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“Can the people who use wheelchairs enjoy the national parks?” Compare the accessibility of people who use wheelchairs to national parks in Malaysia to Hokkaido’s and create a spatial database for the future.

“車椅子利用者は、国立公園を楽しめないのでしょうか？”マレーシアと日本の国立公園の比較から、未来のために GIS データベースの作成

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CHAPTER 1: INTRODUCTION

1.1 Study Background and Justification

In the old days, the People with Disability (PwD) were usually the victims of discrimination, persecution and even holocaust (United States Holocaust Memorial Museum, n.d.). Many children born with abnormality were usually killed or left to death though a handful were accepted by their community as deity or luck. (Munyi C.W., 2012). Besides, the senior citizens who become weak or ill may not survive for a long time because of the harsh environment and the lack of technology and health care. Fortunately, today, with the better awareness of human right, and the advancement of health care, the survival of many life of the PwDs and the elderly have increased and lengthen. According to World Health Organization (2011), more than one billion people in the world, or about 15%, are living in some form of disabilities, of whom nearly 200 million experience considerable difficulty in functioning and this population is still increasing in a relatively fast rate as both world population and ageing population increase. Furthermore, the ever-rising of the world's road traffic injuries which can incur disability is another contribute factor to the increase of PwD population (World Health Organization, 2016).

Besides, national parks are not established only to protect the flora and fauna, their habitats, and ecosystem but also for the use of scientific research, ecotourism, recreational and educational purposes. In addition, according to the study carried out by Keniger and his colleagues in 2013, these natural areas are also able to help to maintain the psychological, cognitive, physiological and spiritual health and wellness of the people. However, the elderly and the PwDs today are still not able to enjoy such opportunities and the quality life that the abled-body are enjoying (Soltani et. al., 2012). For example, the elderly and the PwDs who cannot walk or have difficulty in walking cannot access the uneven path of gravels, muddy trails, steps etc. which are designed for a sound body at most parts of the world, including the natural places such as the national parks.

Furthermore, the national parks are also well-known as the sites for ecotourism. In another words, accessible national parks to everyone can help generates more money to the local community and further increase the country's GDP. Developed countries such as United States, United Kingdom and the European Union are working hard to create a barrier free environment (or accessible) with the universal design, not only for human rights but the accessible tourism is also known to bring in high revenues as the PwDs travelers with mobility difficulty will usually bring along at least one companion as an assistant to move about (European Commision, 2013). Besides, taking EU as an example, more than half of

the disabled have been traveling in year 2012/2013 and generated 394 billion Euros in terms of GDP or 3% within the EU (European Commission, 2013). This is also proving what UN said in 2003 is correct, that “*barrier-free tourism is an opportunity not an option at extra cost*”.

Asia, on the other hand, is a region with the largest population, and enjoy fast-economy growth. The growth rate for Asia’s older populations is fast because of those born during the post-war baby boom are reaching older ages (UN, 2015). Besides, Asia which houses more developing countries, has more accidents that may cause disabilities (World Health Organization, 2016). Also, the globalization and the air transportation which have made the world become smaller, have caused more people with disabilities becoming more interested to travel, not only to the Europe but also to Asia. Therefore, not only the developed countries such as Japan and Singapore, many developing countries such as China, India and Malaysia are also taking action in creating a barrier-free environment to encourage accessible tourism. However, there is still a long way to go for the developing countries to achieve the target (Indian Institute of Tourism and Travel Management, 2010; Bi, 2006).

1.2 Objectives and Focus Group

This study is divided into three parts with different objectives: 1) To identify the accessibility of people who use wheelchairs to selected national parks in Malaysia and Japan; 2) To compare the accessibility of Malaysia’s and Japan’s in case study: Kinabalu Park and Daisetsuzan National Park; 3) To create a spatial database for future park planning and researches.

Objective 1: The study is designed with the intention to analyze the accessibility of selected national parks by people who use wheelchairs in Malaysia and Japan. The central question is as below:

“How accessible the national parks are to the people who use wheelchairs?”

And the other sub-questions to answer in this study are:

- i. How can the people who use wheelchairs go to the selected national parks?
- ii. Where can the people who use wheelchairs go in the selected national parks?
- iii. How far into the selected national parks can the people who use wheelchairs travel to?
- iv. What and where are the facilities that the people who use wheelchairs can use?
- v. What can the people who use wheelchairs do/enjoy/feel in the selected national parks?

Objective 2: The study is a case study comparing both country accessibility to the people who use wheelchairs taking Kinabalu Park and Daisetsuzan National Park as an example. The questions to answers are as below:

- i. What is/are the difference(s) between the accessibility of the people who use wheelchairs to selected national parks in Malaysia and Japan?
- ii. What can Malaysia do to improve the accessibility?

Objective 3: The data collected and/or created in this study are used to create an open spatial database for future's park planning and other researches because Malaysia is one of the country well-known for its unwillingness to share data to the public either freely or openly. This can be seen from the policy of Malaysian Centre for Geospatial Data Infrastructure (MaCGDI) which share the spatial data only with certain organizations and others will have to purchase with a price. Also, Malaysia has an Open Data Portal which was started in 2014 but only 0.2% are spatial data in KMZ and KML format when I checked later on January 8, 2016.

Therefore, the focus group for the first two objectives in this study are the people who use wheelchairs, regardless of whether they are born-wheelchair users or caused by diseases, accident and/or infirmity of old age; temporary or permanent, wheelchair users. The focus groups for the third objective is the national parks' planners and managers so that they may utilize the spatial database created in this study to benefits more people especially the PwDs and the elderly.

CHAPTER 2: LITERATURE REVIEW

2.1 Terminology

They are some terms or words which I think are needed to be defined and/or clarified to prevent confusion that may lead to misunderstanding when reading this dissertation.

“People with Disability, PwD”

The term means people with long term body impairments, activity limitation or participation restriction according to the International Classification of Functioning, Disability and Health (ICF) in 2011. In another words, PwD does not includes only people who use wheelchairs, blind and deaf people but also including people with study difficulties, speaking difficulties and people who experience mental health.

“People who use wheelchairs”

The term means the any person who needs to rely on wheelchair to move around. Some People who use wheelchairs may be PwDs but not all people who use wheelchairs are PwD as they may need to rely on wheelchair for a short term period only. In another words, “people who use wheelchairs” means the person who use the wheelchair.

“Accessibility”

The term is a noun. According to United Nations (2007), “*Accessibility is about giving equal access to everyone. Without being able to access the facilities and services found in the community, persons with disabilities will never be fully included.*”

“Accessible”

The term is an adjective. According to Oxford Dictionary, the meaning of this term which suit this dissertation context is “*able to be reached, entered or used by people who have a disability*”.

“Barrier-free Design”

The term means the construction method which exclude all the barriers which will or may obstruct the accessibility of the people with disabilities.

“Universal Design”

According to United Nations Convention on the Rights of Persons with Disabilities (n.d.), the terms means “*the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or*

specialized design. It shall not exclude assistive devices for particular groups of persons with disabilities where this is needed.” Therefore, it does not includes only the people with disabilities, but all people.

“National Parks”

According to Oxford Dictionary, Dictionary.com, American Heritage® Dictionary of the English Language and Collins English Dictionary, “National park” means an area of place which has its scenic beauty and/or conservation importance and is owned and protected by the national government (though “state” is mentioned in Oxford Dictionary) for the people to enjoy.

However, the term is used rather differently in Malaysia and Japan. Even though the national park land are generally owned by Malaysia federal government, the term “National Park” is also applying in other state owned and managed parks such as Endau Rompin Johor National Park and Gunung Mulu National Park. Japan, on the other hand, has a much clearer division between the national park and state park but the national park land are owned by various stakeholders which may have different interest.

2.2 The Background of People with Disabilities (PwDs) in Malaysia and Japan with an Emphasis on Wheelchair Users

Like you and I, the PwDs are the group of people which are the creation of God. What they need are just some helps and the similar opportunities and services that we enjoy to be independent. However, the help provided in each country of this study is different from each other, and as a result, the PwDs from each country are enjoying/suffering at a different state. Not forgetting the elderly who has been working hard for his country and family, he may be also suffering from illness that may limit his movement and would also be benefited if the help provided to the PwDs is sufficient and appropriate. Thus, I think it is good to review the similarities and differences of these countries before we can discuss further.

The number of PwDs, the prominent cause of disability in the country, the accessibility system and the related laws or act, the inadequacy of the accessibility system and some testimonies from the PwDs reported in the news are reviewed as below:

2.2.1 The Background of PwDs in Malaysia

According to the Department of Social Welfare (2014), the number of voluntary registered PwDs in Malaysia is increasing from 314,247 persons in year 2010 to 531,962 persons in year 2014, after deducting the numbers who had passed away.

The leading causes of disability in Malaysia are the non-fatal diseases such as ischemic heart disease, stroke, lower respiratory infection, diabetes, low back & neck pain, chronic obstructive pulmonary disease, depressive disorders, skin diseases and intestinal nematodes as well as the non-fatal road injuries (The Commonwealth Health Hub, n.d.). These non-fatal diseases are usually caused by the functional decline in old age. The aged population is still not as big as it is in Japan though the population trend in Malaysia is no longer pyramidal with the low birth rate. However, the accident rate in Malaysia is relatively high. According to Road Transport Department Malaysia (n.d.), the number of drivers and registered vehicles are always increasing. Krishnan and Radin Sohadi (1997) and Kareem (2003) stated that the accident rate in Malaysia has been increasing since 1970s. And these accidents which are non-fatal may cause physical defective and increase the number of wheelchair users in Malaysia.

The accessibility system in Malaysia for the disabled has gradually improving since 2001, when the Ministry of Human Resources trying to enhance the PwDS employment rate by establishing the Code of Practice of Employment of Disabled Person in Private Sector (as cited in Kadir & Jamaludin, 2012). Later in year 2008, the government enacted the Persons with Disability Act to promote and develop the welfare and wellbeing of the PwDSs by providing protection, rehabilitation as well as allowing them to access to various facilities including buildings, services, public transportation, education, employment, technology, recreation, sports and etc. The Act also established the National Council for Persons with Disabilities to co-ordinate, monitor and manage the activities and plan in accordance to the policy and PwDs (Laws of Malaysia, 2014). Additionally, Malaysia ratified the UN Disability Rights convention in 2010 (<http://indicators.ohchr.org/>).

Nonetheless, numerous studies about the accessibilities of built environment such as public transportation (Soltani et. al., 2012), outdoor pedestrian walkway, hospital buildings, school building for both secondary and primary, high rise office building (as cited in Abdul Rahim & Abd. Samad, 2010), hotels (Abdul Rahim & Abd. Samad, 2010), green buildings (Chua et. al., 2013), public buildings (Abdul Kadir & Jamaludin, 2012) show that the system is still inadequate.

Moreover, according to Anthony SB Thanasayan, a person who use wheelchair who spoke to the reporter of The Star, a local newspapers in Malaysia, that the policies are ineffective because they are not fully implemented to empower PwDs rights. For example, many schools and universities do not have accessible facilities for the PwDs and the service animals. Besides, what Judy Heumann, Washington State Department's special adviser said about the existing issues of shame and stigma towards the PwDs, is also applicable to Malaysia, with a number of incidents reported in the news whereby the PwDs are being isolated and locked up because of their condition (Azizan, 2015).

2.2.2 The Background of PwDs in Japan

According to Japan's Ministry of Health, Labour and Welfare (2013 & 2015), the total number of PwD increased from 7,411,000 persons in year 2006 to 7,879,000 persons in year 2011. The total number is more than Malaysia because the survey in Japan is carried out throughout Japan every five years since year 1951 (Okuno, 1998).

As Japan is well-known for the world's highest proportion of the elderly, the leading cause of PwDs are the non-fatal diseases and the frailty caused by aging (Cabinet Office of Japan, 2011; Kuzuya, 2012). Japan has an increasing population of aged 65 and older since 1994 to 26.59 percent of the population. Additionally, the whole population, excluding the foreign residents, fell continuously since year 2009, from 127,076,183 to 125,891,742 in Jan 2016. With low birth, the population of the elderly is expected to increase continuously and the people aged 14 or younger accounted for 12.82 percent only and is shrinking continuously (as cited in Japan Times News, 2016).

The accessible system in Japan is much better as its government enacted the Basic Law for Disabled Persons since 1993 and was revised in 2004. The law was enacted to promote the welfare of PwDs so that they are not discriminated and that they will receive sufficient support such as vocational training, education and employment to be independent (The Basic Law for Persons with Disabilities, n.d.). And since 1996, Japan government started a long seven years Action Plan until 2002 and another Basic Plan continued until 2012 in order to ensure the PwDs are receiving the same opportunities and services as the non-disabled (Disabled World, 2010). In 2007, Japan signed the United Nations Convention on the Rights of Persons with Disabilities and then ratified in 2014. Later the Japan government enacted the Law to Eliminate Discrimination against People with Disabilities in 2013 but only effective from April 1, 2016.

Even though Japan is proactively constructing accessible environment for the PwDs, some may pull back by the high costing in constructing the barrier-free sidewalks (Ishida *et. al.*, 2009). According to a study carried out by the Ministry of Education, Culture, Sports, Science and Technology in 2007, the schools, especially the existing schools, even though with the support from the government, are not completely accessible too. The inadequate accessible system can also be proved by the incident faced by a PwDs who is a famous author and also a politician in Japan known as Hirotada Ototake when he was not able to enter the upscale Ginza restaurant in 2013 (Brasor, 2016).

Besides, the law which was enacted in 2013 has just gone into effect three years later is said to provide sufficient time for the governments, agencies and private sectors to prepare. Yet, because of the law required only “reasonable accommodation” for the PwDs without any specific requirements, the advocator for human rights at Japan Disability Forum, Kiyoshi Harada said that it is vague with loopholes (Brasor, 2016). Additionally, the reporter of Tokyo Shimbun who accompanied a person who use wheelchair to work on one of the weekdays’ morning by taking JR Train, days before the law come into effect on April 1, reported that the person who use wheelchair took 80 minutes to reach her destination while an abled-bodied needs only 30 minutes. This is because she was told by the employee to wait for staff who will help her to get off the train at the station she wanted to go (Tokyo Shimbun, 2016).

2.3 Accessible or Barrier-Free Tourism

With the needs of people changing along the time, tourism too, has been evolving from a typical traditional tourism to niche tourism targeting specific groups of people such as the elders, the youth, the volunteers and etc. With the rapidly aging global population, the total percentage is expected to rise from 15% in 2015 to 22% in 2050 according to World Health Organization. Thus, a segmented tourism named “grey tourism” emerged. However, if you observe closely, grey tourism is also similar to accessible tourism. This is because when you have a barrier-free environment to the PwDs, definitely the elderly are good to access too. Another fact from World Health Organization: our world has over a billion people, or about 15%, have some form of disabilities. This number is huge and could generate a great amount of profit.

Furthermore, tourism has always been a luxurious industry for many countries, including both developed and developing countries. According to World Travel & Tourism Council (WTTC), the contribution to the world GDP was 9.8% and the contribution to employment was 9.5% in year 2015. Even in both Malaysia and Japan, tourism has brought

money and created employment opportunity in the country. From the country report 2016 by WTTC, tourism contributed 13.1% of total GDP and provided 11.4% of total employment in Malaysia while the percentage in Japan is lower, 7.9% of total GDP and 7.4% of total employment for year 2015. United Nations World Travel Organization (UNWTO) is also showing the similar statistics that the inbound tourism is the growing and largest sector which has brought in 1,184 million incomes for the world in 2015, more than 100% growth when compared to year 1995.

The accessible tourism should be much more lucrative industry because the PwDs usually do not travel alone. They usually travel together with at least one companion or with friends and families who can help them out during the travel and this generated 394 billion Euros or 3% of the GDP for year 2012/2013 within the European Union (European Commission, 2013). Also, they are known to spend 30% to 200% more than the able-bodied to travel (as cited in UN, 2003). Besides, it is a myth that the PwDs do not like to travel. Studies show that PwDs do want to travel like the non-disabled do, it is just the barriers that are stopping them (as cited in UN, 2003). This can be proved in much accessible European countries who are working to create a barrier free environment for all: over 50% of the PwDs and a slightly smaller percentage of elderly aged 65 in European Union (EU) took about 783 million trips within EU (*Economic Impact*, 2014).

Therefore, Japan has set up a Japan Accessible Tourism Center and Barrier-free Tour Center at Ise-Shima to assist tourists with disabilities. Even the local PwDs have started projects to create “all-people-friendly destination”, barrier free mapping and trying to raise awareness at schools and among the tourism sectors (UNWTO, 2016). On the other hand, in Malaysia, particularly in main city states such as Penang and Selangor, many projects which involve not only PwDs but also researchers, government bodies, NGO and volunteers are working together to access audit the accessibility of the built environment. An NGO, Beautiful Gate Foundation for the Disabled, even set up a website to support the tourists to Malaysia (<http://www.inclusivemalaysia.com.my/>). However, there are still many to be done before the accessible tourism in Malaysia can flourish (Chin, 2015).

2.4 Management System of National Parks

The management of national parks in Malaysia and Japan are different and I think that it is essential to have an insight of how each country is managing their protected areas before I can compare Malaysia national park's accessibility to Japan's. Part 2.4.1 discuss about the protected areas management system in Malaysia while part 2.4.2 discuss how are the protected areas being managed in Japan.

In summary, the management system of national parks in Malaysia uses multi-regions protected areas management system which means each region (ie. Peninsular Malaysia, Sabah and Sarawak) uses different management system and different legislation to achieve different vision and missions. For instance, the Peninsular Malaysia focus more on preserving the nature because of the scarcity resulted by development; the Sarawak focus more on sustainable logging while Sabah focus more on ecotourism. Malaysia designated all of the protected areas within the government land, on both federal and state government land, with the main aim to preserve and conserve the natural resources, the rich biodiversity and various ecosystem. Therefore, the protected areas are mainly the nature land where human activities are limited though some local people may live near to the protected areas boundary. To further smoothen the management and/or solve financial related issues, some states in Malaysia established a private company under the government e.g. Johor National Parks Corporation, Perak State Parks Corporation, and Sarawak Forestry Corporation. The term of "national park" is relatively vague as it is both used in federal governed parks as well as state governed parks. For example, Johor, a state located at Peninsular Malaysia, uses "national park" in naming their protected areas. Besides, Sarawak and Sabah are the other two management system available in Malaysia, but only Sarawak uses "national park" in naming their protected areas. In addition, Sarawak has about half of its national parks not opened to public even for recreation purpose.

Japan, on the other hand, has more synchronized management system as the protected areas are gazette under the same law and has the same coordinator, which is the Ministry of Environment Japan (MOE). Japan designated the protected areas on the land owned by both government bodies and private organizations with different interests. And the purpose of protecting an area is not only for the natural resources but also the area with heritage (e.g. shrines) and traditional uses (e.g. farmland) importance because of the original driving force in expanding the protecting areas, i.e. the economic potential of protecting areas. MOE Japan has a Park Plan that includes Regulatory Plan and Work Plan which act as basic reference in the management of all the protected areas.

2.4.1 Protected Areas Management System in Malaysia

Malaysia is a tropical country rich in natural resources. Malaysia has about 19.12 million hectares of rainforest, covering 58.1% of Malaysia's total land area (Md Bakri, 2005). This rainforest has a very rich biodiversity because the forest is a unique natural heritage which has been evolved for over 3 million years (Ashton, 2008). Besides, Malaysia has more than 4,600 km of coastline bordering Straits of Malacca, South China Sea, Sulu Sea and Sulawesi Sea and has more sea area which include the claimed Exclusive Economic Zone (EEZ) than the land area. Parts of Malaysia seas are also included in the Global 200, the list of ecoregions identified by WWF, and according to World Resources Institute, Malaysians eat more fishes from the sea than other Southeast Asia countries (World Wildlife Fund [WWF], n.d.).

Aware of the importance of these natural resources, Malaysia started forest management as early as the 1900s (Forest Legality Alliance, 2013) by the colonizer, the British. Nonetheless, the marine conservation was started only in the 1980s, twenty-three years after Malaysia achieved independent in 1957. However, the management of these natural resources of Malaysia today is unique as these natural resources are divided into three regions, each with their own management system and different laws and regulations. This is because, the union of Malaya, Sabah and Sarawak to form one country, the Federation of Malaysia in 1963 has given Sabah and Sarawak the authority over their forestry and land matters which also means that the revenues from the forestry are paid to the State instead of federal treasury (Chan, 2008). Therefore, the management system for each region is briefly described as below:

i. Peninsular Malaysia (used to be known as Malaya)

Peninsular Malaysia (PM), has 11 States and two Federal Territories. The main organization to manage and conserve natural resources and environments is the Ministry of Natural Resources & Environment (NRE) which was established in 2004. Though there are 12 departments under NRE, only Department of Wildlife and National Parks Peninsular Malaysia (DWNP) is directly responsible to manage national parks and other protected areas such as wildlife reserves, wetland and Ramsar Site in accordance with the Wildlife Conservation Acts 2010, Federal National Parks Act 1980 as well as Pahang, Terengganu and Kelantan States' National Park Enactment. DWNP has eight division, namely Protected Areas, Biodiversity Conservation, Law and Enforcement, Ecotourism, Ex-Situ Conservation, Institute of Biodiversity, Consultancy and Management to carry out the management more efficiently. DWNP also has an office at each State and Federal Territories. DWNP has only two national parks, namely Penang National Park and Taman Negara National Park.

