique natural heritage.

The area’s “primary” industry involves farming and fishing. The Wudalianchi area’s land use is dominated by traditional farming. According to land-use data compiled for a 2000 hydrogeological investigation, farming as 51.8% of the total land area; forest as 25.3%; pasture land as 10.8%; residential and industrial land as 1.1%, transportation as 0.3%; water 4.6%; and unused land, accounting for 6.1% (Whole Area Plan 111). Secondary industry in the area includes mineral water production, which has the leading role, along with food processing, mineral cosmetics, machine repair, wood processing, and down processing. Tertiary industry includes tourism and health resorts.

Tourism in the Wudalianchi area can be contextualized in terms of tourism in the province. Wudalianchi is located in the Heilongjiang Province. As shown in Figure 1.2, Heilongjiang Province has three primary tourist attractions.

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3 Primary industry is defined as the extraction and collection of natural resources; secondary industry, as the manufacture of a finished product; and tertiary, as service industries.
Comparing the three attractions in Heilongjiang province, Jingpo Lake has had 60 million tourists in recent years, while Wudalianchi has attracted only 0.1 million during the same period of time. And, Harbin’s world-famous, week long Ice Festival alone has attracted between 12-15 million visitors per year in recent years (Zhang, 58). Tourism is an industry in the Wudalianchi area that could be further developed and that will be positively affected by a World Heritage designation.

Further development would have to address Wudalianchi’s remoteness and inaccessibility. There is no train service and no airport. Because there is no airport or train to Wudalianchi or surrounding communities, where access is limited to one second-class highway. It takes 7-8 hours to travel from Harbin to Wudalianchi on this highway, and about
5 hours to travel between Wudalianchi and Heihe City, on a road that is mainly gravel. Although a national highway between Wudalianchi and Heihe is currently under construction, existing roads are mainly gravel or dirt, and less than half can be traversed during both rainy and normal conditions (Whole Area Plan).

The climate of the area is subarctic. This climate is characterized by long, very cold winters and short, mild to cool summers, and features some of the widest temperature variations on earth. For example, the lowest recorded temperature in the Wudalianchi area is -44 degrees Fahrenheit; the warmest, 100 degrees Fahrenheit. The average temperature is 31 degrees Fahrenheit. The average yearly precipitation for the area is 18 inches (New Town Plan, 8).

The town of Wudalianchi shares its name with a larger town in close proximity. On Chinese maps, the name Wudalianchi Town distinguishes this municipality, which is my focus, from Wudalianchi City, a larger city that is about 30 minutes away by bus that has recently changed its name to Wudalianchi. The name, itself, means Five Interconnected Lakes < http://scenery.cultural-china.com/en/146S2688S7766.html>. For the purposes of this thesis, I will refer to my hometown (Wudalianchi Town) as, simply, Wudalianchi. The rudimentary form of Wudalianchi as a town began as the Daur visited the mineral springs sites there on a yearly basis⁴. The Daur set up camp in the area for a few days, before returning to their own area. The formal town was founded in the 1940s because of the land’s natural fertility for agriculture. In the 1960s, the town became known for its access to mineral

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⁴ The Daur people are a Mongolian sub-ethnic group that form one of the 56 ethnic groups officially recognized in the People’s Republic of China.
springs. From this point, Wudalianchi has been developing as a tourist site. A detailed analysis of the definitive features of Wudalianchi as a town appears in Chapter Three.

**Methodology**

In exploring the question, “What are the site-specific sustainable strategies most appropriate to Wudalianchi’s transformation?” I first did the library research to contextualize my discussion, using the key terms: World Heritage, tourism and urban planning, local physical identity (in architectural planning), landscape urbanism, and sustainable development. I also used Wudalianchi as a key term to locate situation-specific information on the site.

To discover information about the transformation plans for the site, I accessed the following three plans: the Whole Area Plan, the New Town Plan, and the Regulatory Plan:

- **Whole Area Plan**: This is the Wudalianchi Master Plan (2007-2025)—a revision of Wudalianchi Master Plan (1986-2010), compiled in 1986 by Shanghai Tongji Urban Planning & Design Institute and Department of Landscape Science and Tourism, Tongji University, and which covers the entire Wudalianchi area. This plan is referred to as the *Whole Area Plan* in this thesis.

- **New Town Plan**: This second plan has an identical official title to the first plan, and will be known in this thesis as the *New Town Plan*; the New Town Plan (2006-2025) was proposed by the Tsinghua University Institute of Landscape Architecture, Beijing. This plan focuses on town planning. In the new town plan, the buffer zone lines are established, according to "the implementation of the World Heritage Convention Guide."

- **Regulatory Plan**: The third plan is Wudalianchi Regulatory Plan (2006-2025), also designed by Tsinghua University, Beijing, to be referred to as the *Regulatory Plan*. 
My analytical methods involved identifying significant features of my hometown that would have to be accommodated in any plans for transformation, articulating the areas of sustainability. I analyzed the old town features and came up with criteria for sustainable planning that are regionally situated. These situated criteria were then used to critically analyze new town plans. Finally, I will develop a sustainable strategy for my hometown.

Another element of my analysis features a configuration approach. Discussing sustainability in urban environments, A. Van Nes argues that sustainability “can best be approached from a configurable point of view” and observes that sustainable topological configurations include “both structural and social aspects” (411, 415). Other researchers have used configuration to examine sustainability in rural areas. For example, Ghandour and Peter Goche propose “a spatial regeneration scheme” based on the configuration of farm communities (1). Their research uncovers four factors/principles of spatial regeneration that contribute to sustainability: 1) geographic consolidation, with sufficient population and networking but not necessarily with spatial density, 2) landscape morphology recognized in new patterns of development and use, 3) small cycle economic pattern centered on reinforcing community relationships, and 4) adequate and sustainable infrastructure (193-194). Each of these factors/principles grew out of a close look at the configuration of space. I will similarly analyze the perceived space of Wudalianchi with an approach that encourages the consideration of large-scale concerns including regional landscape as well as of small-scale concerns including town layout and residential forms.

Scope and Limitations

In exploring the question: “What are the site-specific sustainable strategies most appropriate to Wudalianchi’s transformation?” this thesis will focus on only those criteria related to the
unique aspects presented by Wudalianchi as a site of sustainable development. Although the thesis is most interested in the alterations that might have to be made to sustainability criteria so that such criteria can effectively accommodate the Wudalianchi situation, the thesis will also identify and use selected established criteria for sustainable development that represent an excellent match to the situation in the evaluation. Issues dealing with budget or economics, national and international politics, and China’s urbanization policies will not be the subject of critique. This study will also not cover World Heritage issues such as involving global warming and buffer zone management.

The limitations of this study include inadequate information regarding stakeholder participation in the plans under discussion.

Definitions

To understand this thesis, two definitions are necessary: one of sustainability as a concept, and the other, of the production of space. Sustainability, the impulse underpinning the World Heritage movement, is currently a hot topic in a variety of disciplines. According to Mike Jenks, the “most commonly cited definition of sustainable development has been drawn from the [1987] Brundtland report” (3). This report, sponsored by the World Commission on the Environment and Development (WCED), has as its primary concern that actions of the present should not compromise future generations. The report defines sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” It entails social equity, environmental protection, and economic growth. Within this context, Jenks cites various components as having the potential to “influence the sustainability of urban form” (3). These include concerns such as the compactness of cities, processes of intensification and decentralization,
and land use practices as they influence sustainability. Sustainability has many aspects, physical as well as social, but basic to this thesis is the social aspect in the production of space.

The idea that space is socially constructed is a concept derived from Henri Lefebvre’s seminal work, *The Production of Space*. In this work, Lefebvre recognizes that space entails more than simply geometry and that space includes social aspects such as politics, ideology and technology (Lefebvre 8-9). Lefebvre’s three-part categorization of space into perceived space, conceived space, and lived space (bullet two) will be more fully articulated in Chapter Three, where it will provide a framework for discussing Wudalianchi.

**Chapter Outline**

In this thesis, the chapters unfold as follows:

- Chapter One: Introduction to Situation and Issues, includes introduction, background, methodology, scope and limitations, definitions.
- Chapter Two: Literature Review, shows the research on four aspects: world heritage, tourism and urban planning, social space, sense of place, social sustainability and sustainable design in built environment
- Chapter Three: Spatial Production and Sustainable Analysis at Wudalianchi, introduces the production of space, analyzes built environment and develops situated criteria of sustainability for analysis and evaluation.
- Chapter Four: An Analysis of New Town Plan for Wudalianchi, uses situated criteria of sustainability to analyze the New Town Plan, and gives recommendations for the sustainable development of Wudalianchi.
Chapter One: Works Cited


“Heilongjiang Attractions Map,” China Tourist Maps. 30 March 2011


WuDaLianChi City. 23 February 2011. < http://wdlch.net/manager.do?viewType=newsdetail&bb=English&flowsort=01192012511293PM100 >


Chapter Two: Literature Review

In exploring the question “what are the site-specific sustainable strategies most appropriate to Wudalianchi’s transformation,” this thesis benefits from several bodies of research. In this chapter, I will discuss this research in terms of the following categories:

- World Heritage
- Tourism and Urban Planning
- Social space, Senses of Place, and Social Sustainability
- Sustainable Design in the Built Environment

The World Heritage body of research provides necessary definitions involving World Heritage sites as well as examples from various site situations. Because Wudalianchi has been nominated as such a site, information found here will help in understanding the situation faced by the town, the contexts informing World Heritage sites, as well as the issues surrounding such sites. Information on tourism and planning is important in two main respects. Because Wudalianchi is currently a tourist site as a GeoPark, this information will aid in understanding the current situation at the site as well as future challenges. This research will also clarify how tourism impacts the built environment and local economic development. The social space, senses of place, and social sustainability research provides information important to the social production of space found in Wudalianchi at present and as projected for the future. This research also provides insight into social constructions of space and criteria for the evaluation. The information on sustainable design considers issues in built environments and sustainable urban design, and also suggests criteria of evaluation. This research also indicates the situatedness as crucial to sustainability.
World Heritage

UNESCO provides information necessary to understanding the World Heritage mission, which involves the protection, conservation and presentation of the cultural and natural heritage at world heritage sites.\(^5\)

Research about World Heritage includes discussion of issues regarding human population in core areas of natural sites as well as the creation and management of buffer zones. The issue of the status of human populations in core areas of natural heritage zones is raised by the International Union for Conservation of Nature (IUCN).\(^6\)

No natural World Heritage site is immune from human influence or can be considered ecologically pristine . . . Nor is it the objective of many natural World Heritage sites to totally preclude human use. Indeed, many natural World Heritage sites are not nature reserves in the strict sense and some are multiple use areas that allow a range of extractive activities to take place. (Jim Thorsell and Todd Sigaty, 2)

Thorsell and Sigaty also point out that while a majority of natural World Heritage sites have no resident human populations, 47 of 120 sites have resident populations varying from 38 to 50,000. A total of 266,567 people live in natural World Heritage sites, with an average of 6,268 per site (3). Moreover, online resources suggest that preserving indigenous populations at World Heritage natural sites is part of the conservation mission. And, the IUCN Website considers balancing “the needs of people with the needs of the planet” as part of the mission, as well as reducing poverty and improving people’s lives through social and economic development <http://www.iucn.org/about/>. The research thus suggests that the removal of

\(^{5}\) UNESCO launched its World Heritage campaign with the publication of its document “Convention Concerning the Protection of The World Cultural and Natural Heritage,” 16 November 1972. This document is available online at <http://whc.unesco.org/archive/convention-en.pdf>.

\(^{6}\) The IUCN is the organization charged with the helping to protect World Heritage natural sites.
human populations from natural World Heritage sites is not required and, indeed, may be in violation of the social sustainability goals associated with such sites. This fact is important to Wudalianchi in that it contextualizes any plans for such removal found in the New Town Plan.

Also related to plans for World Heritage sites are buffer zones. Buffer zones are areas of land surrounding the core site established to enhance the protection of a conservation area and are now part of the effort to preserve designated cultural and natural sites. Not part of the original 1972 convention, buffer zones were established in 1977; as late as 2005, the inclusion of a buffer zone was recommended but not required in the Operational Guidelines <http://www.iucn.org/about/>. A variety of spatial patterns and arrangements for buffer zones exist, all following the same principle, but adapting to completely different conditions—ecological, political, economic, as well as geographical. Hence, a wide diversity can be observed in the criteria for their creation and management of buffer zone with most commonly considered aspects being: size, ecology, economy, legislation, social and institutional impact (A-Z Areas of Biodiversity Importance).

Another issue at buffer zone site is in a discussion of the African Ngorongoro crater, where “an increase in human activities, not compatible with conservation interests has threatened the site” <http://www.eturbonews.com/9119/africas-unesco-ngorongoro-conservation-area-faces-significant-eco>. These activities included traffic congestion on roads leading to the crater, proposed major hotel constructions on the rim of the crater, and the mass tourism policy itself. This resource suggests that one criterion in the planning and management of World Heritage sites is achieving a balance between preservation and tourism, and between nature and economic benefit. Overall, the research on buffer zones establishes that not only does every site have different experiences with buffer zone management, but also there is no single set of specific guidelines that can be stipulated for World Heritage buffer zones.

Complex problems can occur at sites overall. For example, Yellowstone, a World Heritage site since 1978, faced legal problems that emerged when a mining company in an area north of the site proposed to help maintain environmental quality by using a cyanide-free process for gold extraction and cleaning tons of historic tailings. What the company did not know was that these strategies, recommended in domestic law, did not meet international law requirements, which govern World Heritage locations. Other issues emerged as various environmental groups “cited increased levels of tourism, geothermal development, road building, home building, new population clusters and efforts to control brucellosis in the park's bison as some of the threats to Yellowstone” <http://www.sovereignty.net/p/land/wildlandtom.htm>. Because of these threats, Yellowstone was listed as a World Heritage site in danger in 1995. However, Yellowstone was removed in 2007 from the In-Danger List because of “the progress made in addressing all the key issues
that led to the Danger Listing of the site” 7. Figure 2.1 outlines the threats addressed and outcomes achieved that led Yellowstone to be removed from the In-Danger list:

<table>
<thead>
<tr>
<th>Threat</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>Mining discontinued; U.S. government acquired lands in need of clean-up and assumed costs of doing so; restoration projects completed</td>
</tr>
<tr>
<td>Bison</td>
<td>Core Yellowstone bison population sustained at historic high levels. Issues regarding the risk of brucellosis transmission from bison to livestock addressed with vaccination of herds.</td>
</tr>
<tr>
<td>Cutthroat Trout</td>
<td>Gillnetting fishing-effort and efficiency increased. Improvements in lake trout removal technologies improve harvest efficiency, and mitigate negative effects of whirling disease and drought on trout.</td>
</tr>
<tr>
<td>Water Quality</td>
<td>Congress appropriated $22 million for water and sewage projects and special monies to replace all single wall fuel tanks in park. Deficiencies with wastewater lift stations corrected; monitoring/notification systems updated.</td>
</tr>
<tr>
<td>Road Impacts</td>
<td>Yellowstone developed integrated, methodical, long-term program to improve fabric of park’s roads and lessen unsafe conditions and unsatisfactory visitor experiences, and prevent resource degradation.</td>
</tr>
<tr>
<td>Visitor Use</td>
<td>Final Environmental Impact Statement (EIS) substantially reduces the daily maximum number of snowmobiles from historic highs, requires the use of best available technology for both snowmobiles and snow-coaches, and requires all travel groups to have guides.</td>
</tr>
</tbody>
</table>

Source: Data taken from 2008 Yellowstone Report

**Figure 2.1 Threats and Outcomes Resulting in Removal of Yellowstone from In-Danger List**

Keys to the successful outcomes included partnerships among various state and national organizations; the passage of protective statutes, regulations and policies 8; consensus-based planning and decision-making; and significant government funding. This case introduces the numerous and various difficulties that can be experienced by World Heritage Sites, and also suggests that effective solutions to a range of concurrent problems can be achieved with a well-planned, multifaceted, integrated approach.

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8 The many statutes governing the Yellowstone site can be retrieved from <http://data2.itc.nps.gov/npspolicy/index.cfm>.
Tourism and Urban Planning

The main emphasis of the World Heritage convention is to balance human and natural needs. Tourism is thus a factor inherent to World Heritage sites (Leask and Fyall 153). The very fact that tourism can be the subject of critique is the basis of serious tourism research. *Tourism Research: Critiques and Challenges* discusses tourism as a serious field of study with articulated methodologies, and raising such issues as the extent to which public and private funding be able to address the high cost of developing tourism infrastructure. In “Global Assessment of Tourism Policy: A Process Model,” D.E. Hawkins lists nineteen such issues in all, suggesting possible areas of application to Wudalianchi.

Authenticity is one concern of the tourist experience. John Urry suggests that the tourist can be imagined as “a kind of contemporary pilgrim, seeking authenticity in other ‘times’ and other ‘places’ away from that person’s everyday life (9). Articles from the Lansansky and McLaren collection discuss authenticity ironically in terms of tourist-site regeneration. During the regeneration of towns for tourists, new identities are constructed through media packaging, and sometimes “the very neglect of the city’s built environment” facilitates its later development as an authentic “old town” tourist destination (169). Papers at the 2008 International Conference in Huangshan also focus on the integrity and authenticity of the sites can be protected while, at the same time, granting tourist access.

Balancing the needs of tourists and local residents comes into play when existing local structures and environments are regenerated and redesigned with tourists in mind. Urry notes that tourism’s economic benefits are often less than expected and facilities built to support tourism do not always benefit the local population (57). Lansansky and McLaren assert that the tension between tourists and residents are often emphasized during
regeneration, when the “histories of specific structures, spaces and sites have been reconceptualized,” with some being preserved and celebrated and others left to decay in a process of amplification and suppression (1). In this process, buildings, cities and entire countries are “remapped by tourism initiatives to serve political, cultural, economic and scholarly goals” (1).

Problems that occur with the increasing in visitors at tourist sites which generates negative physical impacts that include “an abrasive clutch of motorized transportation,” the spread of diseases and the destruction of flora and fauna, in addition to problems with littering, vandalism and sewage disposal (Riddell, 170). Furthermore, Riddell identifies negative socio-cultural impacts, including the commodification of the local heritage or the degradation of local facilities. Riddell points out that things can “go away within the tourism industry,” especially if tourism growth “expands in a largely unplanned, unstructured and uncoordinated way” (172-73). Other problems include the need for increased tourist management. Shackley, for example, observes that “what has emerged is not only the desperate need to manage visitors for the benefit of sites, as well as the other way round, but also to find ways to manage the quality of the visitor experience” (xiv).

Focusing on World Heritage and tourism, Di Giovine sees World Heritage sites as a “newly ordered social structure” that can be termed a “heritage-scape” (6), because it approaches World Heritage sites as a socially constructed whole, and identifies “unity in diversity” as the “narrative claim behind the heritage-scape” (35). The book links “heritage-scapes” to Lefebvre’s discussion of monumentality, where the monument invokes claims of cultural possession and where place-making is a social and material process mediated by memory (26). Di Giovine’s work essentially conflates Lefebvre’s perceived and lived space
and sees the adaptation to new or “perceived” spaces as involving shared scripts, images, and narratives. In short, World Heritage sites represent for Di Giovine a social production of space that follows a script that is, to a large extent, tacitly shared by the whole world and that reflects the dynamic of globalization and, ultimately, strives for the goal of making peace (429).

**Social space, Senses of Place, and Social Sustainability**

The idea that space involves physical and social aspects informs the literature. In *The Production of Space*, Lefebvre claims that space “serves as a tool of thought and of action” (26) and is also “a means of control and hence of domination, of power” (26). Lefebvre’s understanding that architectural space involves more than a “strictly geometrical meaning” (1) brought about an emphasis on the role spatial practice plays in the definition of space. However, while researchers following Lefebvre emphasize the dynamic nature of space and the sense of space that people have about a place, others emphasize the physicality of both spaces and the sense of place invoked by built and natural environments. These environments are more “fixed” in nature and are, at the same time, more situated.

Regionalism in architecture focuses on “connectedness” to a place and responds to local needs⁹ (Canizaro 12). In architecture, regionalism might entail establishing connections between new and existing structures or drawing upon the region’s cultural heritage in design (21). Architectural regionalism fosters an understanding the concepts of “place” and “identity” that relates to my discussion of the New Town Plan. Understanding space and a sense of place as dependent on such “fixed” elements as volcanoes is important to my thesis.

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⁹ Architectural regionalism is focused on the local nature of design and its connectedness. Canizaro supplies a provisional definition of regionalism as a large area “with boundaries determined by a range of cultural and natural criteria” (18).
This understanding is discussed in detail in Frampton’s “Ten Points on an Architecture of Regionalism,” which offers a “manifesto” of architectural regionalism that emphasizes the important of the interaction of experience with topography, site, climate and light as well as with time (378-383). Such an understanding of space and place helps form one definition of situatedness. Frampton suggests regionalism is an architecture of place rather than of space, sensitive to time and climate, and inclusive of local experience (385). In other words, an architecture of place assumes some fixedness. At the same time, my thesis also involves Lefebvre’s dynamic sense of place in that I’m concerned with spatial practice of the spaces designed for Wudalianchi, with the attention to both local and global populations in the plans, and with how the built environments might contain identity in their spatial practices.

The connection between space and a sense of place can be understood that “the intersection of two emerging concerns in international development: sustainability and self-determination of indigenous communities” (Rhoades 1). Robert Rhoades’ collection, Development with Identity, maintains that a sustainable future, and how it is achieved, must account for local values, perceptions and capabilities, and not just what outsiders or distant policy makers assume would be desirable. Ultimately, the collection concludes that the pursuit of sustainability is a local understanding, not only because each community is ecologically and culturally unique but also because its citizens have special place-based needs and requirements. Thus, as S.S. Zubir and W.A. Sulaiman point out, developers need historiographical information about cities to understand the morphology of the place that includes outward shape, structure, color, pattern as well as internal form and structure (236). Zubir and Sulaiman not only see a direct connection between urban morphology and sense
of place, but also stress that neighborhoods themselves possess a “collective memory” connected to the place and thus are “living testimonies of our heritage” (238, 243).

The connection between space, a sense of place and memory is evoked when people are forced to move out of a space that they consider “home” to another space. Jamie Horwitz discusses a case where an entire town had to be moved because of flooding. She recounts how the expert plans, which modeled “the best practices of sustainable redevelopment,” were rejected by local residents, who put their stamp on the layout of the new town by using memories drawn from the old sense of place. Originally designed to have an efficient use of land space, the new town, designed by the locals, preserved spatial relationships between buildings and homes of the original site. Locals “instinctively configured a new town that reproduced their social relations but without the conscious regard for topographical variations, streams, solar gain, prevailing winds and so on” (190).

Other cases of forced removal raise quality of life issues. For example, in a Hong Kong case, when people were moved to newer, better buildings their quality of life (QoL) did not improve. This is because QoL was found to be dependent on residents’ ability ‘to develop a new network of trusted and helpful neighbors to replace the old one,” and such networking was negatively impacted by the new, unfamiliar, high-density environment (Ng, Kam, and Pong 356). The study also found that “the human cost of involuntary resettlement is considerable, and should be taken into account in the formulation of resettlement policy as well as the assessment of its impact” (356). Additional cases from Mexico City, where people resisted being moved from their “home” in the city dump, and from Phnom Penh,

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10 The case is about Patonsburg, Missouri, recounted in “Leaky Walls: Challenges to Sustainable Practices in Post-Disaster Communities.”
where “the livelihoods framework,” showed a range of social and economic problems associated with relocation (Solon) conclude that resettlement should be avoided or, at the very least, minimized. In line with these findings, G. Klunder argues that people-based impacts are more critical than construction-based impacts (369-377). Klunder’s statement points to the importance of social sustainability. As Lefebvre points out, sustainable design involves both physical and social aspects. *The Social Sustainability of Cities*, edited by Polese and Stren, in fact, defines sustainability for a city in terms of people, not buildings. Sustainable development is “compatible with the harmonious evolution of civil society, fostering an environment conducive to the compatible cohabitation of culturally and socially diverse groups while at the same time encouraging social integration, with improvements in the quality of life for all segments of the population” (15-16).

Social sustainability often involves inclusiveness and participation. While Riddell discusses the ethical dimension of participation by both obvious participants such as developers, conservationists and planners, as well as invisible participants, including individuals and entire communities (29), Enrique Penalosa discusses participation in sustainable development as a matter of political policy. Penalosa associates inclusiveness with a sustainable city that enables human happiness through a habitat where people can have contact with both people and nature, and feel included (319). Similarly, to increase inclusiveness, *The Humane Metropolis* recommends increasing public open space in city center, fulfilling the need for parks and green spaces within reach of city dwellers, for
boulevard systems connecting other assets (50), and for “purposeful amenities,”\(^{11}\) with bicycle paths and sidewalks connecting them (98).