However, some other parks which are managed under the authority of the State governments may use the term “national park”. Examples are the state parks managed by the Johor State government, ie. Endau Rompin Johor National Park and Gunung Ledang Johor National Park because of the Johor uses the term “national park” instead of “state park” in its enactment, which is known as Johor National Park Corporation Enactment 1989.

The other departments which are also involved in the management of natural resources are Forestry Department of Peninsular Malaysia (JPSM) and Department of Marine Park Malaysia (JTLM) for the management of marine protected areas. The JPSM is responsible to manage, plan, protect and develop the Permanent Reserved Forests (PRF) in accordance with the National Forestry Policy (NFP) 1992 and the National Forestry Act (NFA) 1984. The PRFs have functions as Production Forest, Protection Forest, Amenity Forest and Research and Education Forest which are usually assigned as IUCN protected area categories of I(a), II, IV, V and VI. According to JPSM Annual Report 2014, 5.8 million hectares or 44% of 13.18 million hectares of PM, are forested land. From this total forested land, 4.85 million hectares or 83.5% are PRF. The State Forestry Departments are responsible in managing this PRFs in their respective borders.

The JTLM is responsible to protect, preserve and manage the aquatic life and regulate recreational and other activities at the Marine Parks in accordance with Fisheries Act 1985 and Marine Parks Malaysia Order 1994 (Amendment 1998). JTLM works together with the related state governments and local governments in the management, development and implementation of the planning. Today, JTLM is administrating 42 islands located at Kedah (4), Terengganu (13), Pahang (9), Johor (13), and Labuan Territory (3), which are gazette as Marine Parks with a total of 2357.23 km².

ii. Sabah

Sabah is the second largest state of Malaysia which is located at the most eastern part of Malaysia and Borneo. It is comprising of 60% forested area, thus rich with biodiversity and natural resources. The management of the natural resources is mainly for the purpose of eco-tourism, and thus is managed by the Ministry of Tourism, Culture and Environment Sabah (KEPKAS) which was established in 1987. KEPKAS has 6 departments and agencies, but only The Board of Trustees of the Sabah Parks and Department of Wildlife are involved directly with the management of protected areas.

The Board of Trustees of the Sabah Parks (<http://www.sabahparks.org.my/>) manage and preserve both terrestrial parks: Kinabalu Park (75,370 ha), Crocker Range Park (139,919

ha), and Tawau Hills Park (27,927 ha) as well as marine parks: Tunku Abdul Rahman Park (5,000 ha comprising 5 islands, surrounding reefs and sea), Pulau Tiga Park (15,864 ha comprising 3 islands), Turtle Islands Park (1,740 ha comprising 3 islands), Tun Sakaran Marine Park (35,000 ha comprising 8 islands, reefs and sea), Sipadan Island Park (12 ha) and Tun Mustapha Park (1,020,000 ha comprising more than 50 islands and islets) in accordance to Park Enactment 1984.

Department of Wildlife declares three types of protected areas in accordance to Wildlife Conservation Enactment 1997. The first is Conservation Areas (2,854 ha as of year 2014), to protect wildlife and habitats; the second is Wildlife Sanctuaries (26,103 ha as of year 2014), to protect fauna, flora, genetic resources and habitats; and lastly the Wildlife Hunting Areas, to manage animal population by regulating hunting (Sabah Wildlife Department, n.d.). The Conservation Areas are unique because some land gazette are in alienated land instead of State land only (WWF, n.d.).

Sabah also has Sabah Forestry Department which was established in 1914 to manage the protected areas other than regulating forestry activities. The department classify the forested areas in accordance to the Forest Enactment 1968 (revised in 1984), which classify forest reserves into seven classes. Class I Protection Forest Reserve, to protect water supplies, soil fertility and environmental quality; Class II Commercial Forest; Class III Domestic Forest; Class IV Amenity Forest; Class V Mangrove Forest; Class VI Virgin Jungle Reserve; and Class VII Wildlife Reserve. However, only Class I, Class VI and Class VII are the protected areas which intend to provide undisturbed forest for research purposes and gene pools preservation (Sabah Forestry Department, 2014). The number of Forest Reserves and the total area in hectares according to the classes are shown in table 2.4.1 below:

Class	Type of Forest Reserve	Approximate Area (Ha)	No. of Forest Reserves
Class I	Protection Forest	1,038,890.00	109
Class II	Commercial Forest	2,033,183.00	29
Class III	Domestic Forest	4,673.00	4
Class IV	Amenity Forest	12,409.45	17
Class V	Mangrove Forest	281,374.56	23
Class VI	Virgin Jungle Forest	106,801.14	62
Class VII	Wildlife Reserve	137,735.00	5
Total		3,615,066.15	249

Table 2.4.1: The number of Forest Reserves and the total area in hectares according to the classes. (Source: Sabah Forestry Department, 2014)

Another organization involving in managing conservation areas is Sabah Foundation, also known as Yayasan Sabah Group. Yayasan Sabah Group was established in accordance to Enactment No. 8 of the Sabah State Legislative Assembly in 1966 with initial objective to provide social welfare for Malaysian in Sabah. However, over the years, the Group has diversified its activities to meet the people needs and has becoming an advocator in conservation. The Group is currently responsible for 3 Class I conservation areas, namely the Danum Valley (Class I; 43,800 ha), Maliau Basin (Class I; 58,840 ha), Imbak Canyon (Class I; 30,000 ha); and other conservation areas, namely Silam Coast (about 2,770 ha) and Taliwas River (about 9,700 ha).

iii. Sarawak

Sarawak, the largest state of Malaysia which is located at eastern part of Malaysia and northern part of Borneo, has the largest forest area. The 68% or 8.3 million ha of its land area is forested (Blakeney, 2001). Therefore, Sarawak Forestry Department (SFD) was established in 1919 to manage and conserve the State's forest and marine resources. As SFD has many constraints and limits to effectively achieve sustainable forest management, the State Assembly established Sarawak Forestry Corporation (SFC) which owns a private company, with the advice from International Tropical Timber Organization (ITTO). SFC is responsible to manage and conserve the forest and protected areas sustainably in accordance to Sarawak Forestry Corporation Ordinance 1995, the Forests Ordinance 1958, the National Parks and Nature Reserves Ordinance 1998 and the Wildlife Protection Ordinance 1998. As Sarawak also uses the term "national park" in its Ordinance, the term "national park" has also been used in naming the protected area.

The SFC has 6 key business unit to achieve the vision, namely Sustainable Forestry and Compliance; Security and Asset Protection; Corporate Services; Protected Area and Biodiversity Conservation; Applied Forest Science and Industry Development; and Strategic Planning, Special Projects and Land Use. The SFC's Protected Area and Biodiversity Conservation unit is managing the Totally Protected Areas which is a total of 35 national parks (464,981 ha), 4 wildlife sanctuaries (206,460.4 ha) and 14 nature reserves (2,539 ha) which cover a total area of 903,769.40 ha of land area and water body based on IUCN's World Conservation Union Management Framework.

However, there are only 16 national parks are opened to public, namely Tanjung Datu National Park (Argus Pheasants; 752 ha); Talang Satang National Park (Green Turtle; 19,414 ha); Gunung Gading National Park (Rafflesia; 4,196 ha); Kubah National Park (Frogs; 2,230 ha); Santubong National Park (Mount Santubong; 1,410 ha); Bako National Park (Nepenthes & Sea Stack; 2,727 ha), Batang Ai National park (Orangutan; 24,040 ha); Maludam National Park (Red Banded Langur; 53,568 ha); Similajau National Park (Irrawady Dolphins; 22,120 ha); Niah National Park (Swiftlets; 3,138 ha); Miri-Sibuti Coral Reefs National Park (Coral Reefs; 186,930 ha); Gunung Mulu National Park (Pinnacles; 85,671 ha); Bukit Kana National Park (Mount Kana; 4,923 ha); Lambir Hills National Park (Palms; 6,949 ha); Loagan Bunut National Park (Oriental Darter Bird; 10,736 ha); and Pulong Tau National Park (Rhinoceros Hornbills; 69,817 ha). Among these national parks, Talang Satang NP and Miri-Sibuti Coral Reefs are marine parks. The wildlife sanctuaries are gazette to protect certain rare or endangered species in Sarawak and are not opened to the public. However, visitors are allowed to visit the rehabilitation centers which serve as a center for wildlife species rehabilitation before releasing back to the wild (<http://www.forestry.sarawak.gov.my/>).

The other classes of forest in Sarawak are the Permanent Forest Estate (6 million hectares) which comprising of Forest Reserves, Protected Forests and Communal Forests to ensure sustainable forest management and production as well as the State Land Forest (<http://www.forestry.sarawak.gov.my/>). Not forgetting the marine parks in Sarawak which are gazette in accordance to the National Parks and Nature Reserves Ordinance 1998.

2.4.2 Protected Areas Management System in Japan

The Ministry of the Environment (MOE) Japan is the main organization responsible for the management and conservation of the protected areas in Japan (<https://www.env.go.jp/en/nature/nps/park/index.html>). The protected areas in Japan does not include only the natural forest but also the area for natural heritage such as shrines and temples, traditional uses such as farmland and forestry and home to the local community. Even though there is a total of 2,093,000 ha of land being designated as national park up to year 2015, MOE only owns 12.4%, while 61.2% and 25.7% are owned by the state (under jurisdiction of the Forestry Agency) and private-sector respectively.

The efforts to protect the natural resources by establishing national parks started since 1911 and the efforts resulted in the enactment of National Parks Law in 1931. It took 20 years before the law was established because of the fierce academic debates and then a prolonged economic depression that finally convinced the government to enact the law

(Jones, n.d.). After the enactment of the law, twelve national parks were designated in just five years. The first three designated national parks were Setonaikai, Unzen and Kirishima in March 1934, followed by the designated of Aso, Nikko, Chubusangaku, Akan and Daisetsuzan in late 1934. Towada, Fuji-Hakone, Yoshino-Kumano and Daisen were designated in 1936, before World War II.

After the war, the new national parks were designated or existing national parks were expanded by promoting the economic potential of parks for eco-tourism. Ise-Shima National Park was the first park designated after the war, in 1946 before the other 7 parks being designated through 1955. As more national parks are designated, the managers realized the needs of different protected areas categories for more efficient management. Thus, Natural Parks Law was enacted to replace the old one in 1957. As a result, three categories are designed:

i. National park

MOE designates the park due to its excellent landscape view and wide range of habitats and ecosystem and thus the park is managed with highest level of protection. The national park must has at least two landscape elements and area of more than 30,000 ha in which 2,000 ha must not be easily affected by the development. For marine national park, a minimum of 3,000 ha of sea area is required.

ii. Quasi-national parks:

MOE designates the park with the request from local governments for its similar importance to national parks. The quasi-national park must has landscape view similar standard to those of national parks and area of more than 10,000 ha in which a minimum of 1,000 ha must be well-maintained. For marine quasi-national park, a minimum of 3,000 ha of sea area is required.

iii. Prefectural natural parks:

The local government designates and manages the park.

The exponential economy growth and development in Japan after the war has

resulted in more national parks were designated to accommodate the increasing number of visitors for recreation. Besides, over-crowded in national parks and environmental pollution have raised concern about the health of environment. Therefore, the Environment Agency was established in 1971 to manage the environment and national parks (originally managed by the Ministry of Health and Welfare) and later changed name to Ministry of the Environment (MOE) during the reorganization of the administration in 2001. MOE amended the Natural Parks Law in 2002 by including some new regulations regarding activities in special zones, creation of regulated utilization areas and preparation of new systems for landscape protection agreement and park management organization. MOE will also revise the park plans for national parks and quasi-national parks about every five years.

The park plan is divided into Regulatory Plan and Work Plan (Chart 2.4.1).

Regulatory Plan includes:

- i. Protection Regulatory Plan which protects the park and controls the activities inside the park. In this plan, terrestrial areas are divided into “special zones” which are further divided into Special Protection Zones and Class I, II and III Special Zones, as well as “ordinary zones”; while marine area is divided into “marine park areas” and “ordinary zones”. Both terrestrial area’s special zone and marine area’s marine park areas are all Regulated Utilization Areas to prevent over-crowded and thus ensure the sustainability of the park. Special Protection Zones has the highest restriction to protect its authentic environment; Class I Special Zones is to protect the landscape comparable to the Special Protection Zones; Class II and III Special Zones have farming, forestry or fishing activities but class II has higher restriction than class III; ordinary zones are the buffer zones that fill in the gap between Special Zones or Marine Park Zones and non-park zones; Marine Park Areas are to protect the ecosystem and landscape related to the sea and the seashore.
- ii. Utilization Regulatory Plan which regulate the use of the landscape area such as regulation of private cars to protect the environment.

Work Plan includes:

- i. Facility Plan which consists of “Protection Facility Plan” and “Utilization Facility Plan”. “Protection Facility Plan” aims to restore degraded natural environments with facilities

such as vegetation restoration facilities, animal breeding facilities and etc. “Utilization Facility Plan” is to minimize the effects caused when building the facilities in the park. Examples are facility complex (the administration office); individual/private facilities such as picnic sites, hotel and lodge, rest area and campsites; roads and trails such as walking trails, bicycle paths and roads for vehicles and transport facilities such as railroads, aerial cableway and watercraft.

- ii. Plan for Ecosystem Maintenance and Recovery is to preserve and conserve the nature by conducting various projects such as invasive species removal.

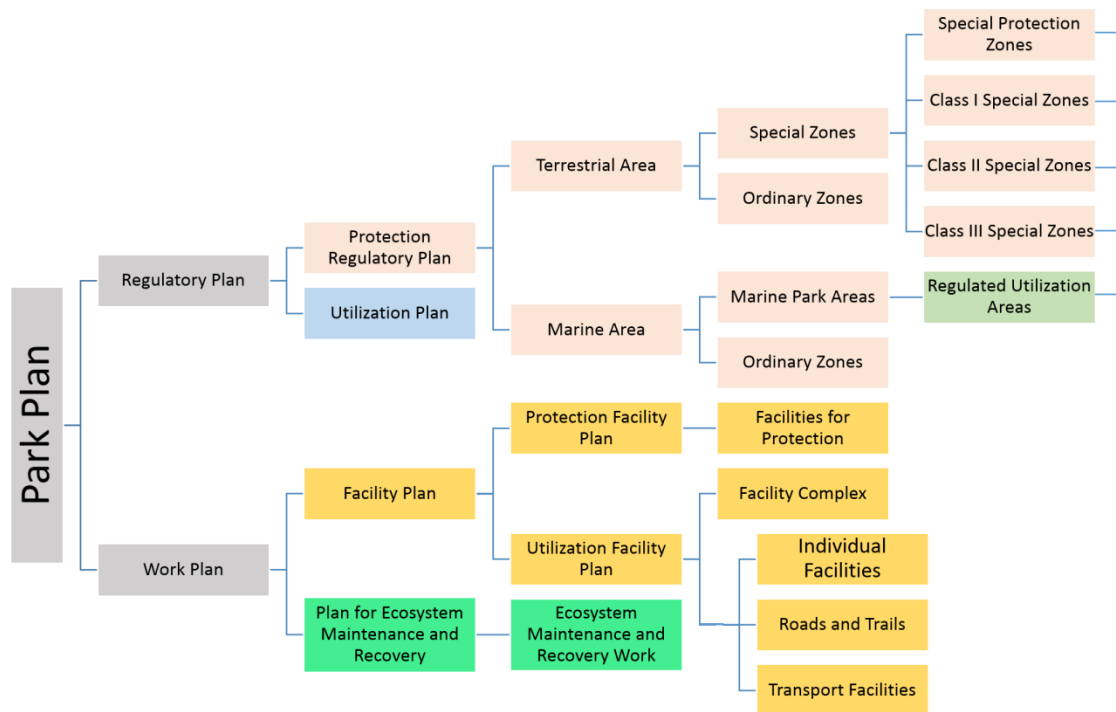


Chart 2.4.1: The Park Plan which acts as a basic guideline in protected areas management of Japan.

2.5 The importance of National Parks to be Accessible

National parks are protected green areas or natural areas for the use of conservation, education and recreation. According to the review by Maller and her colleagues in 2005, we cannot deny that humans have been shifting from the natural environments to urban areas in recent centuries. And thus, we have gradually lost contact with the nature which is proved to be able to enhance our well-beings, both physical and physiological health. Therefore, everyone, including people with and without disability is encouraged to reconnect with the nature.

Besides, people with disabilities are usually less active physically than the able-bodied (Rimmer, 2005). While some may be caused by the additional barriers such as the society discrimination and lack of local opportunities with unskillful instructor to handle people with disabilities to participate in physical activities (Shields & Synnot, 2016), Rimmer continued to suggest that people with disabilities being less active may be caused by the inaccessibility of built environment, including both indoor and outdoor. Such sedentary lifestyle have caused higher number of secondary conditions in which most are preventable such as sleep disorder, fatigue and weight issues (Kinne et al., 2004).

In addition, Williams and his colleagues (2004) show that people who use wheelchair do want to participate in outdoor activities, especially those activities such as bird watching, wildlife viewing and visiting archeological sites which do not demand high physical effort, required few adaptations or gears, need not much teamwork, inexpensive, and the location for the activity is accessible with adequate accessible facilities. They continued to discuss that encouraging people with disabilities to go out actively can reduce society stigma towards disability and thus enhance the skills and confidence of people with disabilities.

However, people who use wheelchairs are usually omitted from being able to access to the national parks or nature. This is because they are unlike the able-bodied who can walk, run and hike easily with the two legs, they cannot move without the assistant of bulky and clumsy wheelchairs or other mobile assisting devices. And these devices are not advance enough to allow them go to the nature, wilderness and national parks which the able-bodied can reach easily. Thus, an accessible national park equipped with sufficient accessible facilities such as flat and wide trail or path, accessible toilets along the trail or path, clearly designated signage and parking spaces for people with disabilities will provide another alternative and equal access for the people who use wheelchairs to exercise and be physically more active for the sake of their health and well-beings.

CHAPTER 3: RESEARCH SITES

3.1 The Selection of National Parks

The national parks were selected based on two factors: the travel distance from the main city which is one of the popular destinations for tourism and/or the popularity of the national park as an eco-tourism destination.

In Malaysia, because of the unique union in 1963 (further detail please refer to section 2.4.1), there are only two national parks on Peninsular Malaysia, namely Penang National Park and Taman Negara National Park. They were both chosen because Penang National Park is near to Georgetown, Penang, which is the World Cultural Heritage Site; while Taman Negara National Park is the nearest national park to the capital city Kuala Lumpur. The third park chosen was Kinabalu Park in Sabah, East Malaysia. Even though the parks in Sabah are not officially known as national parks because of the agreement in 1963, Sabah is the only state in Malaysia which focus in conserving the nature for eco-tourism purpose. The city of Kota Kinabalu is surrounded by Tunku Abdul Rahman Park, Crocker Range Park and Kinabalu Park but only Kinabalu Park is chosen because Kinabalu Park is well known for its highest peak in Malaysia and a World Heritage Site.

In Japan, Hokkaido has the largest natural resources with seven national parks available. Therefore, Sapporo, the largest city of Hokkaido is chosen as the main city. The national park which is relatively near to the Sapporo city, Daisetsuzan National Park (DNP) is chosen. Besides, DNP is within top 10 national parks with highest number of foreign tourists in both 2012 and 2013 in Japan (as cited in Jones & Ohsawa, 2016).