Some professionals have not yet realized the importance of social sustainability, especially in China, as can be seen in master plans which ignore the fact that the transformation to a sustainable city must involve social transformation, where an infrastructure of shared resource distribution is understood and supported. In the *New Directions in Sustainable Design*, Shannon May critiques the master plan for Huangbaiyu in China because, although it has as its goal “a higher quality of life for the villagers,” the plan itself has “no discussion of villagers or children,” nor is there mention of “existing types of labor,” nor of “land tenure and its relationship to household income”: the plan only talks about “architectural form and expert-led systematic urban planning” (41).

The extent to which social sustainability can be achieved also depends on who has the power to make decisions. In “The Contest for the City Centre,” Gareth A. Jones and Ann Varley focus on the role power played at the World Heritage site of Puebla, Mexico\(^ {12}\), where the World Heritage designation supported municipal plans to renovate the city center (30). Jones and Varley assert that, in aiding the city to recreate an “ideal image in order to symbolically ‘recapture’ the centre” (39), the World Heritage ended up helping to “scratch away at the multiplicity of other meanings implicit in the centre to leave, or to impose, just one: a meaning congruent with an ideologically defined view of society and an idealized image of both the past the present” (41). In this case, the historic renovation of the city meant, on the one hand, the conservation of architecture, and, on the other, the destruction of

\(^{11}\) Purposeful amenities include cafes, banks, groceries, and so forth.

\(^{12}\) The World Heritage site of Puebla, Mexico is recognized as *Patrimonio de la Humanidad* by UNESCO in 1986.
the present ways of life (41). Jones and Varley politicize Shackey’s earlier concern that World Heritage cultural sites may accrue a “slightly spurious cultural history” (4).

Political and economic aspects are important to sustainability overall. Polese and Stren provide cover a range of policy areas affecting sustainability, including governance, social and cultural policies, infrastructure and public services, urban land and housing, urban transport and accessibility, employment, economic revitalization, and building of inclusive public spaces as major policy areas (16-36). Venetoulis discusses politics as the “distinctive leg” of sustainability (9), and Head, in The Brunel Lecture states, “the critical task is to take human development forward with much fewer non-renewable resources and an economic model where growth comes from the efficiency in using renewable resources” (22). Riddell discusses economics by focusing on “getting sustainable-in-intent conservation connected to profitable-in-intent development” (3).

**Sustainable Design in the Built Environment**

*Sustainable Development*, edited by Ukaga, Maser, and Reichenbach, defines sustainability as an ideal toward which planners work rather than an endpoint, and discusses the interrelated dimensions of sustainability including the ecological, economic, social, political, and epistemological (ix). Sustainability, according to Stren, White, and Whitney involves factors such as food supply, solid water disposal, transportation, health, water supply, energy supply, housing, environmental legislation, developing politics (265-280).
Important to any discussion of sustainable design in the built environment is the Melbourne Principles for Sustainable Cities, which are intended to provide a strategic framework for action in achieving sustainable development” (3). These principles include:\(^{13}\):

1) provide a long-term vision
2) achieve long-term economic and social security for all
3) recognize the intrinsic value of biodiversity and natural systems, and preserve them
4) enable communities to minimize their ecological footprint
5) build on the characteristics of ecosystems in development\(^{14}\)
6) recognize distinctive characteristics of cities, including their human and cultural values, history and natural systems
7) empower the people to foster participation
8) expand and enable cooperative networks to work towards a common, sustainable future
9) promote sustainable production and consumption
10) enable continual improvement, based on accountability, transparency and good governance. (4-13)

Social sustainability emphasized sense of place and attachment of place; also sustainability in the built environment characteristically emphasizes situatedness. In *Towards Sustainable Cities*, edited by Sorensen, Marcotullio, and Grant, differentiates between the planning necessary for sustainability in the West versus in East Asia, the editors claim that planning for Western cities tends to focus on finding ways to increase density, facilitate mixing of land use and enhance public transit use; while planning in East Asian countries

\(^{13}\) These principles were developed at an International Charrette held in Melbourne (Australia) between 3 and 5 April 2002 that was organized by the United Nations Environment Programme International Environmental Technology Centre.

\(^{14}\) Characteristics include diversity, adaptiveness, interconnectedness, resilience, regenerative capacity, and symbiosis.
“improve environmental quality, manage processes of rapid urban growth, encourage public participation and share the benefits of economic prosperity” (3).

A range of issues dealing with strategy, planning, development, and management; cultural heritage and architectural issues; spatial configuration and landscaping topics; and socio-economic concerns inform several sources on sustainable design. For example, in *The Sustainable City III*, B.A. Kazimee and R. Bartuska discuss city scale strategies including: the reanimation of the historic city center, design priority given to pedestrian and public transit systems, the use of state building codes to increase energy conservation, and the move toward self-sufficiency in waste disposal (362). Also in this collection, A. Chiesura links the presence of natural areas in urban contexts to the sustainability of cities and the quality of human life. And Van Timmeren, Eble, Verhaagen, and Kaptein explore agriculture, aquaculture, and ecological sanitation and waste management, and linking infrastructures as important green spaces rivaling common green spaces such as parks (310).

Evaluating the success of sustainable is very important. Peter Nijkamp and Gerard Pepping point out that sustainable development has become “one of the touchstones of urban policy in recent years” and offer an application of meta-analysis to better understand the “critical success factors of urban energy policies” (1481). In “(Re)Analysing the Sustainable City,” Mark Whitehead calls the sustainable city “a leading paradigm of urban development throughout the world” and draws upon the “insights of regulation theory” to critically engage the sustainable city as a socio-ecological space (2003: 1183). In “Comprehensive Evaluation on Urban Sustainable Development of Harbin City in Northeast China,” Chunmiao Cai and Jincheng Shang regard cities as complex ecosystems where human activities are ultimately “restricted by the laws of natural ecological environment” (2009: 144). Cai and Shang
propose a series of five subsystems and thirty-seven indicators to evaluate urban environmental and socioeconomic development. All of these authors recognize the pervasive role the sustainable city concept now plays in urban development and each offers a way of evaluating a sustainable city’s success.

Strategies and criteria of sustainable design are discussed in many resources. In *Ecological Urbanism*, articles establish the importance of a process-based approach to urbanism and focus on an aspect that takes into consideration how "urban landscape architecture integrates landscape with infrastructure" (Waldheim, 39). *Sustainable Urbanism* by Douglas Farr provides concrete discussions of aspects important to sustainable design such as street design criteria for walkability, fine-grained analysis of mixed land use, and high-performance infrastructure involving public right-of-way “encompassing street and sidewalk, underground utilities, storm-water infrastructure, landscapes, and streetscape elements (278-80).” *Compact Cities*, edited by Jenks and Burgess discusses issues involving population density and infrastructure. *Strategies for Sustainability: Asia*, edited by Carew-Reid, establishes the relationship between national conservation strategies and development planning, and provides ten conditions needed for an effective strategy for sustainability (6-7), including drafting action plans and environmental action plans, as well as using federal capital conservation strategies and national strategies for sustainable development.

Interrelationships between nature and sustainable development are discussed in Ian McHarg’s *Design with Nature*. McHarg is concerned with considering both natural and social conservation as important factors in land development. He believes that evaluating

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15 One of the cases included at the end of the book focuses on Dongtan, Shanghai, China.
projects should involve nature and social conservation issues,\textsuperscript{16} and that providing for open space in the city serves the double purpose of ensuring the availability of natural land while also “employing lands unsuited to development in ways that would leave them unharmed by these often violent processes” (56). Such an examination is necessary to understanding what constitutes a “creative-fit-healthy” environment (195). Emphasizing the cooperation of human and natural factors, and partnerships between humans and the natural environment, Peter Newman and Isabelle Jennings in \textit{Cities as Sustainable Ecosystems} present models for sustainable development based on natural systems, including the metabolic model (29), and various cycles, including the carbon cycle (245).

Joining these sources linking human and natural environments are sources on landscape urbanism. \textit{The Landscape Urbanism Reader} is a collection that describes a “disciplinary realignment” in which “landscape replaces architecture as the basic building block of contemporary urbanism” (11). In this collection, Christophe Girot comments that urban landscapes have “in great part become \textit{sui generis} environments–that is to say that sites are no longer composed as such, but rather produced and transformed by abstract rules and regulations” that may appear “after the fact” (101). This time-based fluidity requires “a vision capable of transcending the present condition, drawing on unforeseen priorities” (102). Linda Pollak contributes the term \textit{constructed ground} to the study of landscape urbanism\textsuperscript{17}; Pollack also features a time-based approach and emphasizes that landscape design must recognize the potential for reinvention and reconstruction (138).

\textsuperscript{16} Nature conservation involves slope, surface drainage, soil damage, bedrock foundation, soil foundation, and susceptibility to erosion should all be accessed in terms of sustainability (36-37). Social conservation involves historic, scenic, recreation, residential, water, forest, wildlife, institutional and land values (41).

\textsuperscript{17} Constructed ground “represents a hybrid framework that crosses between architecture, landscape architecture, and urban design, to engage the complexity of contemporary urban landscape” (Pollak 127).
Conclusion

The reviewed research discusses various aspects important to the conceptual linkage between nature conservation and culture preservation. In doing so, themes of situatedness, stakeholder balance, as well as sustainability in the social production of space and in the built environment thread their way through the discussion.

Figure 2.2, provides a summary of the concerns in the research and suggests a range of aspects and discussion points that could be used in criteria of evaluation.

<table>
<thead>
<tr>
<th>Concerns</th>
<th>Possible Criteria Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situated Vision</td>
<td>• factors inherent to global aspiration of Wudalianchi as World Heritage site articulated</td>
</tr>
<tr>
<td></td>
<td>• Wudalianchi’s mission identified</td>
</tr>
<tr>
<td></td>
<td>• overall match between Wudalianchi goals and Beijing plans for city established</td>
</tr>
<tr>
<td>Stakeholder Balance</td>
<td>• variety of stakeholders identified and consulted</td>
</tr>
<tr>
<td></td>
<td>• expert and non-expert participation in planning</td>
</tr>
<tr>
<td></td>
<td>• scale and capacity considered for both local residents and tourists</td>
</tr>
<tr>
<td></td>
<td>• buffer zone creation respects both community and conservation</td>
</tr>
<tr>
<td>Materiality of Sustainable Social</td>
<td>• tourism infrastructure and services adequate</td>
</tr>
<tr>
<td>Space</td>
<td>• connectivity of and accessibility to open public spaces and green spaces</td>
</tr>
<tr>
<td>Sustainability in the Built</td>
<td>• attention to carbon footprint issues</td>
</tr>
<tr>
<td>Environment</td>
<td>• adequate attention to water as a resource</td>
</tr>
<tr>
<td></td>
<td>• mixed land use and population density</td>
</tr>
<tr>
<td></td>
<td>• walkability</td>
</tr>
<tr>
<td>Space-Production Continuity</td>
<td>• spatial relationships in redesigned town account for established spatial practice</td>
</tr>
<tr>
<td></td>
<td>• density of housing similar in old and new</td>
</tr>
<tr>
<td></td>
<td>• spatial memory of residents accommodated in new plans</td>
</tr>
<tr>
<td></td>
<td>• livelihoods insured in new location</td>
</tr>
</tbody>
</table>

Figure 2.2: Concerns and Possible Criteria Points Derived from the Research
Chapter Two: Works Cited


Chapter Three: Spatial Production and Sustainable Analysis at Wudalianchi

In his seminal work, *The Production of Space*, Henri Lefebvre makes a distinction between perceived, conceived, and lived space. Perceived space involves the practical or physical basis of perception of the outside world. Conceived space derives from knowledge and ideology that informs representations of the physical space. And lived space involves representational spaces having sources in both community and individual history (Lefebvre 41).

Perceived space is closely related to spatial practice, “which embraces production and reproduction”; conceived space involves representations of space; and lived space involves representational spaces, “embodying complex symbolisms” linked to social life (Conrad 2-3). In other words, perceived space features the material, and conceived space, the ‘ideal,’ while lived space involves local forms of knowledge, human experience, and subjectivity.