3.2 Selected National Parks in Malaysia

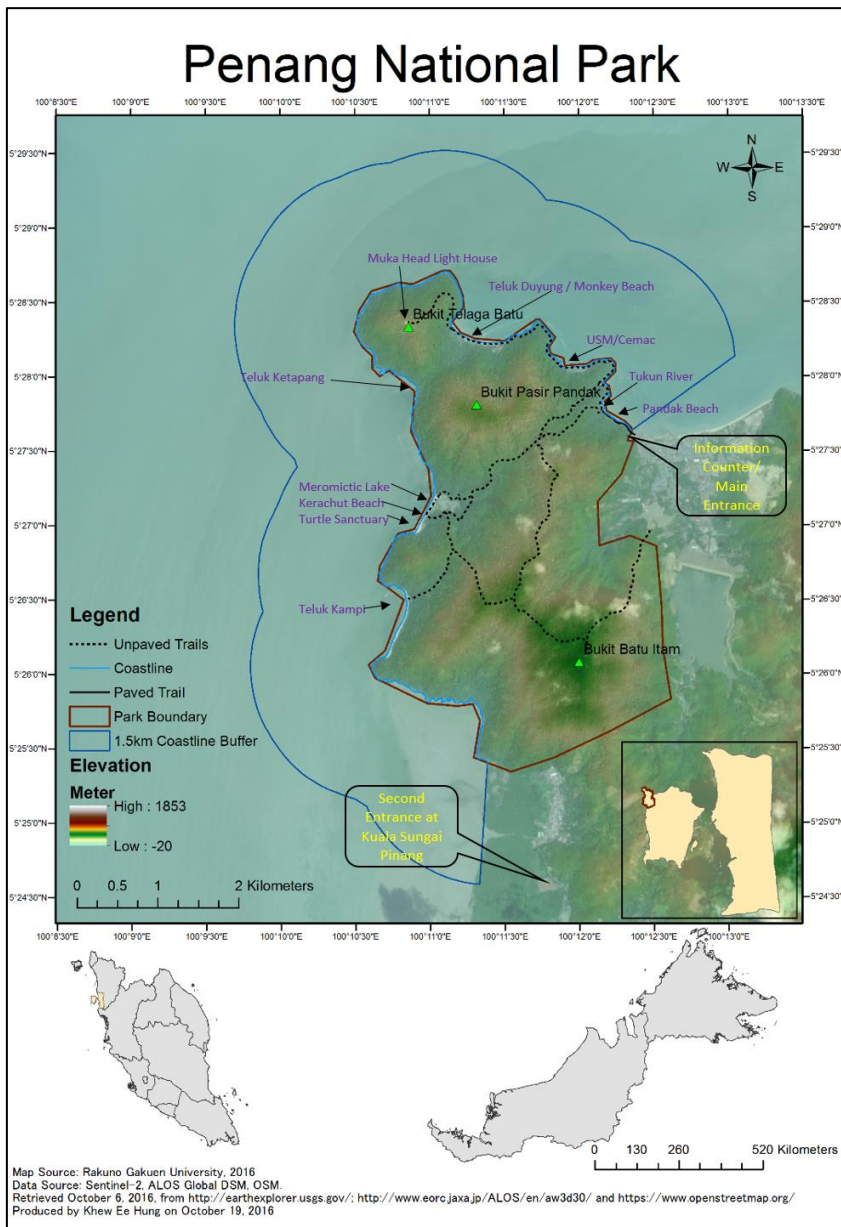
3.2.1 Penang National Park (PNP)

Of all the national parks in West Malaysia, PNP is the nearest to the city center, which is known as Georgetown (about 30 km or 45 minutes drives) and is the smallest national parks of Malaysia with only 1,266 hectares. PNP was a forest reserve for logging until 1996 and has become first national park established under Malaysia's Act 226 of National Park Act 1980 (Laws of Malaysia, 2013). Therefore, it is currently under the management of DWNP. The PNP is the only area with natural forested areas left on Penang Island, with 70 hectares still regarded as virgin forest (as cited in Kaffashi et. al., 2015).

PNP is also the only national park in Peninsular with both forest and marine features and thus provides wide range of habitats from sandy and rocky shores to mangroves and from Hill/Lowland Dipterocarp to seasonal meromictic lake. PNP mostly constitute of hill and slope areas. With the availability of various habitat, though is small, it has more than 417 species of flora and 143 species of fauna. Together with free entrance and various activities provided such as camping, wildlife observation, swimming, picnic, fishing, jungle trekking and canoeing, PNP has attracted visitors with different interest (DWNP, n.d.). The main attractions are the Meromictic Lake which has layers of water that do not intermix and the Turtle Sanctuary where both are located at Kerachut Beach.

However, PNP does not has adequate park management, strong enforcement of laws and regulations and has no proper zoning has allowed the expanding of urban and agricultural land into the park, thus disturbing the natural environment and dissatisfying the visitors (Kaffashi et. al., 2015). Ironically, the concept plan for PNP stated that PNP will be divided into two main zones, namely Protection Zone and Recreation Zone. Protection Zone can be further divided into Special Protection Zone, Sustainable Use Zone and Buffer Zone while Recreation Zone is divided into Public Recreation Zone, Coastal Recreation Zone and Extreme Activity Zone (*Pelan Konsep Taman Negara*, n.d.)

The amount of visitors in 2004 was only 21,768 but increased more than 400% to 115,915 in 2013, which is less than a decade (as cited in Fallah et al., 2014). Such rapid influx has caused over-crowded issues such as waste management and flora and fauna loss in the park (as cited in Fallah et al., 2014).



Map 3.1: The map shows the location of Penang National Park.

3.2.2 Taman Negara National Park (TNNP)

Taman Negara National Park, established in 1938/1939, is located at about 3 hours and 15 minutes' drive from the capital city of Malaysia, Kuala Lumpur. Was once known as King George V National Park before the independent of Malaya in 1957, Taman Negara which means “national park” in Malay language, is a combination of three areas from Pahang, Kelantan and Terengganu States. These areas of 434,300 ha of land, with Pahang (247,700 ha or 57%), Kelantan (104,300 ha or 24%) and Terengganu (85,300 ha or 19%), were dedicated by the Sultan of these states to the Britain's King George V in 1938 to commemorate Silver Jubilee of His Majesty reign (as cited in Pakhriazad et. al., 2009). TNNP was established under three similar state enactments, namely Taman Negara (Pahang) Enactment 1939, King George V National Park (Kelantan) Enactment 1938 and King George V National Park (Terengganu) Enactment 1938.

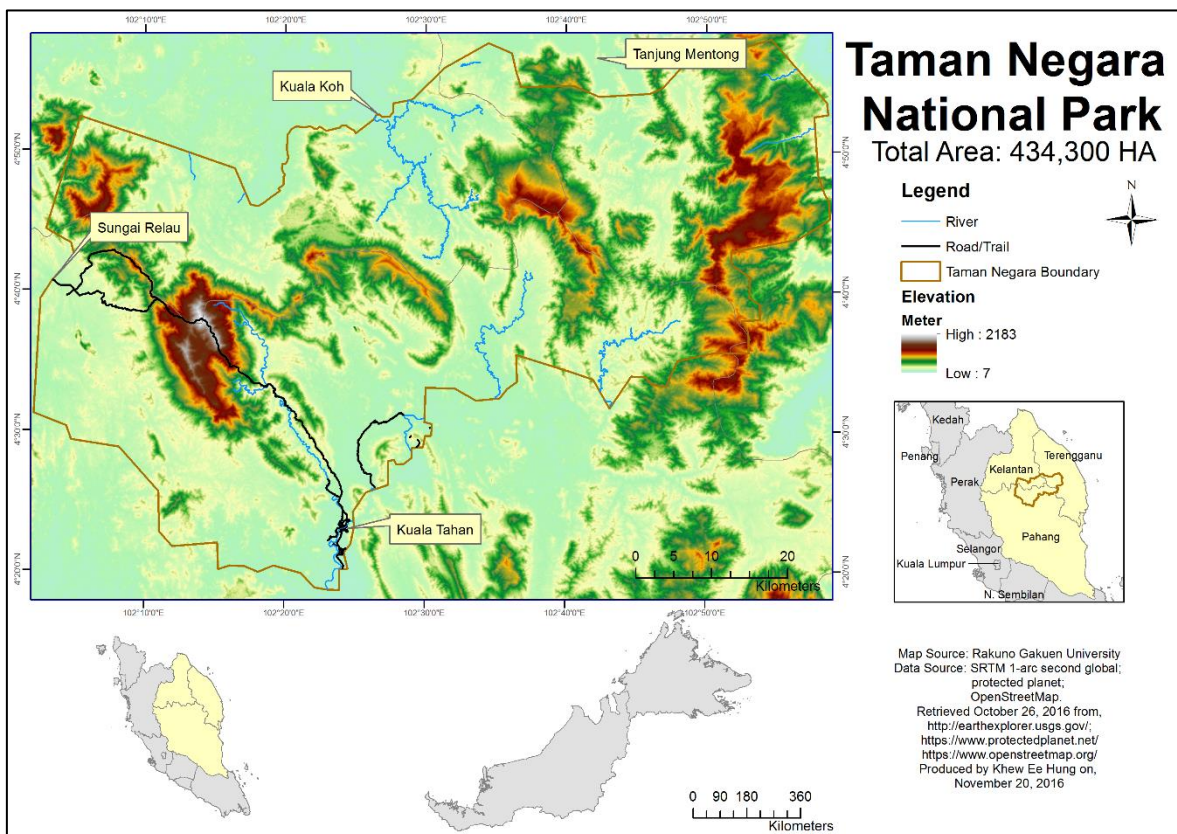
Estimated to be more than 130 million years old pristine forest, the park is mainly made up of lowland dipterocarp forest, about 57.6% of the total park area. TNNP also includes the mountainous range and the highest peak in the park, Gunung Tahan (2,187 m a.s.l.) which is located at Taman Negara (Pahang) National Park, is also the highest peak in Peninsular Malaysia. Therefore, the vegetation in the park consists of the humid tropical rain forest at the lower elevation to montane oak at the higher elevation and ericaceous forests at the summit of the highest hills.

It was only until 1987 that the Department of Wildlife and National Parks produced a more comprehensive “Taman Negara Master Plan” in response to the intense development and proposal to build a road up to Gunung Tahan, the highest peak in the park and Peninsular Malaysia. The objectives are to conserve and preserve the flora, fauna and its ecosystem; to create awareness by promoting unique endemic species; to manage and develop the park recreation with accordance to the legislation; to preserve the park historic, aesthetic and cultural value as well as act as a platform for research and education. The master plan includes the Visitor Policy which stated that everyone regardless of status, physical conditions, color, race, religion, age, health, nationality or income group should be able to access the park.

The administration center for Pahang is at Kuala Tahan, which is also the main entrance to the Taman Negara (Pahang) National Park. The second entrance is at Sungai Relau, Merapoh. The administration center for Kelantan and Terengganu are located at Kuala Koh and Tanjong Mentong respectively (as cited in Pakhriazad et. al., 2009).

In the park, the visitors in the park can enjoy the Taman Negara via boat ride, jungle trekking, bird watching, canopy walk, night safari, rapid shooting, water rafting, fishing, camping and even visit to the village of the indigenous people, the Batek people who stay in the park. The climb to the highest peak of Gunung Tahan is not as easy as the climb to Mount Kinabalu though the elevation is about 50% lower and it takes a minimum of 7 days.

The number of visitors to the TNNP was only 8,177 people in 1984 but has grown up to 60,026 people or 634% two decades later (as cited in Shuib, 1995; Samdin, 2008). The privatization of the facilities and services such as accommodation, restaurants, transportation and tour guiding/recreation services to accommodate the increasing number of visitors since year 1984 as well as the redevelopment project of the park headquarter at Kuala Tahan which started in 1980 and ended in 1992 could be the contribute factors that attract more visitors to the park well known for its rich nature (Shuib, 1995). Furthermore, the travel guidebook such as “Lonely Planet” and the power of “words of mouth” have been a good advertisement in promoting TNNP and attracted more visitors who are interested in its rainforest and abundant species of flora and fauna (Samdin, 2008).



Map 3.2: The map shows the location of Taman Negara National Park.

3.2.3 Kinabalu Park

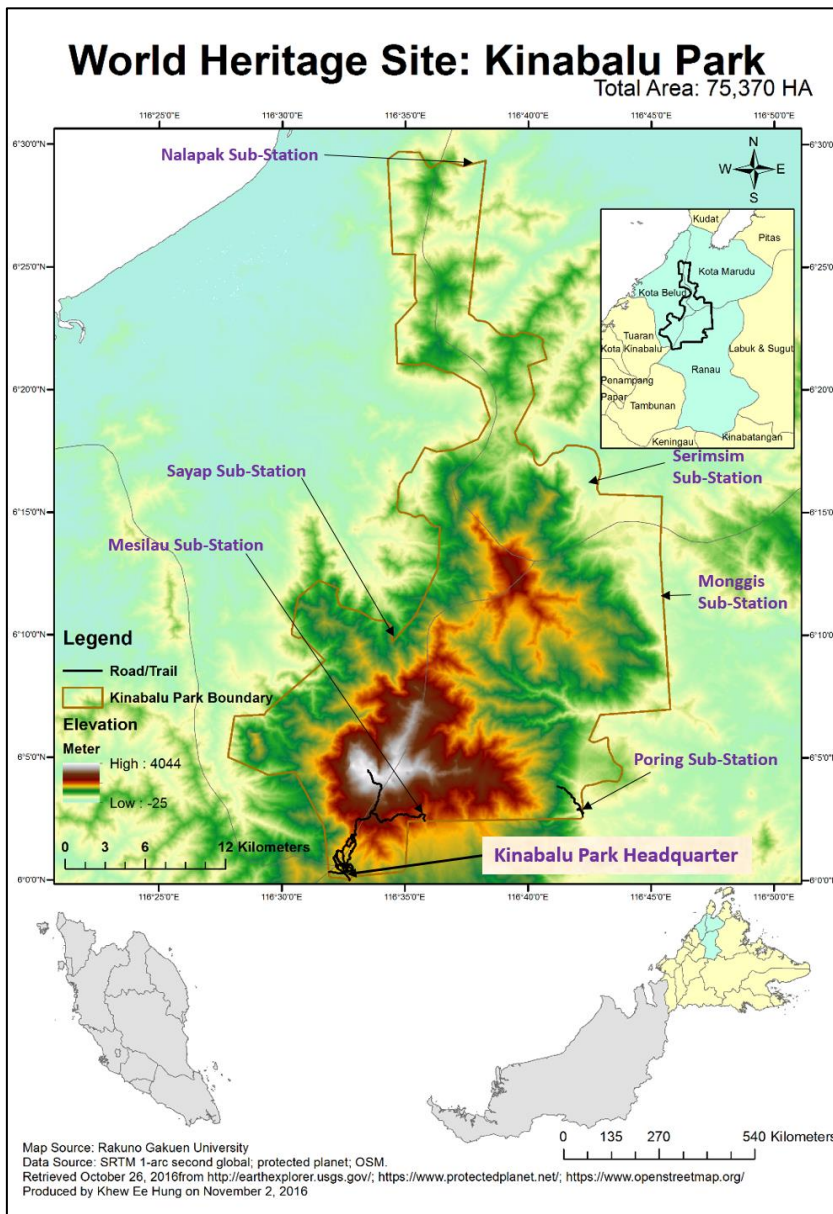
Kinabalu Park is about 92 km or about two hours' drive away from Kota Kinabalu, capital of Sabah (Sheena, Mariapan & Aziz, 2014). Kinabalu Park, with an area of 75,370 ha, is the first state park in Sabah established under the National Parks Ordinance No.5 1962 (as cited in Nais, 1996). It is also the first park gazette as the World Heritage Site in Malaysia in 2000 by fulfilling Criteria (ix) and (x). Kinabalu Park, a Type II protected area according to IUCN category system, is gazette as an effort which started in 1960s to protect the uniqueness of ecosystem, habitats and biodiversity available in the park. The forests around the Kinabalu Mountain were not disturbed even there were about 35 local villages surrounding the parks. This is because the local Dusuns living around the mountain believe that the mountain is a sacred place where the spirits of the dead rest (Nais, 1996). Therefore, the first recorded hike was done only in 1851 by the British, Sir Hugh Low and his expedition team (as cited in Nais, 1996).

The park has a very wide range altitude, from 152 m to the highest peak, Mount Kinabalu (4,095m), which is also the highest mountain between the Himalayas and New Guinea. The park does not only has complex geology but also has habitats including six vegetation zones, from lowland and hill rainforest (35% of the park) to tropical montane forest (37% of the park), sub-alpine forest and scrub at the highest elevations and ultramafic or serpentine rocks (about 15% of the park). Therefore, the biodiversity of Kinabalu Park is exceptionally high and has been identified as a Centre of Plant Diversity for Southeast Asia and a globally important center for both flora and fauna endemism. For flora, the park has about 5,000-6,000 vascular plant species as well as 1,000 orchid species, 78 species of Ficus, and 60 species of ferns with representatives from more than half the families of all flowering plants as well as some species which can be found also at Himalayas, China, Australia, and pan-tropical. As for fauna, the park has 90 species of lowland mammal, 22 species of montane zone mammals and 326 bird species which majority are threatened and vulnerable (UNESCO, n.d.).

The tourist can join various activities in the park, from adventurous and challenging activities such as hiking up to the mountain, experience the world's highest and Asia's first Via Ferrata at 3,200m to 3,800m a.s.l., Alpine Rock Climbing, Paragliding, mountain biking and even participating in annual Mount Kinabalu International Climbathon, to easier and relaxing activities such as bird watching, educative Ex-Situ Garden such as Botanical Garden, Nepenthes Garden, Butterfly Farm, Rafflesia Garden, Orchid Conservation Center etc and guided walk through the nature trail, picnic, camping canopy walk, hot spring, waterfall and nature photography. In year 1998, Sabah Parks privatized the management of

accommodation facilities to Sutera Sanctuary Lodges (SSL) to improve the quality of tourism facilities, reduce administration cost in order to focus in conservation as well as to provide job opportunities to the local communities (as cited in Goh and Yusoff, 2010).

According to the Annual Report 2010 by the Sabah Parks, there were a total of 554,773 visitors in 2009 and increased about 10% to 611,624 visitors in 2010. In both year 2009 and 2010, about 80% were local visitors. However, local visitors increased only about 10% while foreigners increased 12% when compare to 2009. More than 52% or 318,284 visitors visited Poring Hot Spring Station in 2010.



Map 3.3: The map shows the location of Kinabalu Park.

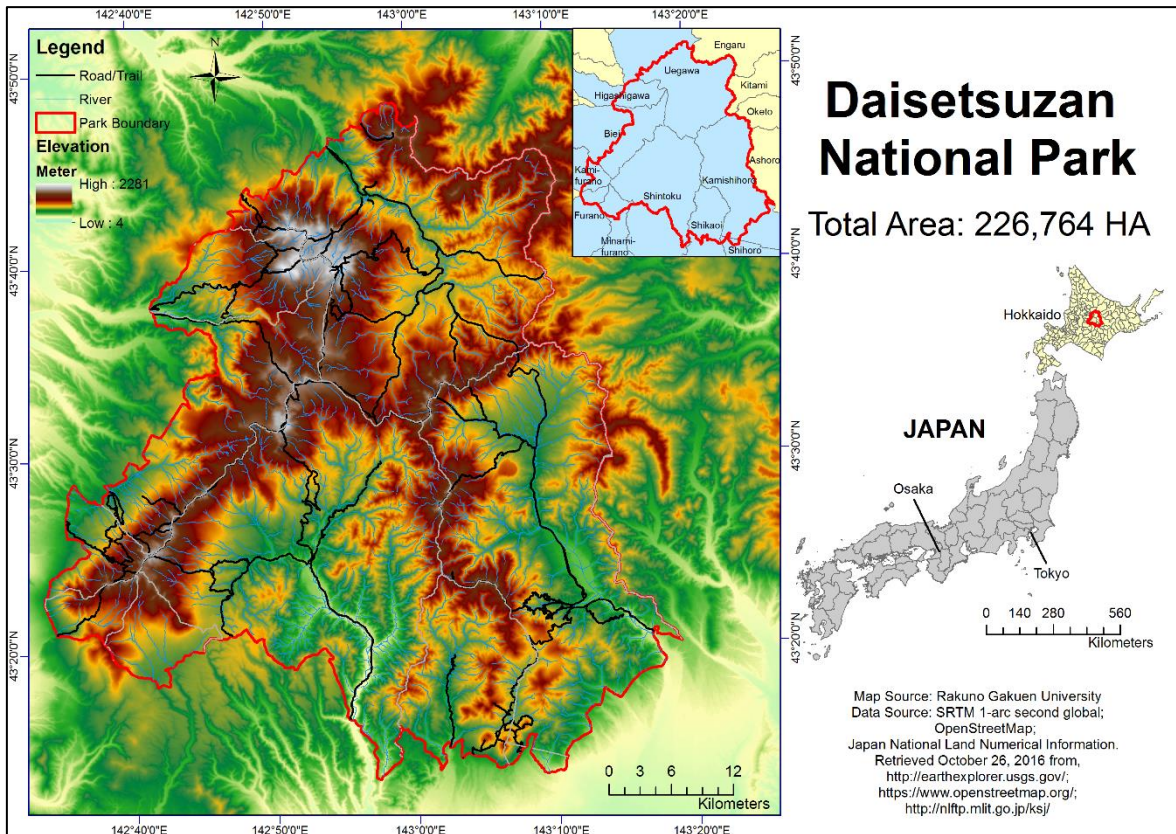
3.3 The Background of Selected National Park in Hokkaido, Japan

3.3.1 Daisetsuzan National Park

Established in 1934, Daisetsuzan National Park is the largest mountain range national park in Japan with an area of 226,764 ha. It is located at the central part of Hokkaido which is about 2 hours and 48 minutes' drive away. The land has government-owned land (214,812 ha or 95%), public-owned land (9,853 ha or 4%) and private land (2,099 ha or 1%). The national park has also being zoned into Special Protection Zones (36,807 ha or 16%), Special Zones of Class I (29,566 ha or 13%), Special Zones of Class II (22,271 ha or 10%), Special Zones of Class III (94,848 ha or 42%) and Ordinary Zone (43,272 ha or 19%) (<http://www.env.go.jp/park/daisetsu/intro/index.html>).