Although these spaces are not always clearly differentiable, Conrad offers this graphic of Lefebvre’s spatial and body triads:

<table>
<thead>
<tr>
<th>Physical</th>
<th>Mental</th>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial Practice</td>
<td>Representations of space</td>
<td>Representational space</td>
</tr>
<tr>
<td>Perceived</td>
<td>Conceived</td>
<td>Lived</td>
</tr>
</tbody>
</table>

*Source: Erik Conrad (3)*

**Figure 3.1: Lefebvre’s spatial and body triads**

This chapter describes the production of space in Wudalianchi as it currently exists and then analyzes it in terms of sustainability. For the discussion of space, I will use
Lefebvre’s three-part definition as a framework for discussing the built environment. The first part will discuss “perceived space” by talking about large-scale issues such as area configuration, before discussing land-use and spatial practice, where there is a close connection between daily routine and urban reality, or the routes and networks which link up public and private life (Lefebvre 38). Later sections will discuss conceived space in terms of existing plans for Wudalianchi as shown in the Whole Area Plan as well as the ideology informing land ownership in China. Then I will discuss lived space in terms of spatial history as well as cultural history, which involves the legends and stories associated with the site. For the discussion of sustainability, I will focus on how sustainability has to be situated in terms of Wudalianchi as a specific site.

**Perceived space**

*Regional Landscape Configuration*

The sustainability of the Wudalianchi area can be ascertained by looking at its configuration. Figure 3.2 shows this configuration with Wudalianchi being the largest community pictured. The more distant communities to the north are clustered around a lake, where farming is supplemented with fishing. The area’s configuration is dominated by agricultural land with the total agricultural population amounting to 63% of the population in the area (Whole Area Plan). The farmers participate in both industrial agriculture, where their goods are shipped to the national market, and productive gardening, where products tend to stay in the community.

Even though the farm towns are spread out, they are networked with roads and related economic practices, which involve farmers traveling from their smaller communities to Wudalianchi both to sell products, grains and fish, and to buy products that are unavailable in their communities. Vendors from Wudalianchi occasionally travel to the smaller towns to sell
their products, and they also purchase products from larger cities in the immediate area for later use or resale. In short, the economy features a small cycle of exchange that is centered on reinforcing relationships between communities and “reinforcing a sense of place centered on communal relationships and local food production” (see Ghandour and Goche, 194).

In Wudalianchi area, there also seems to be a harmonious relationship between agricultural communities and the natural environment. The natural environment, in fact, contributes to agriculture in that volcanic soils usually have high natural fertility that contributes to their agricultural use (V.E. Neall, 1). This relationship is probably one of the major assets of this area that needs to be preserved or recreated in any future transformation.
There are 15 farm communities in the area, the largest having a population of 2,600 with the others having populations ranging from 710-200 (Whole Area Plan). Each community features consolidation and small-cycle economy configurations. Configurations influence the
economic activities, which depend on potential movement patterns (Van Nes 416-417).

Figure 3.3 suggests how the configuration of a typical farm community enables economic activities. In this configuration, each community has an easily accessed commercial center; the typical farm community benefits from its small size, which enables direct connectivity and compact-form layout structure, as seen in Figure 3.3, where single houses are positioned side-by-side, with roads and alleys providing connectivity in terms of infrastructure. This layout is naturally consolidated. But, more importantly, the configuration also entails a productive garden at every house, enabling farmers to support themselves with fresh food and to sell extra production to members of the community.

Source: Map itself from Google Map

Figure 3.3: Configuration of typical farm community.

The configuration of the typical farm community also enables social connectivity. The houses and gardens are adjacent and neighbors can talk with each other over the fence. The alley is a place where people meet and communicate. In addition, the street corner represents a gathering spot, where outside vendors come to sell their goods, or where residents can share their produce. Social connectivity can also be found in the nature of the
farm work itself, which is non-mechanical and which provides a close link between family and community.

**Wudalianchi Configuration**

The configuration of Wudalianchi itself features several types of community configurations. It has the farm-community configuration in the southwest area of town where all the farmhouses are located in town in a particular neighborhood, as highlighted in Figure 3.4.

Source: Maps, themselves, from Google Map

**Figure 3.4: Wudalianchi Town Map with Farm-Community Component**
The configuration of the farm-community component itself is seen in a. This configuration resembles that of two typical farming communities in the area, as illustrated in b and c.

In addition to the farm community configuration, Wudalianchi has other configurations, related to the volcanic field landscape and the mineral water industry and tourism (Figure 3.5).

Source: Map Configuration from New Town Plan

Figure 3.5: Wudalianchi Land-Use Map
In the interaction between these components, the farm community provides food for town residents by selling food products along the streets or in the market, the mineral water industry offers additional job opportunities for farmers as well as others living in the town, and the tourism industry similarly provides employment. Overall, the residents of the town lead a low-carbon lifestyle. Because of the compact form, they are able to walk or bike to any given location in town. Food sources are local and do not require transport. The town also has low density, mixed-use, walkability, and open/green space—especially as it relates to natural landforms. These factors, as will be discussed later in detail, all contribute to the town’s sustainability.

Social Production in Perceived Space

Another layer in the social production of space in Wudalianchi involves the importance of a sense of place in terms of familiar configurations and urban form. The importance of a sense of place has been emphasized in research concerning the removal of people from their old residences or towns. This research reveals that new configurations interrupt social networking and interfere with social sustainability; new configurations can involve a range of factors including housing density and spatial relationships (Ng, Kam, and Pong, 356; Horwitz, 190). Furthermore, because the pursuit of sustainability is a local understanding involving special place-based needs and requirements (see Rhodes), there is a direct relationship between urban morphology and a sense of place (Zubir and Sulaiman 233).

Certain spatial practices in Wudalianchi encourage a sense of community and place. These spatial practices involve, for example, the use of the town’s main commercial district and the mineral springs sites. The main commercial district has both stores and open spaces; this set-up provides places for formal commercial activity in a market and for informal
activity in the places that local farmers sell their products. Besides this market area, there is a ji market that is organized once a week in a designated open space. Although the ji market is mainly for the residents’ use, it represents a good chance for both local and outside businessmen to sell products. The street has indoor stores that use the space in front of their buildings as an extension of the interior store space; it also has street vendors, who are very active. Some vendors are permanent, selling all kinds of goods or providing small repair services for shoes or bikes. Others are temporary, selling local farm products along the street. This commercial activity provides the local people with nearly everything needed for daily life, and the mixed land use makes it easy for customers to buy goods and use various services in a single stop. Such diversity of commercial activity is common in China, where the streets, themselves, are “commonly used as social and cultural spaces where people spend time relaxing and engaging in culturally specific activities” (Fernanco 61). In Wudalianchi, this space works as such a public place. Residents shop, communicate, linger, and stroll around, shopping for goods, bargaining for the best price, and talking with each other, often while holding their bikes. In addition, social interaction happens in the restaurants, which act as common places for meeting.

While the mineral springs are a major tourist destination, the local people are proud of this natural resource and use it on a daily basis. They have created public green spaces at the various sites. They usually walk or ride a bicycle to the sites. From every residential community in the town, local people take paths to get to the nearest mineral spring site, as shown in Figure 3.6.
In short, they have established an informal pattern of connectivity to the mineral springs sites. At first, the springs were just sites where the mineral water bubbled up and the residents dipped their bottles into the springs for water. Later, plumbing was installed, so water flowed from the spring through a tap used by residents. Currently, mineral springs sites have either inside or outside access to mineral water.

Other social spatial practices involve the perceived spaces of the “street,” “hutong,” and “kang” which contribute to the sense of place. The street is used by farmers to dry crops and sell products. Farmers, who have farmland at a distance from their homes, grow mainly soybeans, and from March to August, work the fields from morning to night. During harvest season, the farmers bring their produce into town, and the larger streets become a place of interaction. The farmers put their grain out on the larger streets in town to dry. During both the summer and harvest seasons, farmers also line up along this thoroughfare, selling produce
including watermelons, cucumbers, tomatoes, as well as cooked food, including barbequed meat to local residents.

A less extensive public gathering place available throughout the year, is the. Hutong is the general Chinese name for narrow streets or alleys between houses where people gather. The Hutong in Wudalianchi is a public gathering place, where people sit and play cards, or simply talk, usually in the evening when the day’s work is done (Figure 3.7).

Figure 3.7: Hutong and Kang

The farmers’ houses, themselves, also become gathering places, mainly throughout the winter. The winter is long in Wudalianchi, lasting from September-March; the farmers spend nearly the whole time relaxing and preparing for the next year’s work. They visit friends or relatives living in the neighborhood, and talk, eat, drink, and play games in their houses. The private house becomes a temporary semi-public space for an active social life, depending on how popular and hospitable the host is. In the farmer’s house there is a Kang that serves as a site of activity in the home. The "Kang" is a traditional long (2 meters or more) sleeping platform made of bricks or other forms of fired clay. Its interior cavity,
leading to a flue, channels the exhaust from a wood or coal stove. The heat of a cooking fire may be used for maintaining comfort in cool weather. Typically, the Kang occupies one-third to one half of the main room, and is used for sleeping at night and for other activities during the day. These activities might include putting a table on the kang and gathering around the table to eat, drink and talk. Social sustainability in Wudalianchi is thus connected to and generated by various, specific configurations of space and patterns of urban form.

**Conceived space**

The Whole Area Plan, which has since been superseded by the New Town Plan, is an important representation of the physical space of Wudalianchi. This old plan states, "The nature of Wudalianchi is an international sightseeing-tourist resort, a national-level place integrating science education, sightseeing, leisure, and health infirmary" (29). As such, the plan is situated in the natural environment of the area. This plan includes a plan that deals for population resettlement. In this plan, Wudalianchi is divided into three areas: those without population, attenuated areas of population, and controlled population areas (Figure 3.8). The Wudalianchi area has long been involved in the conservation and preservation of natural resources, and part of the planning has typically linked the preservation of natural resources with the control of human population numbers.
In Figure 3.8, the blue color shows non-population areas, including a 64 square kilometer-lava plateau, 14 protected volcanoes and protected forest areas, where no resident population will be allowed. The yellow color shows the controlled population area, where population numbers will be controlled within certain limits. The purple color shows the attenuation population area, including the western part of the town and other small villages, where the resident population will be reduced in stages through relocation in the new town plan.

Important to the representation of space in the area are definition of property and the ideology underpinning it. In other words, Wudalianchi’s location in China is an important part of Wudalianchi’s situatedness. Even though China is currently undergoing a transformation from state socialism to a market-driven economy, the state still owns the land (Hsing 3). With the promise of international and national economic development, however,
the definition of private property has recently become an issue in China. A concern for private property is, in fact, inherent in the World Heritage framework that assumes, to a certain extent, a role for privatization. However, even with a new property law developed in 2007, the Communist Party still believes the state owns all land and the ongoing “eviction of millions of people to make way for urban development” reinforces this idea of state control.

The significance of this state-owned conception of property can be seen in China’s characteristic response to urban development. Chinese urban development typically demonstrates “the Stalinist maxim that you can’t make an omelet without breaking a few eggs” (Liauw 215). Improvements to Beijing, for example, “have come at the expense of older hutong streets and housing fabric being forcibly demolished, or socialist-era factories relocated, releasing huge tracts of land—all land is state-owned—for urban renewal” (Liauw 215). Such growth does not take into account social, cultural and architectural qualities (Liauw 220). Overall, urban development in China typically involves the state demolishing the old to make way for the new. It also involves population removal from natural sites.

**Lived Space**

Lived space involves how communities understand space and includes stories, rituals, and symbols connected to that space. Lived space is complex, sometimes idiosyncratic, and often entails culture (Lefebvre 40). Because lived spaces have their sources in both community and individual history, lived space can differ from one person to the next, and interpretations cannot be taken for granted (40). Places “constitute a powerful part of the individual and

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18 The development of World Heritage Sites in previously Communist Romania, for example, involved “new laws encouraging small-scale privatization” (Muresan 30).
social practices which people use consciously to transform the material world into cultural and economic realms of meaning and lived space” (Ashworth and Graham 3). Below I will discuss the ethnic history of the Wudalianchi area, the folktales and stories told about the area, and the spatial history of the area as they help contribute to a sense of Wudalianchi as lived space.