The national park was formed by the activities of volcano. It has the highest peak in Hokkaido, the Mount Asahidake (2,291 m a.s.l.), the columnar jointing at Sounkyo and Tenninkyu, caldera filled with mixed forest of needleleaf and broadleaf instead of water at Tokachi-Mitsumata, waterfall, a freshwater lake known as Lake Shikaribetsu and a man-made lake known as the Lake Nukabira as well as several hot springs. Because it is located at the coldest area of Hokkaido, the national park has the earliest autumn and winter as well as permafrost. The lower elevation at the national park are mainly comprising of needleleaf forest and broad-leave forest to coniferous forest to pine and to alpine at the mountaintop. The national park also house some endemic species such as Daisetsuzan moth, endangered species such as Blackiston's fish owls and Eurasian three-toed woodpecker as well as housing other mammals such as brown bear and Ezo-deers.

The national park has two ropeways to accommodate non-hikers who wants to enjoy the view at the mountains. There is an Asahidake Ropeway going up to the Sugatami Station at the Mount Asahidake before you climb another approximately 150 minutes to the peak. The Kurodake Ropeway connects Sounkyo up to the 5th Station and another chair lift that goes up to the 7th Station before you climb another 60 to 90 minutes to the peak of Mount Kurodake. Besides, the visitors can also enjoy the beautiful autumn scenery, snow remnant, ski, hot spring, igloo village etc. Daisetsuzan National Park is the second most popular national park in Hokkaido among both local and foreigners, with about 5 million of visitors in year 2014 (Ministry of Environment Japan, n.d.).



Map 3.4: The map shows the location of Daisetsuzan National Park.

3.4 Comparing Malaysia's to Japan's: Kinabalu Park and Daisetsuzan National Park

For comparison, only Kinabalu Park and Daisetsuzan National Park were compared because of some similar characteristics of the park. Firstly, both are mountainous regions and have hot springs. Secondly, because of high elevation of Mount Kinabalu, even it is located at tropical regions, Mount Kinabalu has montane forest, subalpine forest and alpine forest which are also present in Daisetsuzan National Park. As it is all summer in Malaysia, only the summer condition of Daisetsuzan National Park is compared.

CHAPTER 4: METHODS

4.1 Descriptive Research

Descriptive research method is used to examine the current state of a situation (as cited in Williams, 2007). This study utilized descriptive research method to examine the current accessibility of people who use wheelchairs to selected national parks. The accessibility was accessed based on the collected data, both primary and secondary.

4.2 Data Collection

The data collection method I used in this study for the selected national parks in Malaysia and Japan are similar but not completely the same. The first similarity is both countries data were sourced from both primary and secondary data in order to create a more comprehensive dataset. Second, the secondary data are sourced from free^{*1} and open^{*2} data. And the study was started by collecting and reviewing the secondary data from internet and pamphlets before collecting the primary data via field-observation and/or interviews.

However, because of two reasons: 1. the secondary data about the accessibility of people who use wheelchairs in Malaysia is less than Japan's; and 2. the language barrier I have in Japan, I used more primary data for the study in Malaysia and more secondary data for the study in Japan.

^{*1} "Free data" means you can download and view the data but the use and distribution of the data are limited (Tennison, 2016).

^{*2} "Open data" means that the data is freely available to the public, anyone can download, use, modify and share for any purposes (<http://opendefinition.org/>).

4.2.1 Free/ Open GIS Data Collection

GIS utilized spatial data and attribute data as the basic geographic data. The collected GIS data were secondary data collected from the internet. Spatial data which can answer the "where" question is particularly important in answering the sub-questions. Spatial data has two fundamental models, namely vector data and raster data. Vector data is a collection of points (single x,y locations), lines (linear string of x,y locations) and polygons (closed string of x,y locations) usually saved in Shapefile and/or Coverage format while raster data is a collection of rows and column matrix known as cells or pixels which include images, elevation models and scanned maps. Attribute data are the descriptive information of

particular spatial data such as name, area, length, elevation etc. and are stored in tables and managed by a Relational Database Management System (RDBMS). Provided there is a common attribute, unique ID for example, the table in CSV, XLS, XLSX (Excel) format or the database from Access, Oracle, PostgreSQL can join with the spatial data files.

In order to show the location of the selected national parks, the area of the selected national parks that can be accessed by the people who use wheelchairs, and the location of the location of facilities, services and/or experiences accessible by the people who use wheelchairs, I needed some spatial data as shown as below:

1. Country and states and/or districts boundary;
2. National park's boundary;
3. Zoning of the national park (if any);
4. The entrance location to the national park;
5. The elevation information of the national park;
6. The topography of the national park;
7. The vegetation zone in the national park;
8. The places of interests (POIs) in the national park;
9. The facilities and/or services available in the national park;
10. The trails/roads in the national park.

4.2.2 On-Site Observation for National Parks in both Malaysia's and Japan's

With the spatial data such as location of the facilities/services and places of interests collected, it is still difficult to identify the accessibility for the people who use wheelchairs and identify what they can use/enjoy. Therefore, field observation method, which allows a direct observation at the selected area, comes handy in solving this issue by verification. On-site observation carried out in this study was structured. In another words, a checklist of what to observe was prepared before the field-observation is done.

This on-site observation was carried out to collect primary data to clarify the accuracy of the data and ensuring a more comprehensive data are collected. These short trips to the selected national parks in Malaysia and Japan were not accompanied by any people who use wheelchairs. The observation period for Malaysia's was in February, 2016: Taman Negara National Park was on February 1-2, 2016; Penang National Park was on February 15, 2016; Kinabalu Park was on February 22, 2016. The data were collected based on the checklist below:

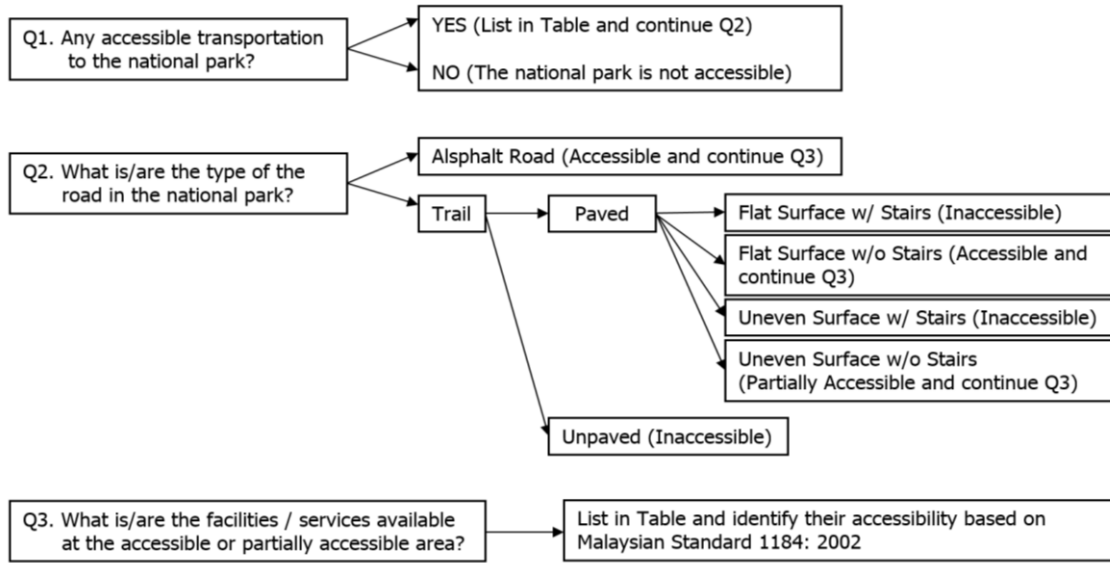


Chart 4.1: The checklist for on-site observation at selected national parks in Malaysia.

And for Japan’s, the observation period for Daisetsuzan National Park was on August 11-12, 2016. The data was collected based on the slightly different checklist from Malaysia and is shown as below:

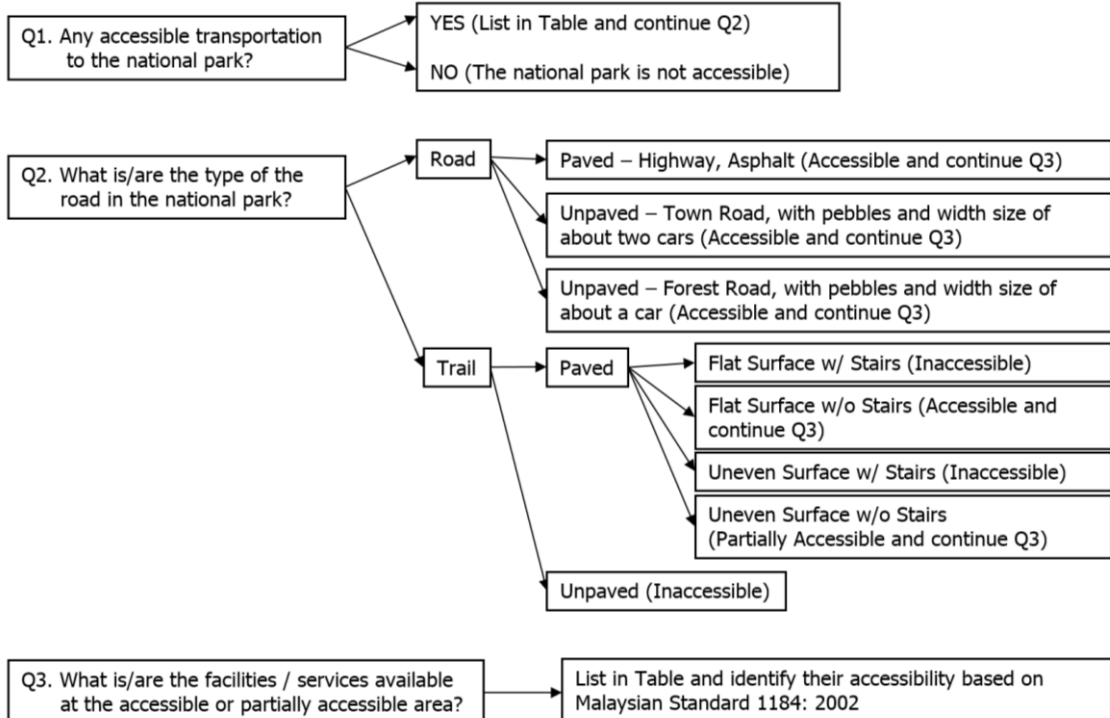


Chart 4.2: The checklist for on-site observation at selected national park in Japan.

Malaysian Standard 1184:2002, the Code of Practice on Access for Disabled

Persons to Public Buildings, was developed by SIRIM Berhad under the authority of Department of Standards Malaysia (DSM) to standardize and accredit the facilities for the disabled people. The standard was developed through consensus by committees made up of balanced representatives from related parties and organizations and are aligned to or are adoption of international standards in accordance to the Standards of Malaysia Act 1996.

4.2.3 Telephone Interview for the Accessibility of Accommodation in Malaysia

Telephone interview is another method to collect primary data in clarifying the accuracy of the data and ensuring a more comprehensive data are collected was interview. Telephone interview was carried out only after the on-site observation as I was not allowed to enter the accommodation area without prior permission. I called the private accommodation operator, Sutera Sanctuary Lodges, at Kinabalu Park. Sutera Sanctuary Lodges is in charge of all accommodations available in the Kinabalu Park Headquarter, Mesilau Sub-station and Poring Hot Springs Sub-station. The questions asked in the telephone interview were: “any room(s) which is/are accessible to people who use wheelchairs at all three headquarter and sub-stations?” and “is/are the toilet(s) in the wheelchair accessible room easy to be used by the people who use wheelchairs?”

The disadvantage of telephone interview is that we can only rely on the information given by the person at the other end of the phone and we cannot understand the condition of both room(s) and toilet(s) as no access audit can be done.

Telephone interview was not carried out in the other two national parks in Malaysia because Penang National Park does not has accommodation built in the park and Taman Negara National Park is not accessible with the staircase. It is also not carried out in Japan because of language barrier but it is replaced by online survey.

4.2.4 Online Survey for the Accessibility of Accommodation in Japan

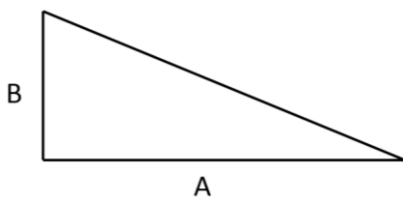
Due to language barrier in Japan, I replaced the telephone interview with online survey. Online survey is used to collect secondary data from internet. The accessibility of the accommodation in Daisetsuzan National Park was sourced particularly from the official websites of the hotels and resorts, as well as some other hotels booking websites.

4.3 Spatial Data Utilization and Analysis

The required spatial data as in 4.2.1 were used and analyzed as shown in Table 4.1. The first three were used to show the location of the national parks; the zoning which means the different protection status of the national park, was used to show where people who use wheelchairs can access; the elevation data were the most important data as they were analyzed spatially to generate topography data (No. 5), contours, vertical vegetation zone for national parks with high latitude areas (No. 6) and to identify the accessible area of the people who use wheelchairs using slope percent analysis; sixth and seventh were used to identify what and where can the people who use wheelchairs enjoy if they go to the national park; eighth was used to show which facilities/ services the people who use wheelchairs can use or enjoy and the trails/roads data were used to show how far can the wheelchair users travel in the national park

With the SRTM 1-arc global second data downloaded, I created a topography map for each national parks using hillshade tools in ArcGIS 10.3.1. Next, I created contour at an interval of 200 m with the same SRTM dataset. As it is difficult to identify the accessible slope area for the people who use wheelchairs by observing only at the field, I calculated the slope percent for the accessible and partially accessible roads/trails identified from the on-site observation using SRTM 1-arc second global raster datasets in ArcGIS 10.3.1. The slope percent which is less than or equal to 5% (slope ratio of 1:20) is considered easy for the people who use wheelchairs to use; between 5% and 8% (slope ratio of about 1:12) is medium or moderately difficult for the people who use wheelchairs to use and any slope percent more than 8% will be considered difficult for the people who use wheelchairs to use (Aiko & Shibata, 2005).

Slope percent is used to identify the difficulty for the wheelchairs to move around at the roads, paths and/or trails which were identified as accessible and partially accessible based on the two checklists in 4.2.2. The slope percent is a grade for the slope ratio. Slope ratio is ratio of vertical distance to horizontal distance. According to Zeller and his colleagues in 2012, the formula for slope percent and slope ratio is calculated as below:



Let's A = horizontal distance and B = vertical rise;

Slope Percent:

$$B / A = C \text{ slope per meter}$$

$$C \times 100\% = \text{Slope Percent}$$

Slope Ratio:

$$A / B = D$$

$$\text{Slope Ratio} = 1:D$$

Table 4.1: The utilization and analysis of the spatial data required.

No.	Spatial Data	Form	Utilization	Analysis
1.	Country and states and/or districts boundary	Polygon	To show the location of the national park.	Nil
2.	National Park's boundary	Polygon		
3.	The entrance location to the national park	Point		
4.	Zoning	Polygon	To show what and where the people who use wheelchairs can/may enjoy.	Nil
5.	The elevation information of the national park	Raster	To create topography, vertical vegetation zone (if any), and to show the accessible slope for the wheelchairs.	Hillshade, Contour, Slope Percent
6.	The topography of the national park (result of Hillshade analysis)	Raster	To show the topography of the national park.	Nil
7.	The vegetation zone in the national park (both vertical and horizontal vegetation zone if available)	Polygon	To show what and where the people who use wheelchairs can/may enjoy.	Nil
8.	The places of interests	Point		

	(POIs) in the national park			
9.	The facilities and/or services available in the national park	Point	To show where and what the people who use wheelchairs can use/enjoy.	Nil
10.	The trails/roads in the national park	Polyline	To show how far the wheelchair users can go.	Nil

4.4 Spatial Database Sharing

In order to ensure the collected and organized free/open spatial data uses are maximized, I shared to the public via sharing platform, ArcGIS Online. The accessibility of facilities and services to the people who use wheelchairs were also edited and shared via Wheelmap.

ArcGIS Online by Esri is an online, collaborative web GIS that allows users to use, create and share maps, scenes, apps, layers, analytics and data. The sharing can be done by sharing a layer package which can be downloaded and editable in ArcGIS Desktop or share as a map using ArcGIS Server. Also, the users are free to choose the terms of use when sharing the data, for personal or noncommercial use or publicly or only within an organization. Therefore, we can limit the usage of the free data which may have terms and conditions while using.

Wheelmap is an open sourced, crowd-sourcing initiative of Sozialhelden, a German NGO located at Berlin, which started in 2010. Wheelmap utilizes the crowd-sourced spatial data from OpenStreetMap and have volunteers translating the wheelmap website and iPhone App into multiple languages such as English, German and Japanese. It is a map for wheelchair accessible locations and can be accessed from website (<https://www.wheelmap.org/>), iPhone app or Android app. Anyone can find and add public places to the map and rate their accessibility according to a simple traffic light system, with red color means inaccessible, orange color means partially accessible and green color means accessible. Thus, I used wheelmap to show the accessible, partially accessible and inaccessible of the places of interests (POIs) and facilities. Besides, pictures and remarks were also added, if available, to the wheelmap so that the people who use wheelchairs can have a better understanding of the place.

CHAPTER 5: RESULTS

5.1 Types of Free/Open Spatial Data Collected

The collected GIS or spatial data, collected status, format and sources are shown below:

	Country, States and/or District Boundary	National Park Boundary	Zoning	Entrance Location	Elevation (DEM)	Topography	Vegetation Zone	POI	Facilities	Trails/Roads
Malaysia										
PNP	○ ¹ (VD)	Δ ³ (VD)	×	○ ³ (VD)	○ ⁵ (RD)	● (RD)	×	Δ ³ (VD)	○ ³ (VD)	○ ³ (VD)
TNNP	○ ¹ (VD)	○ ³ (VD)	×	○ ³ (VD)	○ ⁵ (RD)	● (RD)	×	Δ ³ (VD)	Δ ³ (VD)	○ ³ (VD)
KP	○ ¹ (VD)	○ ⁴ (VD)	×	○ ³ (VD)	○ ⁵ (RD)	● (RD)	×	Δ ³ (VD)	○ ³ (VD)	○ ³ (VD)
Hokkaido, Japan										
DNP	○ ² (VD)	○ ³ (VD)	○ ² (VD)	○ ³ (VD)	○ ⁵ (RD)	● (RD)	○ ⁶ (VD)	○ ³ (VD)	○ ³ (VD)	○ ³ (VD)

×: No ○: Yes Δ: Incomplete ●: Derived from DEM data

(VD): Vector Data; (RD): Raster Data

Sources:

- ¹: Retrieved on October 26, 2016, from <http://www.diva-gis.org/>
- ²: Retrieved on October 26, 2016, from Japan National Land Numerical Information website: <http://nlftp.mlit.go.jp/ksj/>
- ³: Retrieved on October 26, 2016, from OpenStreetMap (OSM) website: <https://www.openstreetmap.org/>
- ⁴: Retrieved on October 26, 2016, from protected planet website: <https://www.protectedplanet.net/>
- ⁵: SRTM 1-arc second global. Retrieved on October 26, 2016, from USGS website: <http://earthexplorer.usgs.gov/>
- ⁶: Retrieved on November 15, 2016, from Biodiversity Center of Japan website: <http://gis.biodic.go.jp/> (Scale: 1/50,000; Years: 1979-1998)

5.2 Accessibility of the National Parks to People who Use Wheelchairs

From Table 5.2.1, we can see a summary of how accessible a national park is. The least accessible is PNP (Penang National Park), followed by TNNP (Taman Negara National Park), KP (Kinabalu Park) and DNP (Daisetsuzan National Park). However, in TNNP, the accessible distance and elevation are the area going to and at the Kuala Tahan Village located in the national park by private transportation. Thus, later at 5.2.1.2, I shows the reasons why the TNNP is inaccessible in details.

Table 5.2.1: A summary table showing the distance and elevation range that the people who use wheelchairs may access in selected parks in Malaysia and Hokkaido, Japan.

	Total Distance of Roads, Trails/Path (Approx.)	Distance accessible by People who Use Wheelchairs	Elevation of Roads, Trails/ Path (Approx. Range)	Elevation Range accessible by People who Use Wheelchairs
Malaysia				
PNP	11,738 m	562 m (4.8%)	1-233 m asl Diff. 232 m	6-35 m asl Diff. 29 m (12.5%)
TNNP	156,121 m	28,883 m (18.5%)	61-2183 m asl Diff. 2,122 m	61-364 m asl Diff. 303 m (14.3%)
KP	40,796 m	9185 m (22.5%)	486-4046 m asl Diff. 3,560 m	486-1918 m asl Diff. 1,432 m (40.2%)
Hokkaido, Japan				
DNP	646,399 m	341,020 m (52.8%)	331-2279 m asl Diff. 1,948 m	331-1604 m asl Diff. 1,273 m (65.3%)

5.2.1 Accessibility in national parks of Malaysia

5.2.1.1 Penang National Park (PNP)

A) Accessibility up to the Entrance(s)

PNP has two entrances, the main entrance at Teluk Bahang and another entrance at Kuala Sungai Pinang. The main entrance at Teluk Bahang is easier and nearer to access from Georgetown via private transportation and taxi (about 45 minutes) as well as the Rapid Penang public bus (about 90 minutes) which is friendly to people who use wheelchair (Figure 5.2.1). The other entrance also requires about 45 minutes from Georgetown by private transport or taxi but inconvenient to access by Rapid Penang

(<http://www.rapidpg.com.my/>). However, the taxi are not specifically for the use of people who use wheelchairs. Furthermore, tourist information websites introducing PNP such as Lonely Planet and VisitPenang always introduce only the Teluk Bahang entrance as most of the recreation facilities are nearer to the Teluk Bahang entrance or the northern part of the park. Therefore, I decided to exclude the Kuala Sungai Pinang entrance in this study.

At the Teluk Bahang entrance (Figure 5.2.2), there are an administration office, an information center and a registration counter. The information center where the registration counter is located is where the people who use wheelchair can access (Figures 5.2.3 & 5.2.4). The toilet which is located at the center of the information center, is however not accessible by the people who use wheelchair even though there is a slope, due to the small width of the door, 300 mm (Figure 5.2.5). Interestingly, one of the toilet rooms has a larger width door of 350 mm (Figure 5.2.6) though still does not match with the requirement of Malaysian Standard of min 900 mm wide door.

Table 5.2.2: The Public Transportation to PNP and their Accessibility to Wheelchairs.

Type	Accessibility	Remarks
Private Car	Partially	Depending on the type of car.
Rental Car	Partially	Depending on the type of the rented car
Bus	Yes	The wheelchair friendly Rapid Bus.
Taxi	Partially	There is no special taxi to accommodate wheelchairs, just normal car.



Figure 5.2.1: The wheelchair friendly Rapid Bus



Figure 5.2.2: The main entrance of the PNP



Figure 5.2.3: The slope to the visitor center



Figure 5.2.4: The registration counter at Teluk Bahang entrance.



Figure 5.2.5: The toilet at the center



Figure 5.2.6: The toilet rooms

B) Accessibility in PNP

The PNP can be accessed via land and sea (Table 5.2.3). Just outside the center, there is a pier where you can board the boat into the park (Figure 5.2.7). The person who use wheelchair may strolls out to the sea via the metal bridge with some assistance because of the small step at the entrance of the pier (Figure 5.2.8) but it is very difficult to board the boat because of the staircase (Figure 5.2.9). And the other piers are located at USM/Cemac and Kerachut Beach only. Therefore, board/alight the boat at other beaches have to be done by the beach. And this would be very difficult for the people who use wheelchair.

Table 5.2.3: The accessibility of access method in the PNP.

Type	Accessibility	Remarks
Via Land	Partially	Only the paved trail
Via Sea (Boat)	No	The boat is boarded either via the staircase at the pier or directly from the shallow seaside.



Figure 5.2.7: The pier outside the center entrance



Figure 5.2.8: The small step at the pier entrance

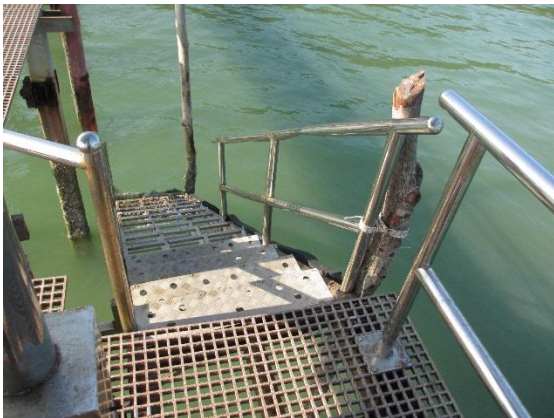


Figure 5.2.9: The staircase



Figure 5.2.10: Trail Guide at Teluk Bahang's main entrance (February 15, 2016).

Another method is via the land. From Ang S. C.'s personal experience which is recorded in his Master Degree thesis (2004), PNP has a total of 15 trails. However, the Department of Wildlife and National Parks (PERHILITAN, the current PNP management organization) only recommends and maintains a few trails which have the recreation facilities. The trails are located at the northern part of the park and are shown on the board as a Trail Guide at the information center (Figure 5.2.10). Therefore, as the rest are relatively unpopular among the tourists, remote and probably dangerous, they are not included in this study.

According to the Trail Guide, there are two main trails only. The trail on the right leads to Muka Head Light House via Pasir Pandak (a sandy beach), Sungai Tukun (river), USM/Cemac at Teluk Aling Beach and Teluk Duyung or also known as Monkey Beach. The trail on the left leads to Teluk Kampi Beach via Pasir Pandak, Pak Abbas Junction and Kerachut Beach. The trail to the Kerachut Beach is supposed to be the most popular among

the tourists because Kerachut Beach has two main points of interest (POIs), namely Meromictic Lake and Turtle Sanctuary.

However, only the trail from the entrance that passes through Pasir Pandak to the first bridge is the rather evenly paved trail in the park. Thus, this approximately 560 m short trail and the bridge with elevation of 8 m to 25 m above sea level (a.s.l.) is said to be accessible to the people who use wheelchair only. However, the slope percent derived from DEM data shows that the trail can be quite steep and thus may not be so easy for the people who use wheelchairs to maneuver around (Map 5.1). Also, there is a barricade which I think is used to prevent any motorcycle or bicycle from entering, is blocking the people who use wheelchairs from entering (Figure 5.2.11). Therefore, if the barricade is removed, they may enjoy the lowland forest, the coastal area and some mangroves (Map 5.2). Map 5.2 also shows the type of surface available in PNP. The other trails are inaccessible because they are unpaved trails with uneven surface (Figure 5.2.12). A summary is recorded in Table 5.2.4.



Figure 5.2.11: The barricade which prevent motorcycle or bicycle from entering



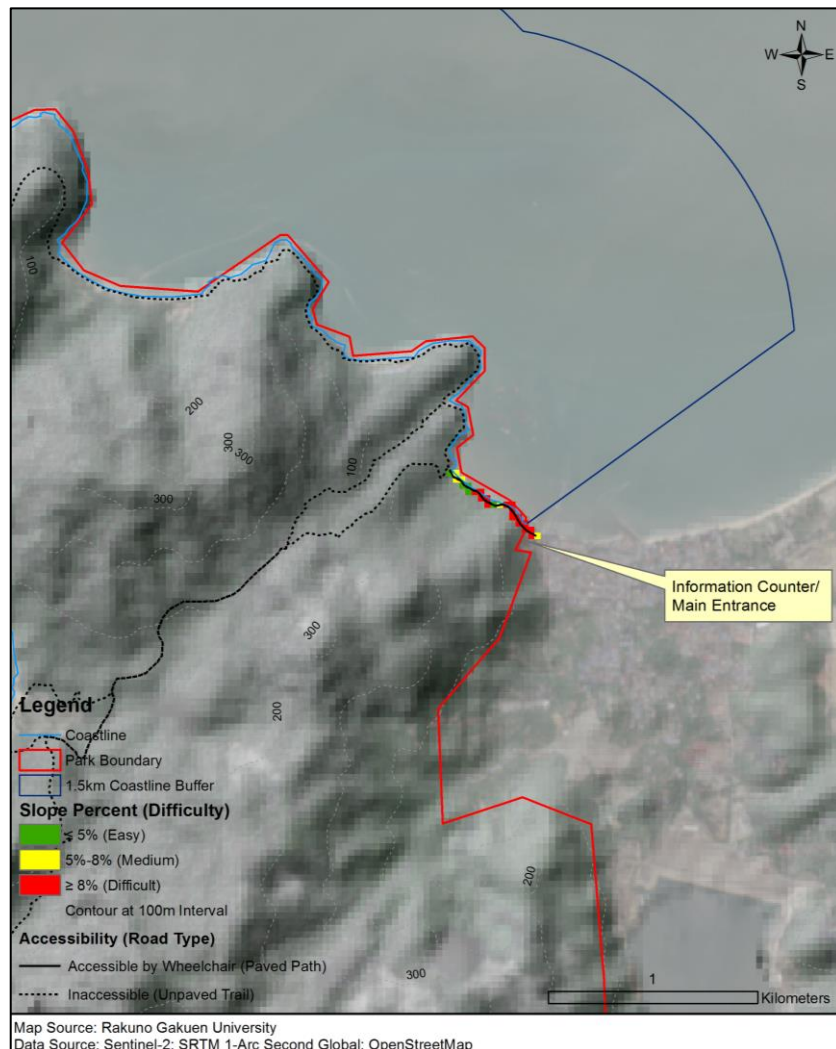
Figure 5.2.12: The unpaved trail

Table 5.2.4: The type of the trail/road and their accessibility in PNP.

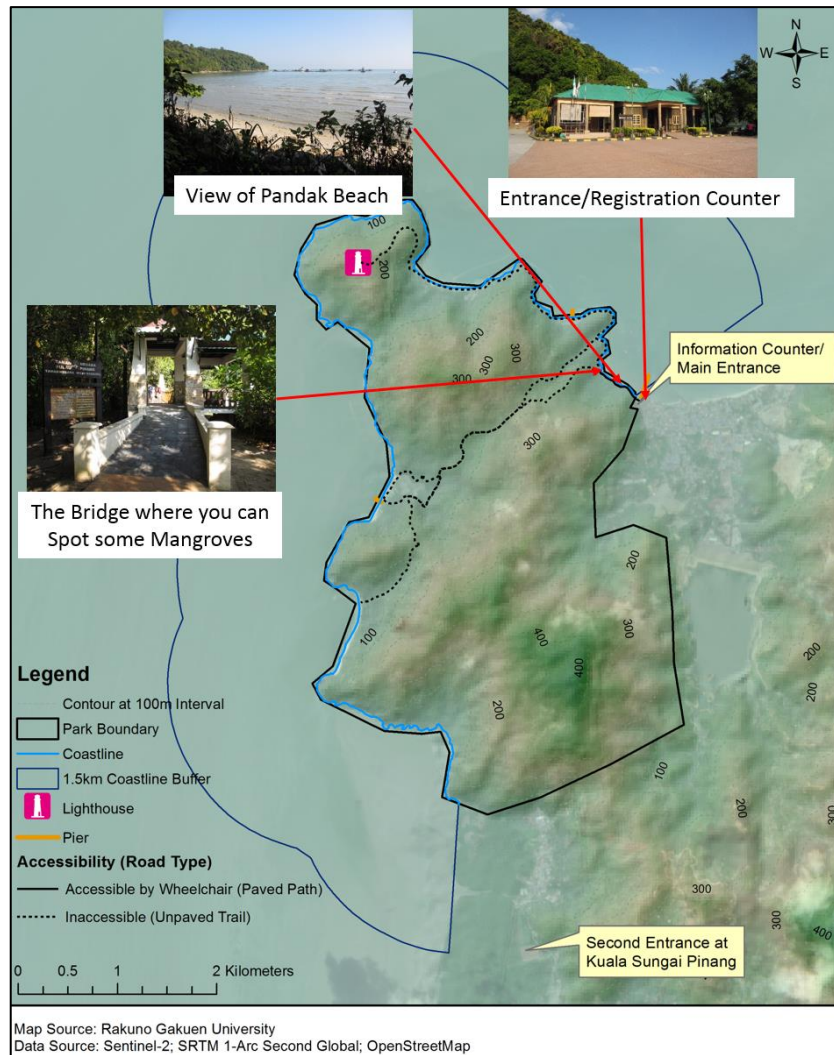
Trail/Road Type	Surface	Stairs/ Steps	Accessibility	Remarks
Paved Trail	Flat	No	Yes	There is a barricade at the entrance.
Unpaved Trail	Uneven	Inconsistent	No	

Table 5.2.5: The facilities/ services available at the accessible or partially accessible area

Facilities/ Services	Accessibility	Remarks
Registration Center	Yes	A ramp is available
- Toilet	No	The toilet door is too narrow even though a PwDs toilet sign is shown at the Trail Guide Map
Pandak Beach/ Picnic	Partially	There are steps to the beach and the beach surface are uneven and sandy.
- Bridge	Yes	After the bridge, there are no longer accessible facilities because of the unpaved trail.



Map 5.1: Slope percent for paved path at PNP and the difficulty for wheelchairs to move around.



Map 5.2: The location of what people who use wheelchairs may see or enjoy in PNP

5.2.1.2 Taman Negara National Park (TNNP)

A) Accessibility up to the Entrance(s)

Taman Negara National Park can be accessed by road and river. Even though Pahang State has two entrances, Kuala Tahan and Sungai Relau, Kelantan State and Terengganu State has one at Kuala Koh and Tanjung Mentong respectively, Kuala Tahan is the most popular among the visitors because it has the most facilities and amenities for visitors. As most people who use wheelchair can access only built environment, I selected only Kuala Tahan entrance in this national park.

To get to Kuala Tahan, a village located in TNNP, one can take public bus from Titiwangsa LRT station to Jerantut and change another bus to Kuala Tahan; public bus from Titiwangsa LRT station to Jerantut, take a van to Kuala Tembeling jetty (Figure 5.2.13) and

then take the boat to Kuala Tahan; or take taxi/rental car all the way to Kuala Tahan. All public buses and boats are however inaccessible to the people who use wheelchair except for taxi (no taxi specifically for the use of people who use wheelchairs) or arranged accessible transportation from Kuala Lumpur. Part of the road towards Kuala Tahan Village, almost 6 km, is included in the TNNP and the road's elevation range is between 61 m to 174 m a.s.l. However, from Map 5.3, we can see that the slope percent is mostly high and thus most parts are inaccessible for wheelchairs. Furthermore, once you reach Kuala Tahan Village, you still have to take a boat which is inaccessible to go across the river to the headquarters of TNNP (Figure 5.2.14) and what's welcoming you is another inaccessible staircase (Figure 5.2.15). Therefore, Taman Negara National Park, Kuala Tahan entrance, is inaccessible to people who use wheelchair.

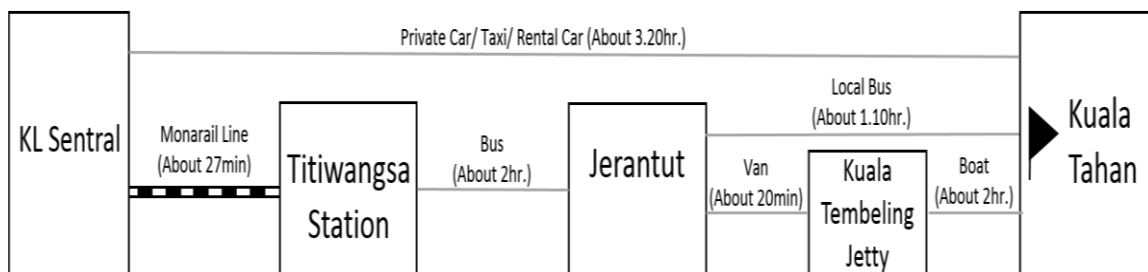


Chart: 5.2.1: Summary of transportation mode to TNNP.

Table 5.2.6: The Public Transportation to TNNP and their Accessibility to Wheelchairs.

Type	Accessibility	Remarks
Public bus	No	From Titiwangsa LRT station to Jerantut town and from Jerantut town to Kuala Tahan town.
Taxi	Partially	There is no special taxi for the people who use wheelchairs, just normal car.
Private Car	Partially	Depending on the type of car
Rental Car	Partially	Depending on the type of rented car
Boat	No	From Kuala Tembeling to Kuala Tahan via river



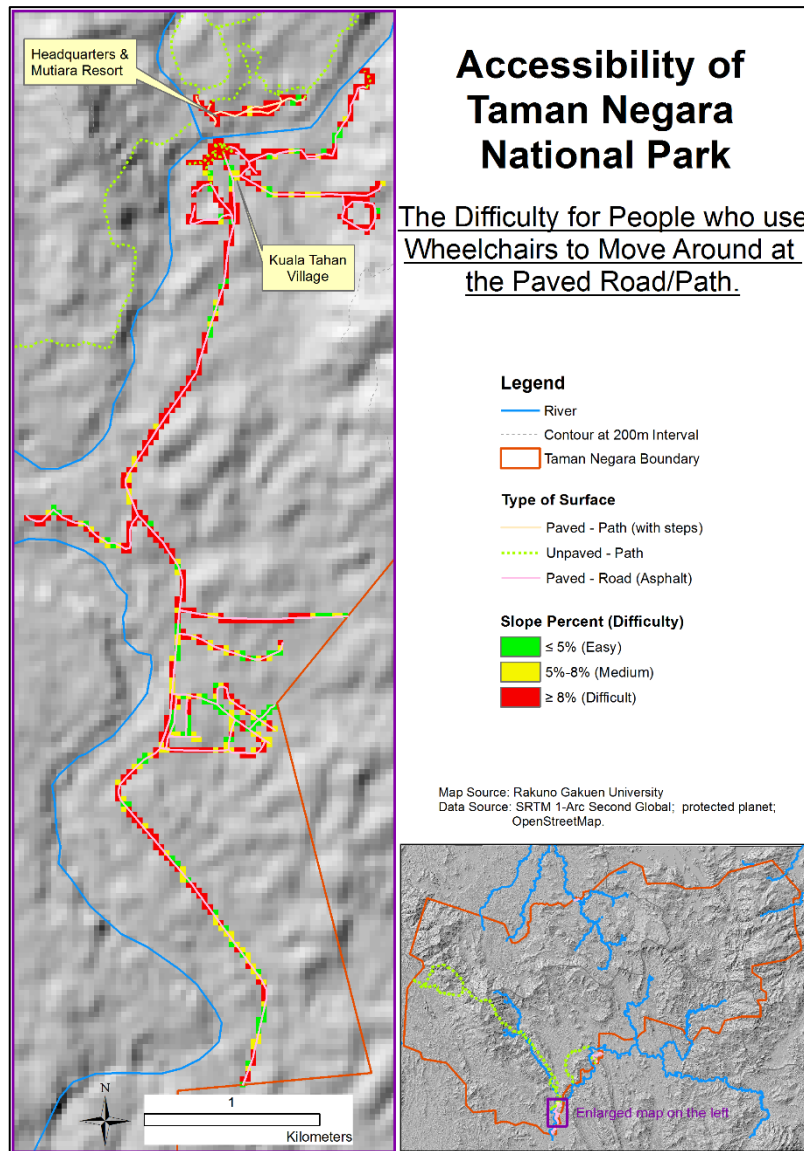
Figure 5.2.13: Kuala Tembeling Jetty



Figure 5.2.14: The boat to go across the river at Kuala Tahan.



Figure 5.2.15: The staircase to enter TNNP.



Map 5.3: Slope percent for paved road/path at TNNP Headquarters and the difficulty for people who use wheelchairs to move around.

5.2.1.3 Kinabalu Park (KP)

A) Accessibility up to the Entrance(s)

Kinabalu Park can be accessed only by road. According to Sabah Park's Annual Report 2010, Kinabalu Park has seven entrances receiving visitors, namely Kinabalu Park Headquarters in Kundasang, Poring Hot Spring Station in Ranau, Mesilau Sub-Station in Kundasang, Serinsim Sub-Station in Kota Marudu, Sayap Sub-Station in Kota Belud, Monggis Sub-Station in Ranau and Northern Kg. Nalapak Division Sub-Station. However, in this study, I selected only three entrances, Kinabalu Park Headquarters Station in Kundasang, Poring Hot Spring Station in Ranau and Mesilau Sub-Station in Kundasang because they are located

much nearer to each other and has the highest number of visitor, consisting of more than 99% of total visitors.