Nomadic tribes originally populated the Wudalianchi area, which was a wilderness area. These nomads were mainly Daur, who lived along the Nemo'er River and Nen River, but the nomads also included another, larger Mongolian Chinese minority, the Oroqen, who currently live in Heilongjiang and Nei [Inner] Mongol provinces. After the Daur found that the mineral water at Wudalianchi could cure various illnesses, they began making an annual summer migration to the site on 5th in May in Chinese lunar calendar (around June in solar calendar), because this day is associated with the prevention of evil and disease. This day is also an ancient Chinese festival named Dragon Boat Festival Day. Over time, other minority groups came to celebrate too. They set up camp for a few days in the Wudalianchi area, before returning to their own areas. The place of the festival constituted the early, rudimentary form of Wudalianchi. Eventually Wudalianchi named this day as "holy water festival" which is the most popular festival in town for the people mainly from northern part of China. It is a cultural festival carrying out within three days, tens of thousands of public participants with folk cultural activities associated with the history, religion, and art <http://minsu.wdlc.com.cn/351.shtml>.

There are many folktales about the springs. One says that around a hundred years ago, Galasangbaiyiin, a young Daur herder, fell in love with Aqimeige, a woman slave. When the herd owner discovered this love, he beat Galasangbaiyiin and threw him in the stables.
Aqimeige stole a horse and, carrying her unconscious lover, rode away from the owner's house. But as they were making their escape, the owner shot a poisoned arrow striking Aqimeige and causing the lovers to fall into the South Spring. The cool water revived them and cured their wounds. In gratitude, Galasangbaiyin inscribed the words "medical spring" on the rock beside the spring. After learning about the spring's magical power, Daur herders swarmed to the spring and erected tents around it so that they too could drink the water and bathe in it. Although this story is a legend, Wudalianchi mineral water now enjoys worldwide fame equal to that of French Vichy mineral water and Russian Caucasus mineral water. <http://www.chinaculture.org.gb/en_curiosity/2005-12/14/content_77176_4.htm>

Wudalianchi also has an interesting spatial history. After the founding of the People's Republic of China in 1949, the Chinese government started a large area of reclamation, but there was still not a large population in the Wudalianchi area; in the early 1960s, there was still only a "production brigade," a basic accounting and farm commune unit, at the site. In April 1975, the provincial government approved the establishment of the Wudalianchi Management District in order to adapt to the tourist and mineral industry development. In 1976, the government decided to designate Wudalianchi as a National GeoPark. Figure 3.9 shows the spatial growth in three time periods.
The special challenge faced by Wudalianchi is the obligation to have sustainable development of both town and site. The sustainable development of the town is a goal stated in the town’s mission statement. The sustainable development of the site is inherent to the World Heritage mission, which involves conservation of cultural and natural heritage.

**Analysis of Sustainability**

The protection and conservation of cultural and natural heritage sites is linked to their “presentation” to a global audience. The low-carbon footprint goal posted on the town’s website relates to the conservation goals. In the sections below, I first discuss those factors that are areas that really need to be improved, and then I will discuss other areas, which at first may at first seem to be problems, are actually areas of strength.

**Areas of Need for Improvement**

The first area in need of improvement involves problems related to tourism development. Wudlianichi started to develop tourism in the 1960s in connection to its
landscape and its identity as a National GeoPark. Figure 3.10 shows an increase in tourism between the years 1988 and 2000.

| Tourist number and income from 1988-2000 (millions) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number | 5.3 | 6.0 | 6.7 | 6.5 | 6.8 | 6.6 | 7.5 | 8.6 | 7.6 | 7.8 | 8.5 | 5.4 | 10.0 | 90.7 |
| Health treatment | 2.8 | 3.2 | 3.0 | 2.9 | 2.4 | 2.6 | 2.6 | 2.2 | 2.9 | 2.0 | 0.29 | 0.51 | 3.0 |
| Travel | 2.5 | 2.8 | 3.7 | 3.4 | 4.4 | 4.0 | 4.9 | 6.0 | 5.4 | 4.9 | 3.3 | 5.1 | 9.49 | 60.5 |
| Income | 77 | 82 | 96 | 92 | 89 | 93 | 108 | 109 | 122 | 139 | 91 | 145 | 200 | 1444 |


**Figure 3.10: The number of the tourists per year from 1988-2000**

Even with this increase, tourism growth rates and numbers have been low, especially if compared to the tourism in adjacent locations in the Northeast China area (see Chapter One). Although the tourist numbers increased to 50 million in 2009, tourism as an industry in Wudalinchi could be further developed [http://news.hlj.net/100314/100661/121018.html].

The slow development of tourism in Wudalianchi can, in part, be related to poor tourism services, failed commercial efforts, and inadequate road access. Inadequate tourism services can be especially seen in the hotels and sanatoriums. Both hotels and sanatoriums reflect low quality in service and construction. For example, most of hotels do not have hot water, or the hot water is available only during a limited timeframe at night. The structures and materials are old, and the style of the architecture does not specifically take advantage of the volcanic and mineral-spring environment that makes the town site distinctive. The hotels, in short, do not fulfill the expectations of tourism that is sustainable by appealing to and meeting a “particular set of standards” found throughout the world (Law 189).
Failed commercial efforts also point to a lack in targeting tourist concerns. For example, there used to be a mall in the center of the town that was planned to serve both residents and tourists. However, with an increasing number of Russian tourists preferring to shop closer to the sanatorium that serves Russian visitors to the town, the mall closed in 2009, and shopping moved to a location where street vendors had already set up their shops. Although some new, small shops opened in 2009 near hotels on the eastern side of town, larger commercial sites have had trouble appealing to both tourists and residents who have different needs. The problem is that larger businesses that attract tourists have goods that are too expensive for residents; the businesses that attract residents tend to have products that are not of high enough quality for tourists. Of special concern are the needs of the Russian tourists. Because Wudalianchi has natural attractions and is close to the Russian border, the town attracts a large number of Russian tourists every year. Wudalianchi even has a Russian compound with a hotel, hospital, entertainments, and restaurants. The needs of Russian tourists, therefore, go beyond typical “tourist” goods and extend to basic goods for use in daily life. Attention to the needs of Russian tourists is especially important because the climate restricts other visitors. With a general tourist season that lasts only from June to September because of the severe climate, the long off-season must cater to Russian tourists, who tend to take extended-stay vacations in Wudalianchi regardless of the time of year. The World Heritage nomination may well affect the tourist pattern.

Tourism also would benefit from an improved transportation infrastructure. Transportation infrastructure is usually discussed in terms of a reduction of motor vehicle movements gained through a compact tourism zone and a clustering of resources (Law, 69-70). In Wudalianchi, which currently does not have a driving culture, the problem is more
anticipating future transportation issues. One big transportation issue is that plane and train services do not currently exist in the area to provide outside connectivity. Another transportation issue involves the roads that are poor quality and inefficient connectivity to larger towns in Northeast China is problematic. The national road between Harbin and Wudalianchi is a second-class highway, and the trip takes about 6 hours. The road to Heihe City, which is north of Wudalianchi, is mainly gravel, with 5-hour travel time. Because of the lack of connectivity in the road system overall, it is also currently difficult to get from Wudalianchi to other main tourist sites in the area, including both Harbin and Jingpo Lake (New Town Plan 52). Inadequate roads make it difficult to form regional networks, or transport products and provide services, which limits the growth of regional, local and international tourism.

Within Wudalianchi, the road infrastructure needs improvement both in terms of connectivity and quality. Many of the roads at the tourist sites, themselves, are gravel, making access difficult. According to the Whole Area Plan, less than half of the existing roads at all levels within both the town and the area can be traversed during both rainy and normal conditions. In short, there are currently few high-quality, high-grade roads in the area, making tourist access difficult (Whole Area Plan, 8).

The second area needs improvement relates to mineral water. A look at the Wudalianchi area shows that the water preservation and conservation is crucial. Mineral water in particular is key not only to the mineral water industry in the area, but also to the mineral springs that serve as a main tourist attraction. However, pollution and exploitation threaten the present water supply.
One threat to current water supply is the incomplete water system that serves the town. Because Wudalianchi is divided into two parts by the lava plateau, there are two separate water systems, one for the east and one for the west side of town. On the east side, one natural water source for drinking water is currently being polluted by human use, and on the west side, where the town was initially constructed without a water supply, the system does not serve every house, so there are local residents there who rely on fetching water to meet their needs (Whole Area Plan, 80-96). This water is not treated, and returns to the water supply are untreated.

Another threat to the water supply is pollution from inadequate drainage systems. The quality of groundwater (mainly mineral water) is threatened because Wudalianchi as a town does not have a drainage system. In western part of Wudalianchi, only three streets have drainage channels. Because of the lack of drainage facilities, untreated dumping causes the direct pollution of groundwater. Residents dump sewage anywhere, not only causing pollution to the water, but also causing odor in summer and ice in winter. Storm water overflows roads and ditches during the rainy season, further spreading a wide range of pollutants. The mineral water underground is vulnerable to infiltration from the polluted water on the surface.

The tourism industry and the mineral water industry also contribute to the pollution problem. Sanitariums and water mineral factories have built their own separate drainage facilities, and use sewage storage tanks. Unfortunately, most of these are built on the mineral-water belt. There are three industry sites located right along the lake that directly discharge sewage and waste into the lake.
Another large problem with the use of mineral water as a resource is its overexploitation. According to New Town Plan, the mineral water has a given capacity and level of regeneration. Beyond a certain point, mineral water cannot regenerate in a way necessary to preserve its original composition (Whole Area Plan, 30-31). Currently, because of the profit motive, the exploration of mineral water has become excessive. In the 1980s, the mineral water industry grew quickly, with many small-scale factories and little managed control. Because there are no restrictions to the amount of mineral water businesses could take, too much water was taken. For example, at one site, the mineral water was generating 110 tons a day, while the amount taken was 397.8 tons (Xiang, 35-37). This obviously was not a sustainable use of this resource. The mineral composition has been literally watered-down because of past industry practices, making it less effective. So improvements need to be made to control the amount of mineral water within its capacity for regeneration, and to fix the sewage system to lessen its impact on the environment.

*Areas of Situated Strength*

Understanding areas of strength in Wudalianchi’s sustainability involves adjusting certain expectations to better match the Wudalianchi situation. These standards involve expectations regarding density, walkability and mixed-land, and open and green space.

*Density.* Compactness or high density is a core value of sustainable urbanism (Farr 42), and increased density is also increasingly being looked on as a sustainable solution to urban sprawl (Fader 1). The normative thinking is that “low-density development results in the highest per capita demands on natural systems and habitats” (Farr 25). Wudalianchi, however, has a low population density of 425.47 square meters per capita.
For western cities, the strategy for sustainability is to achieve a "high density, compact urban form" (Sorensen, Marcotullio and Grant 13). This strategy would also seem suitable for China’s low-density rural communities in general and for Wudalianchi in particular. In Wudalianchi, the industrial areas are unevenly distributed throughout the entire town, and are not concentrated in a high-density area. The uncoordinated dispersal of industry sites suggests an organic pattern of development and points to the need for increasing the compactness of industry locations. In addition, the housing suggests the need for further compactness. Most of the residential areas in the west and southwest of city-center are one-story farmhouses with the traditional garden. There are only a few higher density residential apartments in the east side of the town. These are complemented by a few newly constructed, higher-density residential neighborhoods on the east side. Even so, altogether the residential housing in Wudalianchi is low density (Figure 3.11).

Sources: photo a: by Jingfen Guo; photos b & c: Wudalianchi website http://houshan.wdlc, com.cn/640.shtml

Figure 3.11: Low-density Residential

However, a closer consideration of the site suggests that Wudalinachi is indeed a sustainable mixed-use configuration and that increasing the compactness and density would not necessarily enhance its sustainability. First of all, the spread of Wudalainchi should be viewed in light of its small scale. The town has a population of only 10,000. Although the
town is relatively spread out, this has not resulted in higher energy costs because of the town’s small scale. For example, the town’s small scale makes this town walkable. There is no need for mass transit, and most local people walk or bike to commercial sites and to work.

Increasing density in the residential areas might be accomplished by eliminating the gardens that are part of each farmhouse, or increasing the density of the apartments, but it is hard to see how that would increase sustainability overall, since it is those very gardens that contribute to the family and community food supply. The low density of farmhouse with garden is required to produce local food, which involves sustainability. In addition, historically Wudalianchi is known for its natural features, and high-rise commercial buildings would not match the natural landscape. In fact, the low density of the town relates, in part, to the lava flow that bisects the town.