One can go to the Kinabalu Park from Kota Kinabalu city by taxi and long distance public buses via Jalan Tamparuli Kundasang which cut across part of the Kinabalu Park. However, the buses are not friendly towards people who use wheelchair (Figure 5.2.16). Thus, the only way to Kinabalu Park for the people who use wheelchair is either via private car or taxi though the taxi are not specifically wheelchair accessible (Wheelchair Traveller, 2014). As the slope of Jalan Tamparuli Kindasang is too steep, the people who use wheelchair can enter the park only by car, either taxi or private car (Map 5.5).



Figure 5.2.16: The long distance buses which are not friendly to the people who use wheelchair.

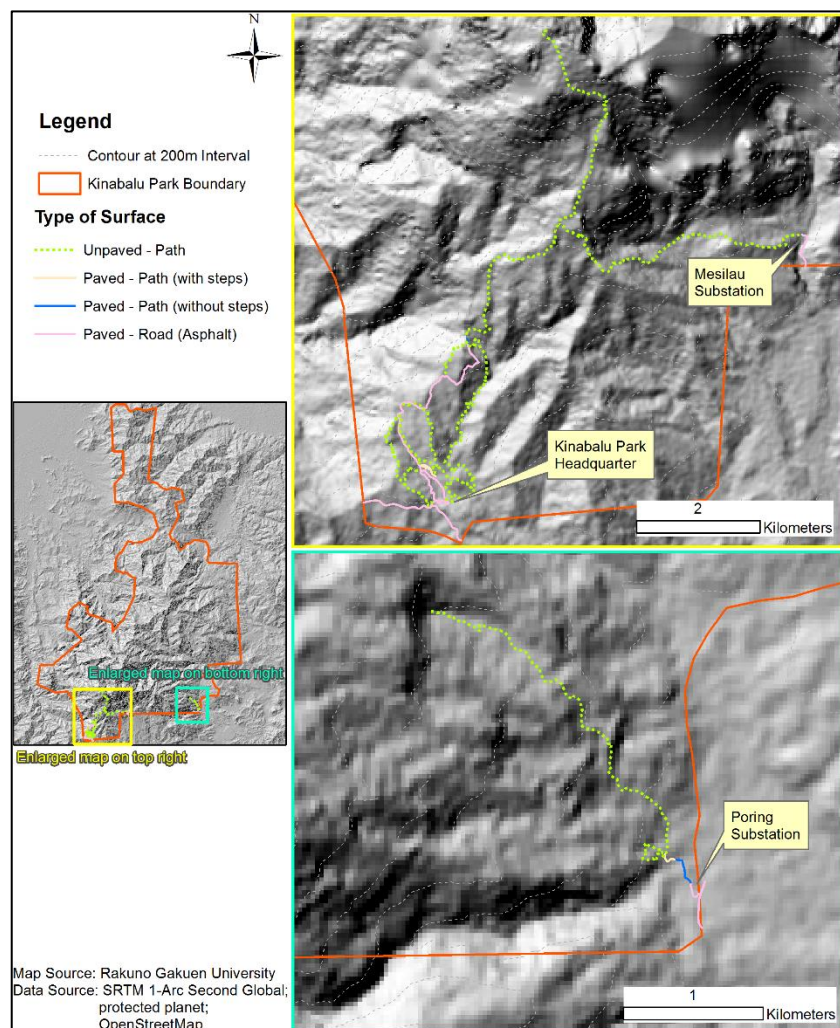
Table 5.2.7: The Public Transportation to KP and their Accessibility to Wheelchairs.

Type	Accessibility	Remarks
Private Car	Partially	Depends on the type of car
Rental Car	Partially	Depends on the type of the rented car
Long Distance Bus	No	Must climb the staircase to enter the bus
Taxi	Partially	There is no special taxi to accommodate wheelchairs, just normal car.

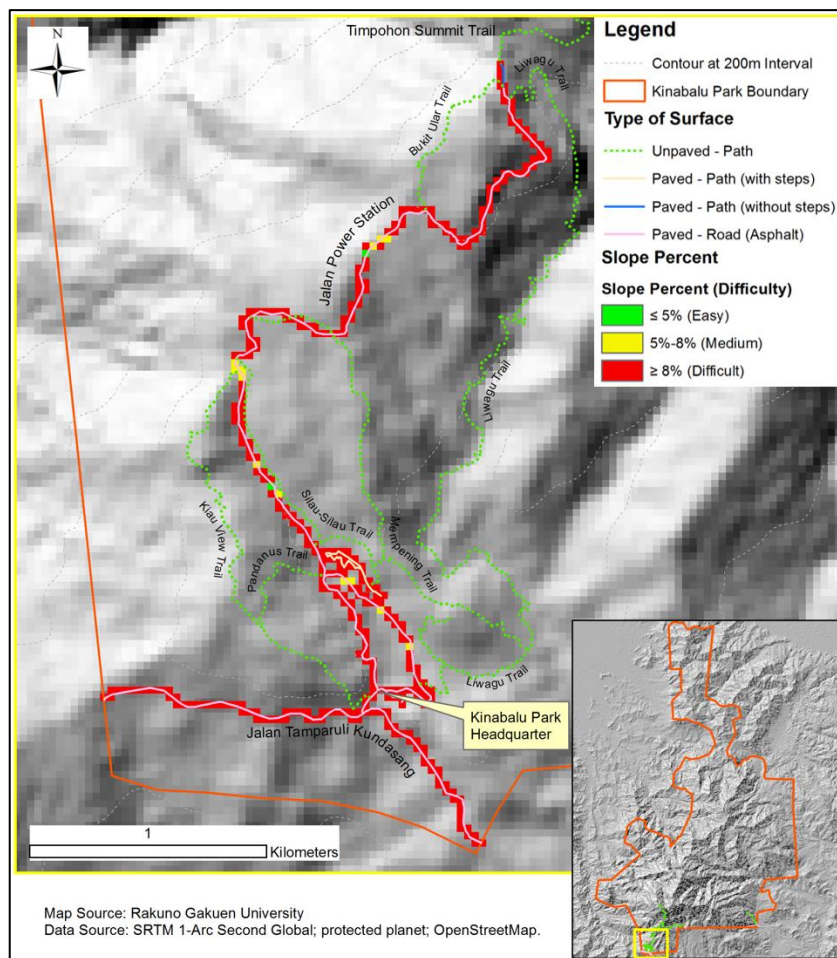
B) Accessibility in the Park

From Map 5.4, we can see the type of surface of the road/path/trail available at the Kinabalu Park. At the Kinabalu Park Headquarters in Kundasang, the accessible paved asphalt road is the longest among other sub-stations. However, the slope percent at the Kinabalu Park Headquarters in Kundasang is too high and thus very difficult for the wheelchairs to move around (Map 5.5). Thus, the people who use wheelchairs can only travel around the Kinabalu

Park by car. Going around by car allows the people who use wheelchairs to access to the visitor center and souvenir shops on the right after pass through the main entrance. It is accessible by the people who use wheelchair with the slope at the side (Figure 5.2.17). And the center has the only PwDs toilet (Figure 5.2.18 & Figure 5.2.19) in the park but it is locked when I was there in Feb 2016. Near to the visitor center there is a gazebo where you can see the spectacular view of Mount Kinabalu (Figure 5.2.20) but the people who use wheelchair cannot go up to the gazebo without assistant as there is a step. Anyway, you do not have to go up to the gazebo to see the breath-taking view. Another view angle of Mount Kinabalu can be seen if you go up to the Conservation Center or the Kinabalu Natural History Gallery via the road next to the visitor center (Figure 5.2.22). The road is also very steep, and thus the people who use wheelchair has to go up by car (Figure 5.2.21). The Kinabalu Natural History Gallery which is an education center for the public is inaccessible because of the staircase at the entrance (Figure 5.2.23). Prior to the Gazebo, there is a small path to Balsam Buffet Restaurant but inaccessible to wheelchairs because of the staircase (Figure 5.2.24).



Map 5.4: The type of the road/path/trail surface in Kinabalu Park.



Map 5.5: The slope percent for paved road and path as well as the difficult for wheelchairs to move around at Kinabalu Park Headquarters.

An able-bodied can go along the one-way Kinabalu Park Road from the visitor center, enjoying the serene and cool atmosphere by taking a walk along the walkway by the road side and where there are a few shelters (Figure 5.2.25) and benches (Figure 5.2.26) along the road, visit the Botanical Garden (Figure 5.2.27), pass by Liwagu Trail and go back to the visitor center. However, the people who use wheelchairs can only enjoy the atmosphere by having someone to drive them through the Kinabalu Park Road and they cannot enter Botanical Garden (Figure 5.2.28) because of the path leading to the Botanical Garden has steps. Besides, from Map 5.5, the Kinabalu Park Road is very steep and part of it may be difficult for the car, especially the smaller cars, to go up too.

In addition, you may go along Jalan Power Station which is normally use by the Mount Kinabalu hikers to the Timpohon Gate. The road is also not accessible for the wheelchairs because of the steep slope but the people who use wheelchairs can travel through a private car or taxi as there is a Mount Kinabalu viewpoint, known as Kiau Gap View along

the road. The road also passes through many entrances/exits to trails such as Pandanus Trail, Silau-Silau Trail, Kiau View Trail, Mempening Trail, Bukit Ular Trail and Liwagu Trail before reaching to the Timpohon Gate (Map 5.5).

From Map 5.6, we can not only see the location of what can the people who use wheelchairs see/enjoy at Kinabalu Park Headquarters if they travel by taxi/private car but also understand that all locations which may be accessed by the people who use wheelchairs are located at lower montane of vertical vegetation zone. In another words, the atmosphere and environment they can experience or the type of plants they can see is the lower montane forest.



Figure 5.2.17: The slope going up to the visitor center.



Figure 5.2.18: The signage to the toilet



Figure 5.2.19: The toilet for PwDs

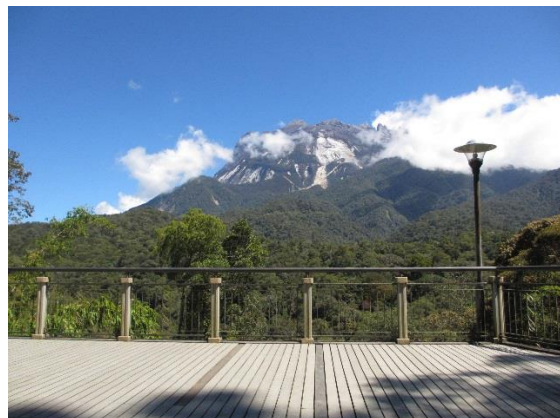


Figure 5.2.20: The view at the gazebo in front of the visitor center.



Figure 5.2.21: The road to the Conservation Conservation Center



Figure 5.2.22: The view from the Conservation Center



Figure 5.2.23: The entrance to the Kinabalu Natural History Gallery.



Figure 5.2.24: The path to the Balsam Buffet Restaurant.



Figure 5.2.25: The shelters available along Kinabalu Park Road and Jalan Power Station.



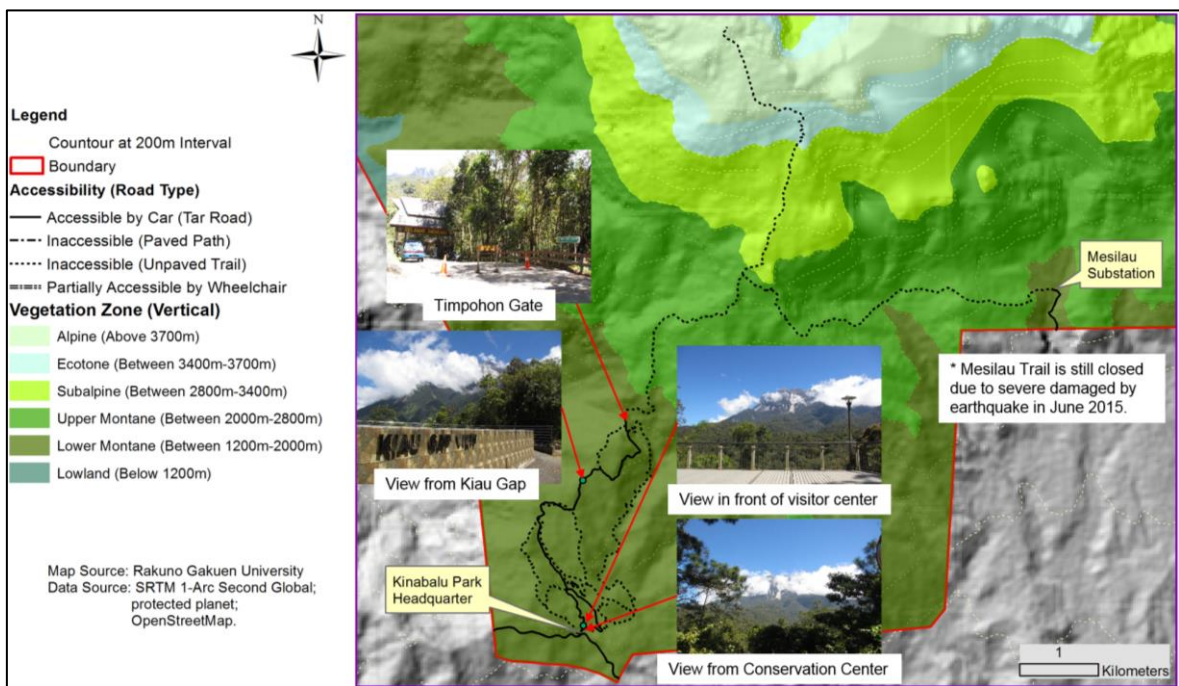
Figure 5.2.26: The benches found along Kinabalu Park Road.



Figure 5.2.27: Entrance to the Botanical Garden.



Figure 5.2.28: The path to the Botanical Garden.



Map 5.6: The location of what can the people who use wheelchairs see/enjoy at Kinabalu Park Headquarters if they travel by car.

Table 5.2.8: The type of the trail/road and their accessibility in KP's Headquarter.

Road Type	Surface	Stairs/ Steps	Accessibility	Remarks
Asphalt Road	Flat	No	Partially	Jalan Tamparuli Kundasang, Kinabalu Park Road, and Jalan Power Station. Most part of the road are steep though.
Paved Path	Uneven	Yes	Inaccessible	Path in Botanical Garden
Unpaved/Paved Trail	Uneven	Yes	Inaccessible	Liwagu Trail, Mempening Trail, Silau-Silau Trail, Pandanus Trail, Kiau View Trail, Bukit Ular Trail, Mount Kinabalu via Timpohon Summit Trail, Summit Trail and Kinabalu Summit Trail.

As for Mesilau Sub-Station in Kundasang, it was still closed when I went there in February 2016 as a result of severe damage caused by an earthquake occurred on June 5, 2015. According to the website of Sabah Park, the Mesilau Sub-Station will close indefinitely because of the cost to repair the damage was too expensive. If the road is not damaged by the earthquake, from my experience in November 2012, one can travel along the Jalan Cinta Mata Mesilau by car but not wheelchairs because of the high steepness of the road itself. Besides, Mesilau Sub-Station is located at an altitude of 1,900 m a.s.l. (Figure 5.2.29), the highest among the three study sites. The Mesilau Nature Centre is where you can access to the Nepenthes Garden which houses the world largest Nepenthes, the Nepenthes Rajah or Giant Montane Pitcher plant at their original habitat (Figure 5.2.30), is however not accessible by the people who use wheelchair because of the trail with staircase (Figures 5.2.31 & 5.2.32).



Figure 5.2.29: The site map of Mesilau Sub-Station. (Picture was taken in November 2012)



Figure 5.2.30: The Nepenthes Rajah (Picture was taken in November 2012)



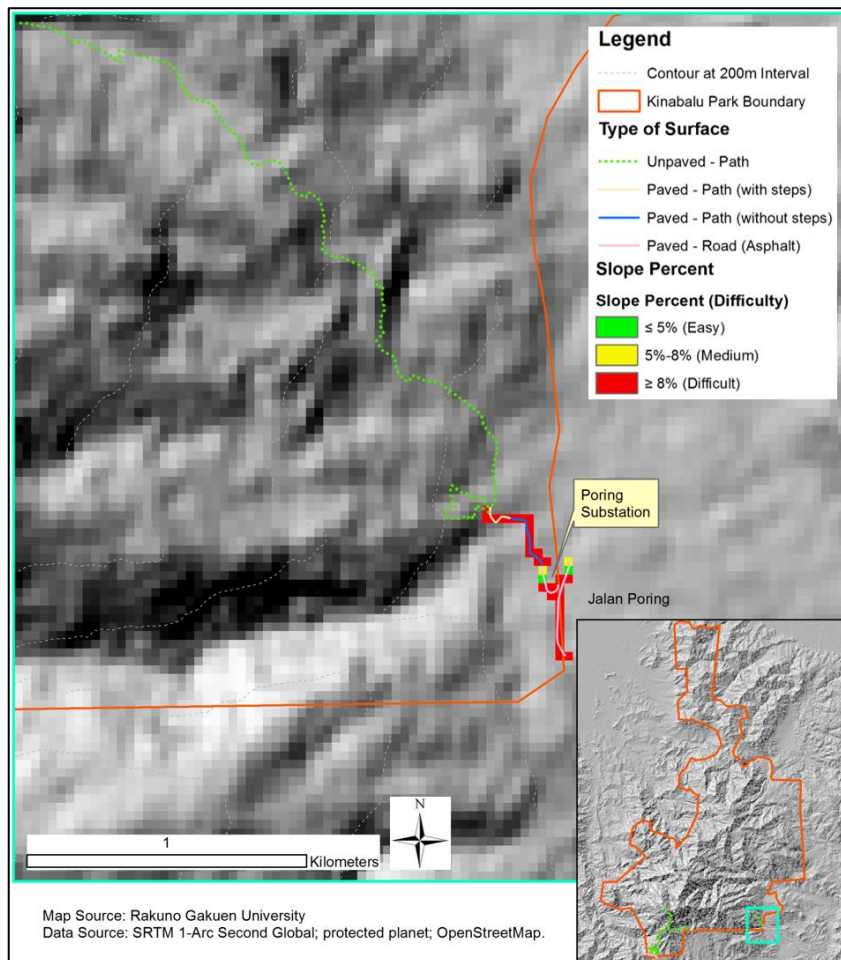
Figure 5.2.31: The entrance to Mesilau Nature Centre (Picture was taken in November 2012)



Figure 5.2.32: The trail where the Nepenthes Rajah was spotted (Picture was taken in November 2012)

The sub-station in Ranau, has hot springs found by the Japanese during the World War 2, is named after the bamboos found abundantly in that area. Bamboo is known as “Poring” in the local Dusun’s language. Thus the sub-station is called Poring Hot Spring Station and has the lowest elevation among the three study sites. It is located about 43 km or about 1 hour driving distance away from Kinabalu Park Headquarter. From the enlarged map on bottom right of Map 5.4, we can see that only a small portion of road/path in the park can be accessed by the people who use wheelchairs. First, it is the part of the Jalan Poring which lead to the main gate of the station is located inside the boundary of the park

and though it is not too steep for a pedestrian but it is still considered steep for the wheelchairs. Map 5.7 gives a clearer view for us that most part of the paved asphalt road and paved path without steps are too steep for the people who use wheelchairs to manoeuvre by themselves.



Map 5.7: The slope percent for paved road and path as well as the difficulty for wheelchairs to move around at Poring Hot Spring Substation.

The Ticket Counter is located just next to the entrance gate but has a relatively high step for a person who use wheelchair to go up (Figure 5.2.33). The building at the front which is an administration office the Poring Hot Spring Station is not accessible to the people who use wheelchair (Figure 5.2.34). Nonetheless, the visitor center located just right behind the administration office is accessible because a ramp built at the side (Figures 5.2.35 & 5.2.36).

Even though the people who use wheelchair are able to access up to the hot spring area because of the flat and wide bridge after the ticket inspection counter (Figure 5.2.37-

38), it is advisable that the people who use wheelchair go with at least one non-disabled assistant because of the two main reasons below: 1) There are ramps but the width is perfect for the smaller baby trolley, not wheelchairs (Figure 5.2.39); 2) Parts of the floor are uneven and most path have irregular width (Figure 5.2.40-42). It is also possible to enter the souvenir shop but it is difficult to open the door as you need to pull open the door (Figure 5.2.43). The restaurant is probably accessible but watch out for uneven floor (Figure 5.2.44).