**Walkability and Mixed Land Use.** Walkability and mixed land use involve standards of sustainability that have to be interpreted in terms of Chinese cultural practices. Walkability is a repeated value associated with sustainability. Walking and bicycling are ‘green’ modes of transport that not only reduce congestion, but also have low environmental impact, conserving energy without air and noise pollution (Forsyth and Southworth 1-3). The walkability of a place is “shaped by the physical characteristics of both the public right-of-way and the adjacent private development” (Farr 151). But factors other than physical characteristics affect walkability.

The distance walked is the most important factor influencing choice of route (Agrawal 81, Forsyth Southworth 2). Distances people are willing to walk will “vary depending on geography, climate conditions, and land use patterns,” and will also vary according to “the weather, the time of day, demographics, the purpose of their trip, and many
other factors” (Pedestrian Facilities Guideline, 12). In addition, distances people are willing
to walk are influenced by culture. Most researchers state that a half-mile is a walkable
distance (Agrawal et al. 81; Rundle et al. 444). Thus, the standard expectation is that
destinations should be within a half-mile walk along a street network.

In Wudalianchi, physical characteristics of the town contribute to walkability in terms
of distance to travel in daily life. But the distances considered to be within acceptable limits
exceed usual walkability standards. For example, residents commonly, even daily, walk 15-20
minutes or bike 8-10 minutes from the southern part of the town to mineral water parks in
the northern part of town. This is technically beyond the standard half-mile limit. This is not
to say that there are formal bike paths and a complete system of sidewalks in Wudalianchi
that contribute to this walkability; in fact, people commonly walk or bike to destinations
using city streets or paths created by pedestrian and bicycle traffic. Overall, the relatively
small scale of Wudalianchi currently allows for walkability; however, the lack of sidewalks
and detract from the walkability of the town. And, using the adjusted expectation that says
distances of more than a half-mile are walkable, residents have no trouble reaching any
destination in Wudalinachi either on foot or by bicycle.

Mixed land use is another feature of sustainability. Overall, Wudalianchi shows a
mixed-land use in three scales: town, neighborhood and building. As can be seen in Figure
3.12, which shows at the town-scale level, the land uses of industry, service, and commerce
blend throughout the town.
Figure 3.12: Close Proximity of Amenities

The town center area also has mix of all kinds of services and commercial enterprises. Figure 3.12a outlines the mixed use in one residential neighborhood, where houses have second uses. These second uses relates to the close proximity of meaningful amenities along streets in neighborhoods that constitute mixed use. This configuration is currently the “goal” of sustainable development. In fact, Wudalianchi currently features the type of mixed land use recommended by researchers as a sustainable land-use configuration, which features compact communities with solutions including mixing residential and commercial land uses (Fader 1). These new communities would seem to mirror how Wudalianchi looks now. In other words, mixed use is a sustainable configuration that currently characterizes Chinese towns.

Open space and green space. Open space and green space are commonly associated with sustainability, which links to the importance of nature in the city. An increase in public open space, especially at city center, is an element of model land-use arrangements (Platt 15). Open space might serve the double purpose of ensuring the availability of natural land while
also “employing lands unsuited to development in ways that would leave them unharmed by these often violent processes” (McHarg 56). Urban open spaces are “defined as publicly accessible open places designed and built for human activity and enjoyment” (Francis 76). Traditional open space configurations include public parks, neighborhood parks, playgrounds, plazas, and pedestrian malls. Innovative open spaces include community open space, neighborhood open spaces, schoolyards, streets, transit malls, farmers’ markets, town trails, vacant/undeveloped open spaces, waterfronts, and found space (Francis 78-79).

A look at Wudalianchi reveals that its open spaces include traditional open space configurations as in the three parks associated with the three main mineral water sites, and the one volcanic park with Buddhist temple on the top. These four parks are major tourist sites and constitute the main green space in town, accounting for 8.69 % of total land use (Xiang, 34). North Spring, South Spring and New South Spring have drinkable water, and these sites have been developed into the parks. At North Spring, for example, there is a “Body Building Garden,” which is built in the Chinese traditional style with a Chinese gate, pavilion and corridor. South Spring has a “longevity garden” and is built in a modern style (Figure 3.13).

Source: Photos by Helen Rothschild Ewald

Figure 3.13: Mineral Springs: a. South Spring Park, b. North Spring Park, c. Author at North Spring
While this percentage would be within the satisfactory range for any given Chinese town, it is at the low end of the 8-15% national standard for any town and well below the “over 15%” green space benchmark set by Chinese Standards, Act 4.3.4, for tourist towns. In addition, there is little diversity with the parks, one plaza, a farmers’ market and some vacant/undeveloped open spaces constituting the available green/open space. General sustainability standards might call for an increase the amount and variety of green space in Wudalianchi (see Platt 50, 98), and The New Town Plan similarly calls into question the distribution and quality of the open space now in Wudalianchi. Currently there is an unequal distribution of open/green space within the town. In addition, the quality is of the open space is low, because there are no benches for sitting or other such structures. Also, the green space of the street is low quality, because the shade is often inadequate, the plantings are not diverse.

While there is no doubt that the quality and diversity of the traditional open and green spaces might be improved, there is evidence that the amount of open and green space in Wudalianchi has been underrepresented, both in terms of the built and natural environments. Two instances of open space in the built environment that have been unaccounted for in the Chinese analysis of old Wudalianchi include the grounds of the many sanatoriums in town and the personal gardens of the farmers’ houses (Figure 3.14).
Figure 3.14: Uncounted Open Space in Sanitariums and Farmer Houses

An even larger amount of unaccounted-for open space involves the open space of the natural environment that involves topography featuring the lava flow and local lake. This omission is ironic in that sustainable urbanism seeks to connect people to nature and natural systems, even in dense urban environments, because biophilia or human access to nature is a “core value of sustainable urbanism” (Farr 42, 49). Sixty-four kilometers of lava plateau flows through the whole town from north to south, which is great natural reserve and serves as open space for residents and tourists alike.

There are some issues involving accessibility, however. For example, while the green spaces in town are within the reach of town residents, some of these spaces are associated with sanitarium grounds, which are not are uniformly accessible to residents. In addition, the open and green spaces of tourist locations also have limited access because of fencing and walls around sites charging admission. “Open space is open when it is accessible”; in other
words, a fenced area is not urban open space (Lynch as cited in Francis, 80). Neither is a fenced tourist location, although Farr admits that parks may be fenced and locked at night, if necessary for security (170). And, tourist locations might have to be restricted due to issues of tourist management and landform conservation.

Therefore, the amount of the open and green space is not the issue; the wild landscape should be seen as part of such space, and the open space of sanatoriums and productive farmhouse gardens are local alternative public meeting spaces.

Conclusion

The town shows the sustainable strengths, which are the result of spatial practice over time and those strengths should be applied in the sustainable development of the town. Therefore, Site-specific sustainable strategies for the Wudalianchi will include criteria and issues reflected in the literature, as well as refinements drawn from the sustainable analysis of the existing built environment. Figure 3.15 provides standard and situated criteria for the site that would be used to analyze the planned changes to Wudalianchi represented by the New Town Plan proposed by the government.
| Configuration       | - Farm configuration maintains sustainability in terms of geographic consolidation, small cycle economy and social connectivity  
|                    | - Productive garden  |
| Density            | - Compact-form with low dense development features mixed-use and walkability.  |
| Mixed-use          | - More than one type of use in one building; set of buildings or neighborhood  
|                    | - The second use in front of the house  
|                    | - Mixed-use town center desired (in term of both social and connectivity)  |
| Walkability        | - Walking distance could be longer than half a mile  
|                    | - Shelter protects from bad weather  
|                    | - Sidewalks wide enough for tourist purpose and ample for the setting and anticipated use in commercial area  |
| Open space         | - Public spaces reflect cultural history (volcano and water culture, minorities)  
| and green space    | - Close to natural, access to natural landscape  
|                    | - Green space takes good use of current sanatorium open space  
|                    | - A variety of open space  
|                    | - Equal distribution  
|                    | - Balance of accessibility in term of tourism management  |
| Sustainable tourism| - Using tourism to support local communities  
|                    | - Adding airline or train line, and complete road system  
|                    | - Appealing to and meeting a “particular set of standards” found throughout the world  
|                    | - Complete transportation system connecting outside world and within tourist sites by  |
| Attention to water | - Preservation of the natural water resource by controlling the amount of mineral water within the capacity using for industry and tourism by complete sewage system lessen impact from human activities  
|                    | - Water culture continuity integrated with landscape  |
| Attachment to the place | - Spatial memory reflect collective memory of place  
|                    | - Spatial relationship reflect historical configuration  
|                    | - Access to the natural site and mineral water, by plan a cultural transportation system special for local to go the mineral site. Or by using water supply system transit the mineral water to the new town  |

Figure 3.15: Standard and Situated Criteria for Evaluating Wudalianchi
Chapter Three: Works Cited


World Economic and Environmental Conference: China’s Development. 10 August 2010  


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Chapter 4: Analysis of New Town Plans for Wudalianchi

An analysis of the New Town Plans for Wudalianchi can be contextualized in terms of what is happening at other Chinese natural tourist sites. In "Tourism in Wudalianchi," Xiang talks about the relationship between a natural tourism site and the main town around that site as part of a developmental process (23). He states that there are three stages in this development (Figure 4.1).

Source: Xiang (23)

Figure 4.1: Relationship Between Natural Tourism Site and Town

During the first stage, the tourism has not developed; there is mainly self-sufficient agriculture production, with the core natural site remaining independent, immune to destruction by human activities. During the second stage, the people become aware of the value of natural resources, with tourism starting to grow, and the traditional agrarian economy beginning its transformation to a tourism-oriented economy. The third stage involves a concurrent development of town and site, with a reappropriation of the town for tourism purposes.

With this national context as background, this chapter analyzes the New Town Plan for vision and sustainability. In terms of sustainability, the analysis will be limited when it comes to stakeholder participation. Although it is known that the New Town Plan was drawn up by a firm in Beijing, other information about stakeholder participation is unavailable.
Active participation has even become unavoidable at times in this country where “the cumbersome state has meant social actors, such as entrepreneurs and migrant workers, are increasingly relying on themselves, although the state is still dominant and looking for better ways of managing society (Hasmath and Hsu 1). Even so, common structures for Chinese organization suggest that any participation proceeded in a top-down fashion and that the Communist Party would have been the body to consult when problems arose (Schumann 45, 73, 106).

Based on the discussion in Chapter Three, I will analyze the New Town Plan in accordance with the following standard and situated criteria.

| Situated Vision                          | • aspects inherent to global aspiration of Wudalianchi as World Heritage site articulated  
|                                         | • Wudalianchi’s mission identified  
|                                         | • overall match between Wudalianchi goals and new town plans for city established |
| Sustainability                          | • configuration maintains sustainability in terms of geographic consolidation, landscape morphology and land use, and economic pattern  
|                                         | • density requirements situated in site for mixed land use and walkability  
|                                         | • open and green space  
|                                         | • attention to issues of sustainable tourism, especially in terms of infrastructure and services adequate and appropriate to World Heritage site  
|                                         | • adequate attention to water as a resource  
|                                         | • social sustainability for residents, especially in terms of spatial memory, and spatial relationships including the aspects of housing density, livelihoods, and attachment to place |

Figure 4.2: Criteria of analysis
Because the New Town Plan entails the complete relocation of the town, criteria include those for evaluating the social sustainability of the new town site and its lived-space implications for current town residents (see last bullet).

The proposed site for new town is about .80 miles south southwest from the old town. The plan essentially moves the town away from the lava flow now dividing it and, in the process, away from the natural site itself. This move conforms to Xiang’s third stage of tourist town development.

According the New Town Plan, the city will be constructed in three stages: 2010-2012; 2013-2015; 2016-2025. The total area of the new site is approximately 595.40 hm², including a short-term built area of 284.09 hm² and a long-term built area of 311.31 hm². The relocated population to the new town will number 21,528, with a municipal infrastructure set aside for 40,000. Figure 4.3 shows the relocation of populations in and around Wudalianchi. The populations to be relocated are shown in red and the site of their relocation in yellow.

Source: New Town Plan
Figure 4.3: Population Relocation Map
Overall, the population relocation plan shows a geographic consolidation of area population to the new site. The New Town is both to function as a transition for tourists visiting the natural sites described in the World Heritage nomination and to serve as a network to "supply products, services, and experiences to travelers and tourists" (see Judd, Fainstein, 11).

**Situated Vision**

The vision offered in the New Town Plan can be situated in the global aspirations represented in the World Heritage nomination, the national Chinese plans for eco-cities, and the local goals of the town itself.

*Global Aspirations*

The nomination of Wudalianchi as a natural World Heritage site is mentioned in the New Town Plans and, as Di Giovani points out, involves a specific social production of space with identifiable goals (9). One identifiable goal is “building peace in the minds of men,” part of the World Heritage mission statement (World Heritage Convention, 1972:2). Di Giovine suggests that World Heritage sites represent a concrete instantiation of peace-building goal “through a ritual reappropriation of tangible monuments, which are juxtaposed against one another to create a worldwide imagined community” (33). Another goal relates to what is regarded as the “most significant feature” of the World Heritage convention: to link the “concepts of nature conservation and the preservation of cultural sites” (UNESCO Courier 6). Added to this goal is the goal of achieving a balance between the needs of nature and those of people <http://whc.unesco.org/en/convention/ >.

The World Heritage emphasis on conservation and culture is clearly reflected in the first two strategies noted in the New Town Plan (5-6):

*Conservation Strategy.* Pursue the withdrawal from the current village and to
concentrate on building the township; secure Wudalianchi heritage resources and ecological environmental protection.

**Cultural Heritage Policy.** Further explore the local culture, especially the "holy water" culture of the Northern Minority Culture; develop through tourism, urban construction, festivals and other forms.

**National Plans**

Wudalianchi’s location in China is significant because of prior Chinese attempts at planning eco-cities. These attempts provide an “evidence base” for the transition from non-sustainable development to sustainable urban planning as represented in eco-city design (Head 32). An example of such an attempt is Dongtan Eco-city on Chongming Island in Shanghai, China. In the case of Dongtan, the English architecture firm Arup created “a model eco-city where half a million people will live and work without damaging the environment” <http://urbanreinventors.net/paper.php?issue=3&author=sigrist>. However, as reported by Austin Williams in the *New York Times*, the plans never materialized <http://www.spiked-online.com/index.php/site/article/7330/>.

Criticism of the plans did emerge, however. As Peter Segrist states, although the Dongtan Eco-City had been “lauded as a progressive model of urban sustainability with the potential for successful replication throughout the world,” the city had also been “criticized as an expensive form of public relations, gentrification, and even totalitarianism” (3). In the first pages of his article, Segrist then cites criticisms of the Dongtan plan ranging from it being “class warfare on the poor” (Girardet 2006), to it being a wrong-headed in “starting anew rather than integrating environmental planning into existing cities” (Jenks and Burgess, 2001; Girardet 2006) to it being merely a “marketing ploy” (Bowerman 2008). As Jenks and
Burgess assert, urban development “tends to be most cost-effective when it makes use of existing infrastructure” (Jenks and Burgess, 2001) (cited in Segrist 3-4). The debate surrounding Dongtan reflects key issues facing sustainable urban development in China and throughout the world. But, more importantly for my thesis, the case of Dongtan suggests certain cautions important for Wudalianchi, in planning a low-carbon city. Because the case implies that low carbon city has high cost, the ability of wudalianchi to afford the expensive urban form for the town is concerned. In addition, technology and material available in the area is another concern.

Local Plans

As Newman and Jennings assert, every city needs to formulate its own vision (9). Chapter 4 of the New Town Plan presents the vision for Wudalianchi’s development and the strategies for achieving that vision. The New Town Plan articulates three goals for Wudalianchi to achieve by 2025: to become a demonstration town of low-carbon sustainable design, to become an exemplary service center as a national park, and to be an important tourist site in the northeastern area of China.

The low-carbon goal is listed under Wudalianchi’s mission statement on the city website and is named as one of the five main strategies of the New Town Plan that includes “the use of a compact layout, a reasonable partition, mixed function, shared transport, green networks, and a concentration on municipal engineering” (5-6). The low-carbon design being proposed for Wudalianchi relates to other attempts to reduce greenhouse gas (GHG) emissions throughout the world. The Kyoto Protocol, adopted in Kyoto, Japan in 1997, is, for example, an international agreement linked to the United Nations Framework Convention on Climate Change (UNFCCC). The protocol requires signatory nations to reduce and stabilize
greenhouse gas (GHG) emissions. The total set of GHG emissions generated by a country, event, product or person is known as a carbon footprint. The carbon footprint is part of an ecological footprint, which is a measure of human demand on the Earth’s ecosystems (Sustainable Development: Principles, Frameworks, and Case Studies). Ecological footprint reduction is necessary, but the Dongtan case shows that the development of low-carbon cities has high costs and other difficulties that question the ability of Wudalianchi to afford the expensive urban form of an eco-town, especially in its remote location, which adds to transportation costs for products, materials, and equipment. In other words, it is important to remember that designs for low-carbon living should be responsive to the needs and particularities of place (Newman and Jennings 9).

Despite difficulties associated with low-carbon city development, the New Town Plan for Wudalianchi uses in its design the core concepts of a low-carbon city, including “the passive house,” and “green public buildings” (26). The plans call for architecture using green building technology, the implementation of energy-efficient design and of integrated solar thermal utilization (New Town Plan, 26). There are seven low-carbon core concepts included in New Town Plan overall: 1) co-ordination of resources, saving energy and land, 2) low-carbon life, the recycling industry, 3) pipeline network and underground corridors, 4) slow system, bus-oriented 5) flood management, water use, 6) garbage, turning waste into wealth. The inclusion of these concepts indicates that the New Town Plan acknowledges the vision of the town having a low-carbon footprint.

The second goal, to become an exemplary service center as a national park, is embodied in the Whole Area Plan. This goal is reflected in the New Town Plan in the strategy to create a high value-added tourism industry:
Tourism Promotion Strategy. Shape the volcanic style town, show the original local cultural customs of the Great Northern area, establish ice and snow entertainment, and create low-carbon construction, life, and travel patterns with mutual benefits for the community and the tourism industry.

This goal will probably be subsumed by goals of the World Heritage, if Wudalianchi’s nomination as a World Heritage site is approved.

The third goal to be *an important tourist site in the northeastern area* relates to Wudalianchi’s current status as a National Park. More specifically, this goal reflects the fact that Wudalianchi, as a tourist site, is currently lagging behind the tourism of another northeast China tourist site, Jingpo Lake. As discussed in Chapter Three, people want to enhance its tourist standing in the area. The New Town Plan proposes the following strategy for Wudalianchi (6):

Stylistic development strategy. Use unique Wudalianchi scenic natural resources, through the national speed skating base project and the state volcanic museum; enhance the town's level of public facilities and expand health treatment; develop other leisure travel features.

Overall, there appears to be a match between goals made for the town by government and New Town Plans.

Evaluation

The analysis of sustainability will first address the problems that the New Town Plan corrects which involve tourism and water. The analysis then will examine those aspects of the New Town Plan that are meant to make improvements but that actually do not.
Sustainable Tourism

Sustainable tourism attempts to accomplish two potentially contradictory goals:

- to have a low impact on both local culture and the environment
- to generate employment for local people

The overall aim of sustainable tourism is to ensure that development brings a positive experience for a range of stakeholders, including local people, tourism companies, and the tourists themselves. Those goals can be found in New Town Plan. The whole purpose of moving the town is to lessen the impact on the natural environment. However, in this case, moving the town has a strong impact on the local culture. Therefore, there appears to be conflict within the first goal itself.

When trying to achieve the second goal of sustainable--generating employment, the New Town Plan proposes the restructuring of the economy by adjusting the proportions given to the various industries. Figure 4.4 shows the change in proportions from the old town to the new town.

<table>
<thead>
<tr>
<th></th>
<th>Agriculture and fishing</th>
<th>Mineral water industry and others</th>
<th>Tourism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Town</td>
<td>46%</td>
<td>24%</td>
<td>30%</td>
</tr>
<tr>
<td>New Town</td>
<td>10%</td>
<td>30%</td>
<td>60%</td>
</tr>
</tbody>
</table>

Source: Xiang (33)

Figure 4.4: Reapportionment of Industry

The tourism industry will be made the leading tertiary industry (New Town Plan, 7). This increase in tourism promises to increase jobs in the new town. However, it will probably take some time for residents to change from being farmers to working in the tourist industry.
As discussed in Chapter Three, transportation and hotel accommodations are the most important aspects that need to be upgraded when considering tourism in Wudalianchi. The transportation system needs to be completed, including regional connections and internal connections between town and tourist site. The New Town Plan accomplishes these goals by building railroad connections with the surrounding cities and also by building an airport. Together with the railroad and airport, the new town has three roads that connect with surrounding areas. Two roads provide connections to the scenic sites. In addition, a Bus Terminal, especially for tourists, will provide transportation to tourist sites.

In terms of hotels and other accommodations, sustainable tourism has to meet a “particular set of standards” found throughout the world (Law 189). This fact was recognized in the earlier Whole Area Plan, when the current facilities were deemed inadequate. The New Town Plan also recognizes the need to upgrade current facilities and to improve the quality of tourism services, although there is no mention of meeting global standards for accommodations (7). The only information provided is that land use for hotels and sanatoriums will account for about 18% of the total land use.

Water Conservation

Water is of particular importance to Wudalianchi because of the natural resource, mineral water, associated with industry and the tourism. As discussed in Chapter Three, conservation of mineral water involves controlling the pollution of the water and controlling overuse in the mineral industry.

The New Town Plan involves relocation and, in the process, recommends methods for water conservation. The town’s relocation will eliminate the need to fix the old system, except near the temple. The relocation will also move people away from the mineral springs,
which were endangered by human activity. The New Town Plan, as presented, has a complete sewage system and a sewage treatment plant. Pollution from the temple will be addressed. Pollution from industry in the New Town Plan will be facilitated by consolidation of smaller mineral industry factories and placement into an industrial park, which is located outside of the natural site. Exploitation will be controlled as well (32).

The New Town Plan has additional features, such as 50% of rainwater being recycled, 100% good quality drinking water, and 90% water-saving appliances. The plan also suggests some innovative strategies recommended in the research, including the use of landscapes in parks that use and preserve rainwater (see Luoni 71).

It is clear that the New Town Plans for tourism and water preservation are both adequate and important to solving current old-town problems. While other aspects of the New Town Plan carefully conform to standards suggested in sustainability research, there are still a few problems in the New Town Plan that undermine its potential sustainability in situated areas.

**Configuration**

Wudalianchi at its current site is sustainable in its area configuration. The small towns around Wudalianchi are networked and maintain a small-cycle economy. There also is a harmonious relationship between agricultural communities and the natural environment. In the New Town Plan, Wudalianchi is moved southwest to a new site and nine small towns to the north are relocated to the new Wudalianchi site (Figure 4.4).
Figure 4.5: Distribution before and after relocation of Wudlainchi

The New Town Plan disrupts the old configuration through geographic consolidation (Figure 4.5). There are fewer small towns and shorter distances between communities, so the demands on the infrastructure become less. However, there are disadvantages. First, the new town occupies a site that was previously farmland. This fact, combined with the fact that the land north of the town is to be restored to a natural environment reduces the amount of agricultural land considerably. In addition, commutes to the remaining farmland are increased. The New Town Plan states that the agriculture population will be transferred to either the tourist industry or to a revitalized mineral water industry. As a result, the farmers will be a smaller proportion of the population. However, the remaining farmers will still go to work to cultivate their fields, which will be geographically farther from their homes than they used to be. Overall, these developments reflect an urbanization process.
Figure 4.6 indicates the *town configuration* of Wudalianchi before and after relocation in terms of land use.

As shown in the map, the configuration of the old and new is not quite similar. The old town grew organically, while the new town is conceived according to the low carbon city model (New Town Design). The land use of the old is mixed, the new has very clear zoning with a certain number of parcels mixed use; the old is compacted with low density and loose spatial relationships, the new is compacted with higher density and tighter spatial relationships; the
old has concentrated natural green space with less accessibility, and the new has a green network with accessibility; the old had commercial sites at the center of town and in mixed use situations, the new has a town center capable of both commercial enterprises and includes a wider range of public service amenities with hotels, schools, squares, post office, banks, and restaurants.