The sheltered open bath tubs, the enclosed bath tubs and the foot bath are inaccessible because of the stairs (Figures 5.2.45 and 5.2.47). The only possible to access but challenging for people who use wheelchairs to use are the two unsheltered bath tub because no handrails provided (Figure 5.2.46). Accessing the Rock Pool or the cold water pool is dangerous for the people who use wheelchair because of the uneven surface surrounding the pool besides the surface may be slippery (Figure 5.2.48). Besides, even though there are ramps leading to the changing room and public toilet, the ramp width are irregular, from about 750 mm to 1,000 mm (Figures 5.2.49-50). Furthermore, the entrance is narrow and has a step at the door to each gender's changing room and public toilet: female on the right while male on the left (Figure 5.2.51). In the changing room and toilet, the bathroom door which is about 630 mm, does not match with Malaysian Standard (Figure 5.2.52). Also, there is neither sufficient space for the wheelchair to maneuver or turn around nor a handrail prepared. As for the toilet, it is inaccessible because of its small size and the step (Figure 5.2.53). The hand washing area may be too high for the people who use wheelchairs too (Figure 5.2.54).

After passing through the bath tubs, the paved trail are no longer accessible because of the stairs. This paved trail with stairs will lead up to the canopy walkway entrance and beyond this point is the unpaved trail only. Therefore, the other facilities or POI such as Butterfly Park, Canopy Walk, waterfalls are not accessible to people who use wheelchair.

From Map 5.8, we can not only see the location of what can the people who use wheelchairs see/enjoy at Poring Hot Spring Sub-Station but also understand that all location which can be accessed by the people who use wheelchairs are located at lowland. Therefore, the atmosphere and environment they can experience or the type of plants they can see is the lowland forest.



Figure 5.2.33: The entrance gate with the ticket counter at the side.



Figure 5.2.34: The administration office



Figure 5.2.35: The visitor center



Figure 5.2.36: The ramp at the side to the visitor Center



Figure 5.2.37: The entrance to the hot spring, the canopy walkway and the trails.



Figure 5.2.38: The accessible bridge after the ticket inspection counter



Figure 5.2.39: The small width slope



Figure 5.2.40: The uneven and small width path



Figure 5.2.41: The uneven, small width path.



Figure 5.2.42: The uneven, small width path.



Figure 5.2.43: The souvenir shop



Figure 5.2.44: The uneven path and ramp leading to the restaurant.



Figure 5.2.45: The staircase and the sheltered public bath tub.



Figure 5.2.46 The unsheltered public bath tub



Figure 5.2.47: The staircase to the sheltered bath tub and foot bath.



Figure 5.2.48: The uneven surface at the Rock Pool.



Figure 5.2.49: The ramp to the changing room and public toilet



Figure 5.2.50: The condition outside the changing room and toilet.



Figure 5.2.51: The narrow entrance space and step.



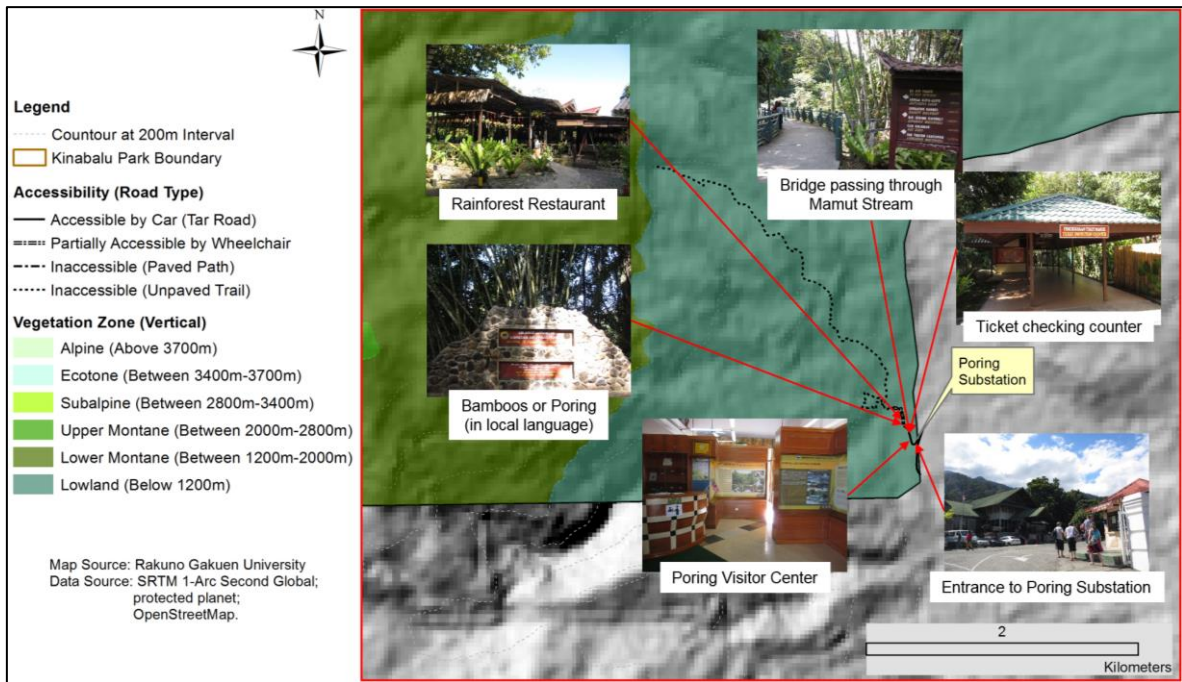
Figure 5.2.52: The narrow bathroom without sufficient space.



Figure 5.2.53: The inaccessible toilet.



Figure 5.2.54: The hand washing area.



Map 5.8: The location of what can the people who use wheelchairs see/enjoy at Poring Hot Spring.

Table 5.2.9: The type of the trail/road and their accessibility in KP’s Poring Sub-station.

Road Type	Surface	Stairs/ Steps	Accessibility	Remarks
Asphalt Road	Flat	No	Partially	Jalan Poring and Road in Poring Sub-Station. Some part of the road are relatively steep.
Paved Path	Uneven	No	Partially accessible	
Paved Trail	Uneven	Yes	Inaccessible	Point after Bath Tub until Canopy Walkway Entrance
Unpaved Trail	Uneven	Yes	Inaccessible	Canopy Walkway and Trail starts from canopy walkway entrance to the Langanan Waterfall.

Table 5.2.10: The facilities/ services available at the accessible or partially accessible area

Facilities/ Services	Accessibility	Remarks
Kinabalu Park Headquarter		
- Toilet	Partially	It is locked when I was there
- Visitor center	Accessible	Ramp is available
- Goodie Bag Shop (Gift Shop)	Accessible	Ramp is available
- Gazebo	Inaccessible	Step is available
- Kinabalu Natural History Gallery	Inaccessible	Staircase only is available
- Balsam Buffet Restaurant	Inaccessible	Steps are available
- Botanical Garden	Inaccessible	Steps are available
- Kiau Gap View	Accessible	Ramp is available
- Peak Lodge	Accessible	According to the telephone interview at +608-8287887 (Florina)
- Grace Hostel	Inaccessible	According to the telephone interview at +608-8287887 (Florina)
- Rock Twin Share	Inaccessible	According to the telephone interview at +608-8287887 (Florina)
- Hill Lodge	Inaccessible	According to the telephone interview at +608-8287887 (Florina)
- Liwagu Suite	Inaccessible	According to the telephone interview at +608-8287887 (Florina)
- Nepenthes Lodge	Partially	Can enter the room but no special toilet is available. According to the telephone interview at +608-8287887 (Florina)
- Rajah Lodge	Accessible	According to the telephone interview at +608-8287887 (Florina)
- Kinabalu Lodge	Inaccessible	According to the telephone interview at +608-8287887 (Florina)
- Garden Lodge	Inaccessible	According to the telephone interview at +608-8287887 (Florina)
- Summit Lodge	Inaccessible	According to the telephone interview at +608-8287887 (Florina)
Mesilau Sub-Station	Inaccessible	Close indefinitely
Poring Hot Spring Sub-Station		

- Ticket Counter by the gate	Inaccessible	Step is available
- Administration Office	Inaccessible	Staircase only is available
- Visitor Center	Accessible	Ramp is available
- Souvenir Shop	Partially	Flat surface at the entrance but the you need to push open the floor
- Rainforest Restaurant	Partially	Uneven surface
- Sheltered Open Bath Tubs	Inaccessible	Steps are available
- Unsheltered Open Bath Tubs	Partially	Nothing for support around the tub
- Foot bath	Inaccessible	Steps are available
- Rock Pool / Cold Water Pool	Inaccessible	Uneven surface
- Changing room and Public Toilet	Inaccessible	Narrow door
- Butterfly Farm	Inaccessible	Steps are available
- Canopy Walkway	Inaccessible	Steps are available
- Langanan Waterfall Trail	Inaccessible	Unpaved trail
- Bat Cave Trail	Inaccessible	Unpaved trail
- Kelicap Twin Share	Inaccessible	According to the telephone interview at +608-8287887 (Florina)
- Serindit Hostel	Inaccessible	According to the telephone interview at +608-8287887 (Florina)
- Jungle Lodge	Inaccessible	According to the telephone interview at +608-8287887 (Florina)
- River Lodge	Inaccessible	According to the telephone interview at +608-8287887 (Florina)
- Palm Villa 1	Partially	Can enter the room but no special toilet is available. According to the telephone interview at +608-8287887 (Florina)
- Palm Villa 2	Partially	Can enter the room but no special toilet is available. According to the telephone interview at +608-8287887 (Florina)

5.2.2 Accessibility in national parks of Japan

5.2.1 Daisetsuzan National Park (DNP)

A) Accessibility up to the entrance

Being the largest national park in Japan, DNP has a few POIs (places of interests)/ entrances, namely Asahidake at Higashikawa Town, Bogakudai Observatory at Kamifurano Town, Sounkyo at Kamikawa Town, Lake Nukabira at Kamishiroro Town and Lake Shikaribetsu at Shokaioi Town. However, I only carried out on-site observation study at the Asahidake and Sounkyo because they are more well-known as Asahidake is the highest peak of Hokkaido while Sounkyo has the highest number of visitors in the whole park since 2001. Both places have ropeway to carry visitors up to higher elevation (Asahidake Ropeway: from Sanroku Station at 1,100m to Sugatami Station at 1,600m; Kurodake Ropeway: from Sounkyo Station at 670m to Kurodake 5th Station at 1,300m and then chairlift up to Kurodake 7th Station at 1,520m.)

To get to the Asahidake from Sapporo, one can travel by private car, taxi, rental car and reach the Asahidake station directly in about 2.50 hours; or JR train/highway bus to Asahikawa Station and transit local bus to Asahidake station which will take longer time to reach. To get to Sounkyo, one can also travel by private car, taxi, rental car and reach Sounkyo directly in about 2.35 hours; JR train/highway bus to Asahikawa Station and transit local bus to Sounkyo will take longer time to reach. In Hokkaido, there are special tour taxi catering for people who use wheelchair (Eg. <https://www.kannkoukaigotakusi-fukurou.jp/> ; <http://kaigo.c-dp.co.jp/> ; <http://kaigotaxi-info.jp/>). The JR train is partially accessible to people who use wheelchairs because you need to contact the staff at the station, preferably in advance so that the staff will be there to help you to close the gap between the train and the platform with a ramp (<http://www.jrhokkaido.co.jp/network/barrier/>). Most highway buses may not be accessible to people who use wheelchairs, thus checking with the company in advance is required. For local bus to Asahidake (Asahikawa Denkidou: <http://www.asahikawa-denkidou.jp/>) and Sounkyo (Dohoku Bus: <http://www.dohokubus.com/>), not all buses are accessible to people who use wheelchairs. Therefore, confirmation with the company about the accessible bus schedule is needed.

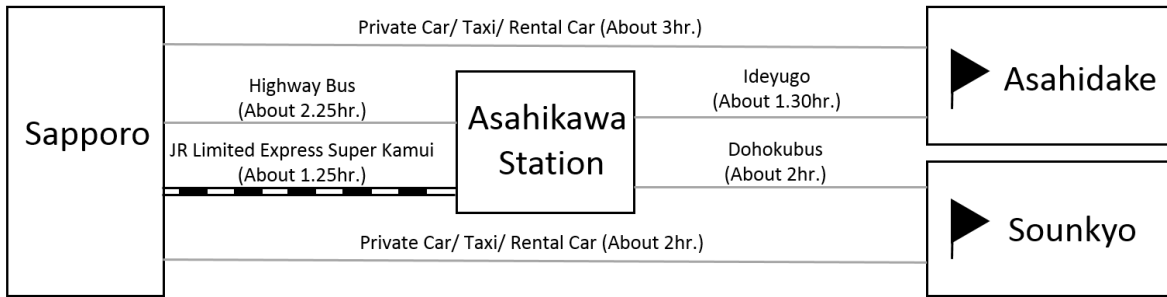


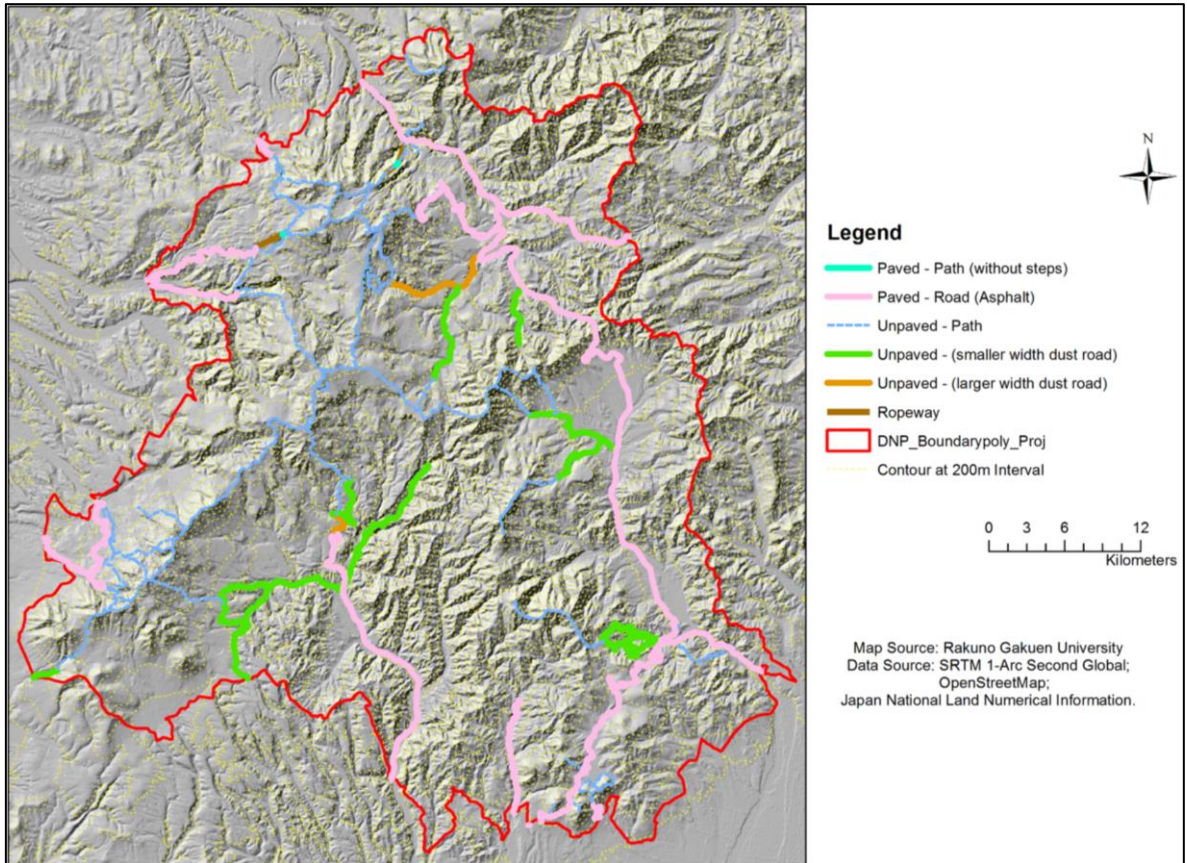
Chart 5.2.2: Summary of transportation mode to DNP.

Table 5.2.11: The Public Transportation to DNP and their Accessibility to Wheelchairs.

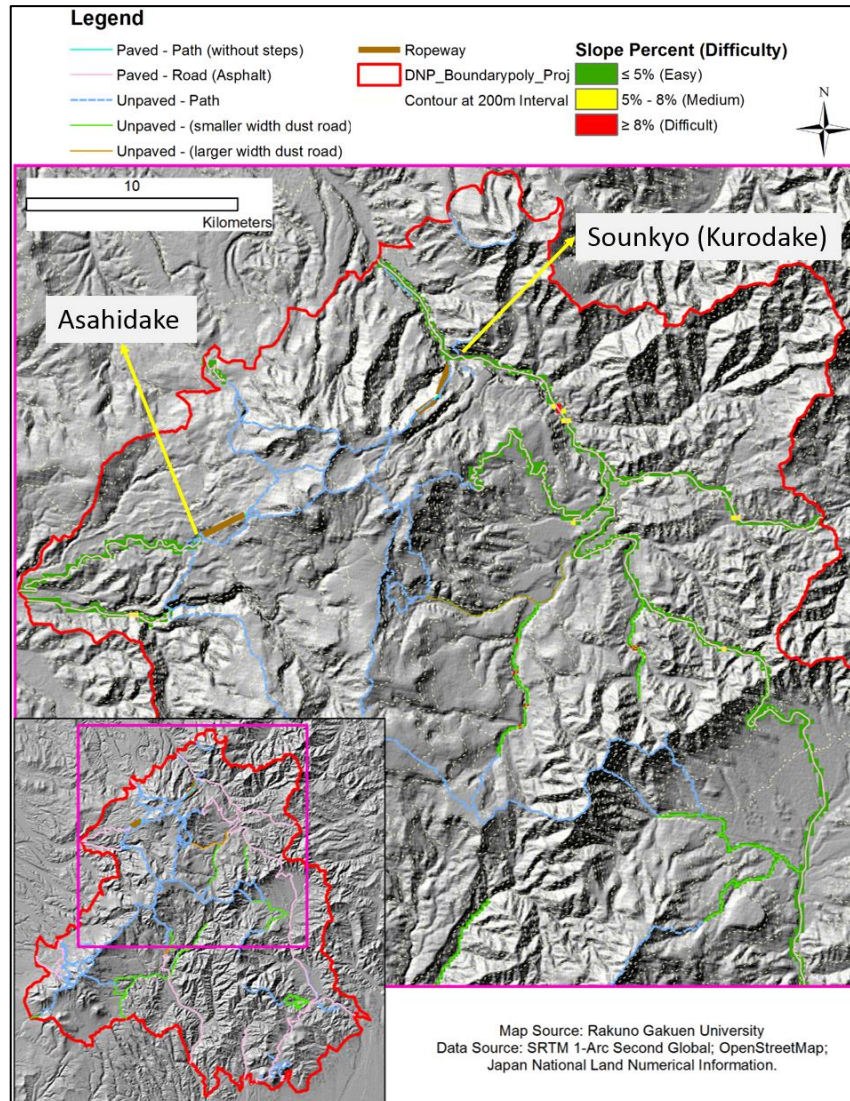
Type	Accessibility	Remarks
Private car	Partially	Depending on the type of the car
Rental Car	Partially	Depending on the type of the car
Taxi	Accessible	Accessible tour taxi for people who use wheelchair is available. Eg. https://www.kannkoukaigotakusi-fukurou.jp/ ; http://kaigo.c-dp.co.jp/ ; http://kaigotaxi-info.jp/
JR Train	Partially	Required assistant and/or advance reservation.
Highway Bus	Partially	Depending on the company. Need to contact the company in advance for the accessible bus schedule.
Public Bus (Ideyugo, Dohokubus)	Partially	Need to contact the company in advance for the accessible bus schedule.

B) Accessibility in the Park

From Map 5.9, we can see that Daisetsuzan National Park has a few types of road and path: the paved asphalt road, unpaved smaller dust road or forest road, and unpaved larger dust road or town road which are usually used by cars; the paved path and the unpaved path. These asphalt roads, forest roads, and town roads are mostly having low slope percent (Map 5.10). Therefore, the asphalt roads are mostly accessible to the people who use wheelchairs but they can access both forest roads and town road only by cars unless they have other mobility assisting devices. The unpaved path are not accessible to the people who use wheelchairs.