The main change evident is that the New Town configuration is no longer that of a farm community. There is a loss of the personal productive garden that defined residential housing in the old town and that contributed to the local economy. The small-circle economy of the old town will change in other ways. There is less agricultural land and there are no fishing villages, which will change the availability of agricultural products in the market and will also require some people to change to other occupations to support themselves. The spatial conditions will change due to the fact that the town will now be dominated by 3-6-story buildings instead of one-story farmhouses. As a result, the social connectivity between households will reduced. As Ng, Kam, and Pong discovered, increased density in housing disrupts interrelationships (356), and the configuration of the housing proposed in the New Town Plan will likely be disruptive. The proposed apartments are less connected to each other and do not offer platforms for social activities as did the old town. The design of the proposed apartments and the residential planning in general for the new town conforms to an increased overall density of the new town.

**Density and Mixed Use**

The configuration of the old town suggests a sustainable compact-form with low density; the configuration also features mixed land use and walkability in line with Chinese cultural expectations.
Figure 4.7: New Town Land Use

The new town design has a compact-form, as shown in Figure 4.7. The small size of the land allotments in the plan is a feature of compact-form. The size of parcels here range from 0.03 square miles-2.08 square miles (Regulatory Design, 35). According to the New Town Plan, land-per-capita ratio will be 118.87 by 2025 (4). The New Town Plan, therefore, calls for increased compactness and density in comparison to the old town. This increase is in line with National Standards. However, these standards do not represent sustainable practice; moreover, they do not represent sustainable practice in Wudalianchi, where—as discussed in Chapter Three—low density is the key its sustainability.

This increased density can be linked primarily to the New Town Plan’s conception of residential neighborhoods, which account for 25.63% of total land use (Regulatory, 35). The residential part has a planned floor area ratio of 1.1-1.3, which is higher than any other part of the new town (Regulatory Design, 5). As seen in Figure 4.8, the neighborhoods will be dominated by 5-6 story apartments, which not only increase density but also change the spatial configuration, compared to the old town.
In addition, New Town Plan states that part of residential buildings will function as family hotels, which will be managed by the local people themselves. The purpose of this arrangement is to show tourists the real life and culture of the people in the northeastern region (New Town Plan, 9). This purpose is ironic, however, because to build the residential hotels, the old town low density patterns and spatial relationships associated with the farm house configuration had to be destroyed. As discussed in configuration session, the basic unit of the typical configuration in Wudalianchi area, and in northeastern China for that matter, is a one-story farmhouse with a garden, lined up along the street. This old town pattern will be hard to recreate with 3-story apartment buildings, although the New Town Plan states that the apartment will be designed to “reflect local culture.”

The New Town Plan uses a mixed-use pattern that integrates hotels with residential housing and commercial sites. The new town center has a mixed-use of commercial shops and hotels, and in part of the residential area, there is a mix of hotels and 3-6 story residences. The mixed land use accounts for 9% of the total land use.

The old town also had mixed use, which featured secondary uses for residential buildings. But this combination of uses was a spontaneous process that was dependent on
one-story residential structures and the owners’ decisions to establish a particular business in their home, using it as a storefront. Such mixed use cannot be realistically conceived in a master plan, because it depends on homeowner preferences. However, the configuration of the town impacts this second use function. In new town plan, the 3-6 story apartments in the new town do not have storefront capabilities, making it less likely that residents will be able to set up their own businesses in their homes.

**Walkability**

In the New Town Plan, figures show the relationship between the neighborhood (sub-zone) and the town center and neighborhood center (Figure 4.9).

![Walkability Image](image_url)

**Source:** New Town Plan

**Figure 4.9: Walkability**

As might be expected, the New Town Plan conforms to walkability standards of sustainability, destinations lying roughly within a half-mile distance. Because the entire area of town can be represented by a circle with a .66 mile radius, work, school, and play are all within walking distance of the residential neighborhoods. For example, Figure 4.9 a. shows that every neighborhood has a center, with a school and services, and that the neighborhoods
themselves have access to the town-center in a short distance. Figure 4.9 b. shows that every neighborhood is within walking distance to green space and parks. Figure 4.9 c. shows that work is also within walking distance.

In addition to distance, walkability is aided by the sidewalks planned for the area. According to LEED, sidewalks ranging from 5-8 feet with clear walking space are walkable (Farr 152). The width of the sidewalks in New Town Plan are not mentioned, but according to No.5.2.3 from Code for Planning design of transportation on urban road (Sep 1 1995, the Ministry of Construction of China), the minimum width of sidewalks is 1.5m (4.9 feet), so the width of the sidewalk will fulfill standard expectations of walkability. However, issues of walkability arise when considering the mineral springs. We will discuss these issues later under spatial memory and social sustainability.

*Open and Green Space*

*Source: Regulatory Design (Atlas) (19)*

*Figure 4.10: Green Space Design for the New Town*
The New Town Plan features a variety of green/open space providing a range of options, including parks and plazas, and areas that have different functions as you can see in Figure 4.10. The spaces are of good quality and distributed evenly throughout the town. In addition, there is the possibility that sports amenities (facilities) will be constructed, adding to the open/green spaces (New Town Plan 80-82). As presented in the New Town Plan, the total public green space is 26%. In these spaces, the local culture is represented through borrowed elements of volcanoes and mineral water to compose the landscape. As shown in Figure 4.10, top, there are four roads leading out of town towards the volcanoes, which enables volcanoes to become landmarks seen from the town center. The Plan also uses mineral water for water landscapes. In doing so, the New Town Plan addresses the problems of lack of variety and distribution found in the open/green spaces of the old town. The New Town Plan also provides improved accessibility.

However, the New Town Plan does not consider the two aspects that are currently sustainable in old town. One is the use of the natural wild landscape as part of open/green space. Because the town is now about a mile removed from the natural lava flow and the mineral springs, the residents have lost the chance to live in close proximity to the natural environment and to visit mineral springs in town. The other aspect not considered is making good use of the outdoor space within the farmhouse gardens and sanatoriums. In the New Town Plan, there are not farmhouses with gardens, and the open spaces within sanatoriums are not open to the public. Sanatoriums represent 6.47% of the town’s land use. These sanitariums are located in the northwest part of the new town. Although the amount of land use for sanitariums is less than that in the old town, and the distribution is not as equal.
Spatial Memory

The Missouri case as discussed in Horwitz suggests that it’s important to accommodate spatial memory and to account for old urban patterns in the new physical space. Spatial memory, when it involves town relocation, involves the idea that urban form is “a reflection of cultural identity, continuity, and heritage” (Friedman 191). The aspects of spatial memory that will be discussed here relate to the social sustainability of the old town and include: the resident’s relationship to mineral water and to house gardens.

As discussed earlier in Chapter Three, the relationship with mineral water is very important for the local people who visit mineral springs on a daily basis. In the new town design, there is no discussion about how to maintain this daily routine. The mineral springs will be about a mile distant from the new town, making daily travel to these sites difficult. Walking or biking to the mineral water site will be especially difficult in the cold winter. And there is no transportation to mineral water sites available for residents. There is one bus station for the tourists traveling from the new town to the old town, but nothing for local people. Neither is there a water supply system for getting the mineral water to the new town. This lack of accommodation of the spatial memory of daily trips to the mineral springs makes the New Town Plan unsustainable in this respect.

Another factor important to the spatial memory of the people and, in fact, to the local economy, is the productive farmhouse gardens that are eliminated in the New Town Plan. In an agricultural area, the people have a tight relationship with their farmland, and a tight relationship with front yard and back yard of their single houses. Talking over the fence while tending gardens is an important part of social interaction in the old town, and sharing home-grown fruits and vegetables with neighbors is a common practice. The “kang,” a semi-
public gathering place, has also disappeared with the New Town residential high-rises. In short, the New Town plan eliminates social interaction in its plan for 5-6-story residential buildings without personal yards and without the traditional kang. This dispossession is magnified by the fact that the alley or “hutong” for public gathering has disappeared in the new town. This additional lack of accommodation for social interaction and sharing is another constraint on the social sustainability of the New Town Plan.

The lack of consideration of the social aspect of spatial design relates to Lefebvre’s critique of state space. Lefebvre criticizes current conceptions of state space as ignoring space itself as an issue:

Even the legal rule *[le droit]* of the State over the (national) territory is poorly defined; sovereignty is exercised over people, rather than over things . . . The State is conceived in itself and by itself, as a real abstraction, without spatial body, without concrete support other than “subjects” or “humans.” (Vol. 4: 164-65)

What Lefebvre recommends instead is that these social relations have social spaces for support. Lefebvre characterizes “this new framework of social space with reference to its ‘abstract’ quality” as “abstract space” (Brenner and Elden, 360). Lefebvre’s abstract space is inherently political; entails transformations or new ways of “envisioning, conceiving, and representing the spaces”; and is “inherently violent and politically expansive” at the national and international scale (Brenner and Elden, 358-359). As Ashworth and Graham note, “Dominant ideologies create specific place identities, which reinforce support for particular state structures” (4).

What planning for low-carbon cities has to, therefore, recognize is that the space that is being designed is a space that will support certain kinds of social relations and not others.
In addition, the space being designed is, especially when towns are being relocated, being designed for particular people with experiences, memories, and livelihoods that are attached to a specific place. The World Heritage nomination may not recognize the town of Wudalianchi itself as worthy preservation, but designing a brand-new low-carbon city displacing the original town affects the authenticity of the place.

Conclusion and Recommendation

The New Town Plan claims follow low-carbon city guidelines and does include features important to the low-carbon city goal. The plan does achieve compactness and walkability, two core values of sustainable design. However, the plan loses important sustainable configurations, such as farmhouse residential productive gardens and socially sustainable arrangements of space, which already contribute a low-carbon lifestyle. What this suggests is there is a tension between the urbanization that is inherent in designs for totally new low carbon city, as represented by the New Town Plan for Wudalianchi, and the situated sustainability that is a characteristic of certain areas and old town configurations that are currently sustainable.

This tension suggests a need for a comprehensive sustainability strategy for Wudalianchi, such as that embodied in Figure 4.11. Major recommendations are highlighted in bold in the figure.
| Configuration | Keep area farm communities, not causing a negative impact on the natural environment; control improper agricultural activities, which cause pollution.  
- Preserve farm community configuration, featuring productive gardens; maintain and enhance the economic activities by developing urban agriculture.  
- Maintain the combination of loose and tight relationships in spatial conditions; preserve the one-story farm house |
| Density | Effect compact-form with diverse density to meet different needs of citizens  
- Have neighborhoods include higher density, lower density, and one-story farmhouses, the proportion depending on the population and capacity estimation.  
- Other area densities can be bigger  
- Enhance the connectivity by using frequent intersections and small blocks |
| Mixed-use | Create mixed-use town center (for social sustainability and connectivity)  
- Include family hotels in one-story farmhouse neighborhood  
- Include second use in one-story farmhouse neighborhood |
| Walkability | Accommodate appropriate walking distance  
- Have shelter protection from bad weather  
- Have sidewalks wide enough for tourism purposes, for the setting and for anticipated commercial use |
| Open space and green space | Reflection of Cultural history (volcano and water culture, minority)  
- A variety of open space  
- Equal distribution  
- Balance of accessibility in term of tourism management  
- Green space takes good use of current sanatorium open space  
- Access to natural landscape |
| Sustainable tourism | Use tourism to support local communities  
- Add airline or train line, and complete road system  
- Appeal to and meet the “set of standards” found throughout the world  
- Complete transportation system with outside world and within tourist sites |
| Attention to water | Preserve natural water resource by keeping the amount of mineral water within the capacity for use by industry and tourism and through a complete sewage system |
| Attachment to the place | Spatial memory reflect collective memory of place  
- Spatial relationship reflect historical configuration  
- Access to the natural site and mineral water, by planning a cultural transportation system special for local to go the mineral site or using a water supply system transit the mineral water to the new town  
- Urban waste management  
  - Recycle materials  
  - Reuse old structure  
  - Naturalize |

Figure 4.11: Comprehensive Sustainability Strategy for Wudalianchi
Finally, as discussed at the beginning of this chapter, China’s tourist sites have the common three stages to develop over time (see figure 4.1). However, from the perspective of both social sustainability and sustainable design, the place attachment and the situated sustainability configuration in each unique built environment should be reflected in the new town development in the third stage, as shown in figure 4.12. Moreover, the problems in old town should be fixed and a buffer area could be set up to preserve natural core. The population should be able to choose between moving to the new town and staying in the old town, with populations achieving balance over time.

Figure 4.12: Alternative Relationship Between Natural Tourism Site and Town
Chapter Four: Works Cited