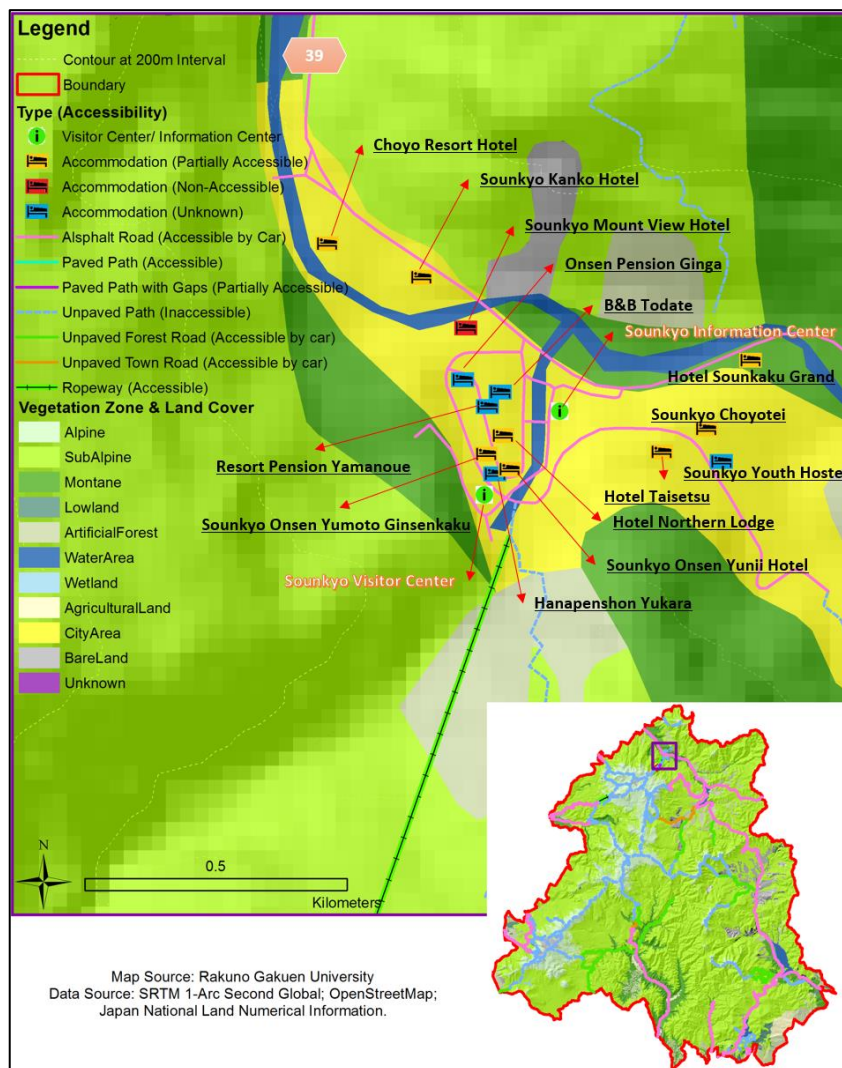


Map 5.9: The types of surfaces of the roads/paths in DNP.



Map 5.10: The slope percent for paved roads and paths as well as the difficulty for wheelchairs to move around at DNP.

Sounkyo, located at Uegawa district, can be reached by National Road 39. Along the road, you will see yourself passing by the amazing view of gorge. Sounkyo is like a tourist town with many hotels and resorts, restaurants, cafe and even convenient store. From Map 5.11, we can see the location of the hotels and visitor center as well as their accessibility to the people who use wheelchairs. The partially accessible hotels are Choyo Resort Hotel, Sounkyo Kanko Hotel, Hotel Sounkaku Grand, Sounkyo Choyotei, Hotel Taisetsu, Hotel Northern Lodge, Sounkyo Onsen Yumoto Ginsenkaku and Sounkyo Onsen Yunii Hotel; the inaccessible hotel is Sounkyo Mount View Hotel; and the accessibility unknown hotels are Onsen Pension Ginga, B&B Todate and Resort Pension Yamanoue. Besides, we can also understand that the environmental settings of the hotels and visitors center located, that is the city/town area.

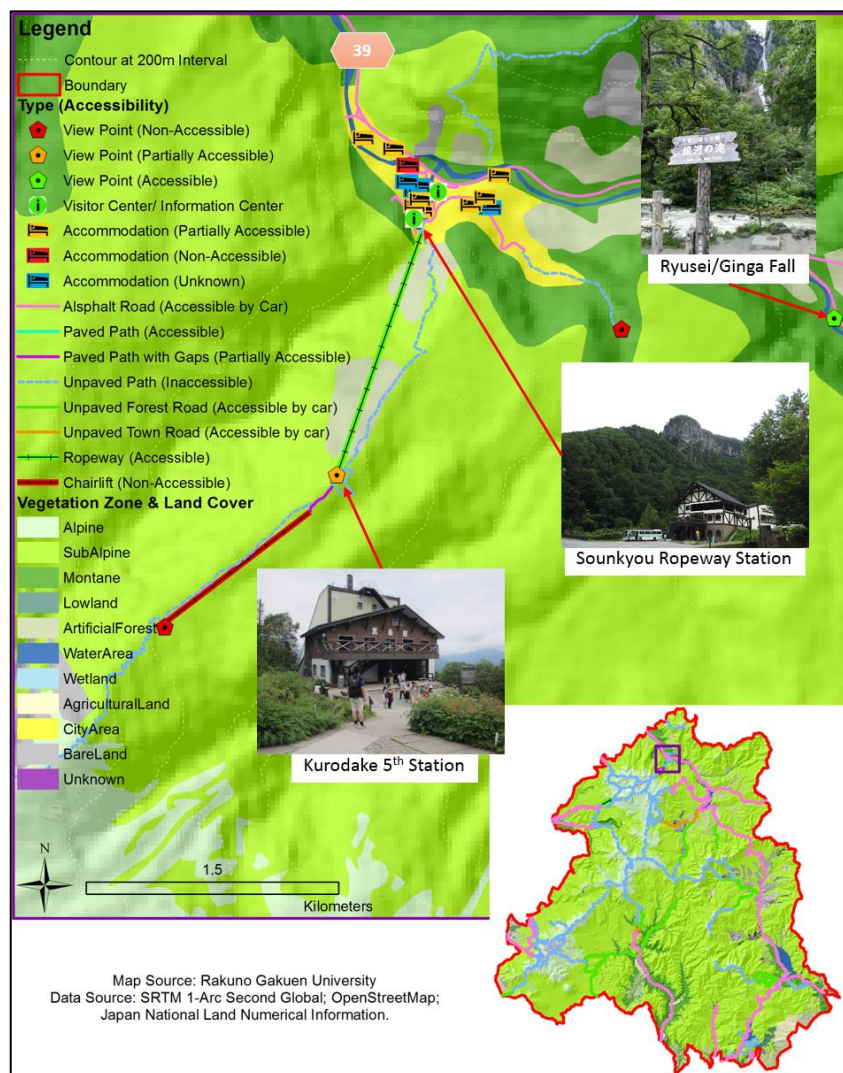


Map 5.11: The location of the accommodations and visitor center and their accessibility to the people who use wheelchairs at Sounkyo (Kurodake)

The Sounkyo has a visitor center near to the Kurodake Ropeway Station. It has a ramp and a parking lot for the use of people with disability (Figure 5.2.55). At Kurodake Ropeway, people who use wheelchair must enter from the parking space located behind of the station (Figure 5.2.56). As there is no elevator, a wheelchair platform stairlift (Figure 5.2.57) is used to take people who use wheelchair up to the ropeway boarding platform (Figure 5.2.58). Even though the people who use wheelchair can board the cable car easily, the ability to move around at the Kurodake 5th Station is limited. The accessible paved path is only about 56.7 m (Figure 5.2.59), the paved path leading to the chairlift (about 219.3 m) which will lead you to seventh station is partially accessible because the path has gaps and may be rough for the people who use wheelchairs (Figure 5.2.60). And the chairlift is inaccessible to the people who use wheelchairs (Figure 5.2.61).

The other POI at Sounkyo is Momijidani, it is accessible partially by car but the trail is not accessible due to its unpaved dust trail, unless another mobility assistant device is used. Gyusei/Ginga Waterfall is a POI two viewpoints: the accessible viewpoint is located near the parking space and the toilet (Figure 5.2.62) where you can see only the Ginga Waterfall; and the inaccessible viewpoint at Sobakudai, literally means two waterfalls viewpoint, because you need to hike up via the trail with staircase.

From Map 5.12, we can not only see the location of what can the people who use wheelchairs see/enjoy at sounkyo viewpoints but also understand that all location which can be accessed by the people who use wheelchairs are located at montane forest (Ryusei, Ginga Fall), city area (Sounkyou Ropeway Station) and sub-alpine forest (Kurodake 5th Station). Therefore, they can experience the different atmosphere and views at the Sounkyo.



Map 5.12: The location which the people who use wheelchairs can reach and the vegetation zone/ land cover they can experience at Sounkyo (Kurodake).



Figure 5.2.55: The Sounkyo Visitor Center



Figure 5.2.56: The accessible entrance at the back of the Kurodake Ropeway Station



Figure 5.2.57: The wheelchair platform stairlift in the station



Figure 5.2.58: The large cable car connecting the platform with small gap



Figure 5.2.59: The accessible paved path at Kurodake 5th station



Figure 5.2.60: The rather uneven paved path (with gaps)

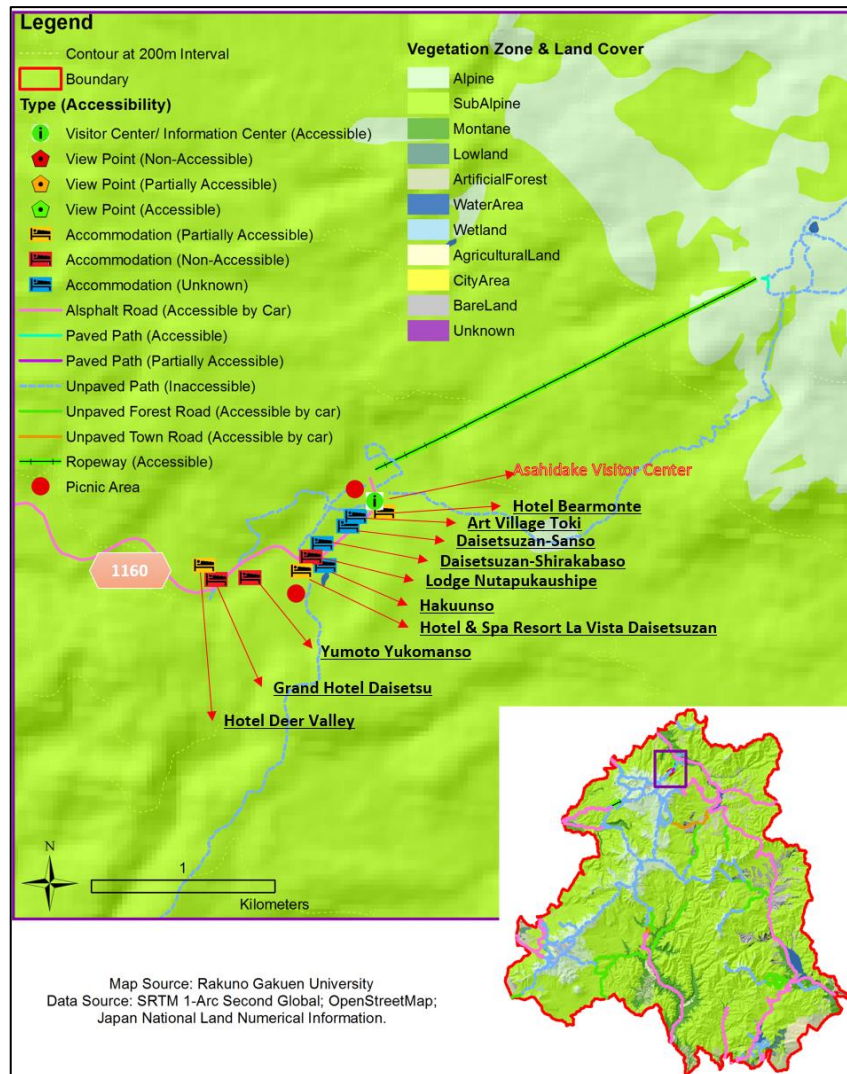


Figure 5.2.61: The inaccessible chairlift



Figure 5.2.62: The accessible toilet at the Gyusei/Ginga Waterfall

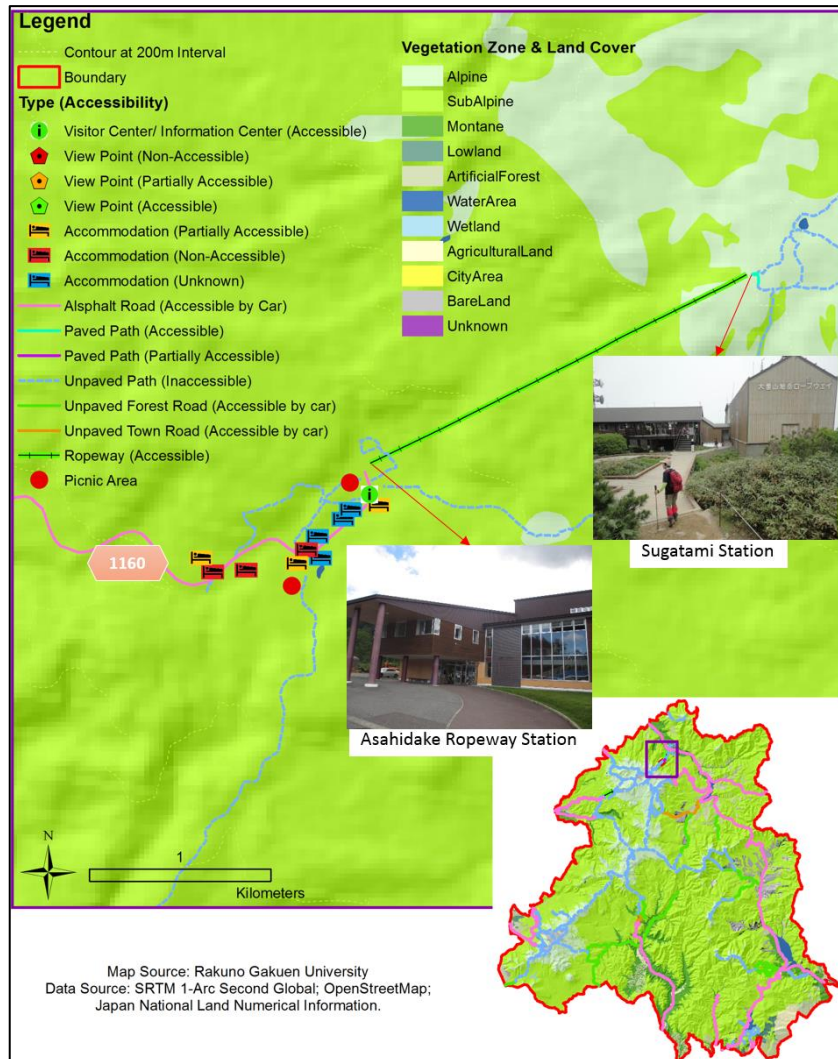
The Asahidake Ropeway, located at Higashigawa district, can be accessed via National Road 1160. There are some lodge, hotels and resort which along the road before reaching the Asahidake Ropeway (Map 5.13). They can be grouped into partially accessible, inaccessible and accessibility unknown groups. Partially accessible hotels are Hotel Deer Valley, Hotel & Spa Resort La Vista Daisetsuzan and Hotel Bearmonte; inaccessible hotels are Grand Hotel Daisetsu, Yumoto Yukomanso and Lodge Nutapukaushipe; and accessibility unknown hotels are Hakuunso, Daisetsuzan-Shirakabaso, Daisetsuzan Sanso and Art Village Toki. These hotels have onsen or hot spring in them. The Asahidake Visitor Center is accessible with a ramp by the side (Figure 5.2.63). The Asahidake Ropeway (Figure 5.2.64) located at the end of the national road is accessible and have some accessible facilities such as the elevator (Figure 5.2.65) and the toilet (Figure 5.2.66). The ropeway is usable by the people who use wheelchair because of the flat surface and small gap connecting the ropeway and platform (Figure 5.2.67).



Map 5.13: The location of the accommodations and visitor center and their accessibility to the people who use wheelchairs at Asahidake.

At the top station or Sugatami Station, there is about an hour short trail to go to five different viewpoints before back to the station (Figure 5.2.68). However, only about 112.4 m of the whole trail, about 1,700 m is accessible to the people who use wheelchair (Figures 5.2.69-70).

From Map 5.14, we can not only see the location of what can the people who use wheelchairs see/enjoy at Asahidake but also understand that all location which can be accessed by the people who use wheelchairs are located at sub-alpine forest (Asahidake Ropeway Station), and alpine forest (Sugatami Station).



Map 5.14: The location where the people who use wheelchairs can reach and the vegetation zone/ land cover that they can experience at Asahidake.



Figure 5.2.63: The Asahidake Visitor Center



Figure 5.2.64: The Asahidake Ropeway



Figure 5.2.65 The elevator leading to the ropeway station



Figure 5.2.66: Accessible toilet for the people who use wheelchair



Figure 5.2.67: Asahidake Ropeway



Figure 5.2.68: The map showing the about an hour trail from Sugatami Station



Figure 5.2.69: The front view of the Sugatami Station



Figure 5.2.70: The side view of the Sugatami Station

Table 5.2.12: The type of the trail/road and their accessibility in DNP.

Road Type	Surface	Stairs/ Steps	Accessibility	Remarks
Asphalt Road	Flat	No	Partially	Some part of the road is steep
Unpaved Road (Forest Road)	Dust/ Uneven	No	Partially	Accessible by car; Smaller width of about a car size
Unpaved Road (Town Road)	Dust/ Uneven	No	Partially	Accessible by car; Larger width of about two cars size
Paved Path	Even	No	Partially accessible	
Unpaved Trail	Uneven / Dust	Yes	Inaccessible	Trail to Sobakudai and other hiking trails
Ropeway	-	-	Accessible	From Asahidake Station to Sugatami Station; From Kurodake bottom station to 5 th Station
Chairlift	-	-	Inaccessible	From 5 th Station to 7 th Station

Table 5.2.13: The facilities/ services available at the accessible or partially accessible area

Facilities/ Services	Accessibility	Remarks
Sounkyo (Kurodake)		
Visitor Center	Accessible	
Information Center	Accessible	
Kurodake Ropeway	Accessible	With wheelchair platform stairlift
Fifth Station	Partially	Some paved path are uneven
Seventh Station	Inaccessible	Chairlift
Toilet	Accessible	At Ryousei/Ginga Waterfalls
Choyo Resort Hotel	Partially	http://www.choyo-resort.com/
Sounkyo Kanko Hotel	Partially	http://sounkyo-kankou.co.jp/
Sounkyo Mount View Hotel	Inaccessible	http://mtview.e-tetora.com/
Onsen Pension Ginga	Unknown	http://www.sounkyo-ginga.com/index.php
B&B Todate	Unknown	http://o-todate.com/

Resort Pension Yamanoue	Unknown	http://www.p-yamanoue.com/
Hotel Northern Lodge	Partially	http://www.h-northernlodge.com/
Sounkyo Onsen Yumoto Ginsenkaku	Partially	http://breezbay-group.com/ginsenkaku/index.html
Sounkyo Onsen Yunii Hotel	Partially	http://travel.rakuten.co.jp/HOTEL/67984/67984.html
Hanapenshon Yukara	Unknown	http://www.aco.co.jp/yukara/index.php
Hotel Taisetsu	Partially	http://www.hotel-taisetsu.com/
Sounkyo Youth Hostel	Unknown	http://www.youthhostel.or.jp/sounkyo/
Sounkyo Choyotei	Partially	http://www.choyotei.com/
Hotel Sounkaku Grand	Partially	http://www.sounkaku.co.jp/
Asahidake		
Visitor Center	Accessible	
Asahidake Ropeway	Accessible	Elevator is available
Toilet	Accessible	In Asahidake Ropeway
Sugatami Station	Partially	Only part of the trail is paved
Hotel Deer Valley	Partially	http://www.deervalley.jp/
Grand Hotel Daisetsu	Inaccessible	http://asahidake.net/
Yumoto Yukomanso	Inaccessible	http://www.yukoman.jp/
Hotel & Spa Resort La Vista Daisetsuzan	Partially	http://www.hotespa.net/hotels/daisetsuzan/
Hakuunso	Unknown	
Lodge Nutapukaushipe	Inaccessible	http://www.n43.net/onsen//asahidake/nutapukaushipe/index.htm
Daisetsuzan-Shirakabaso	Unknown	http://shirakabasou.com/
Daisetsuzan-Sanso	Unknown	https://www.facebook.com/DaXueShanShanZhuang/
Art Village Toki	Unknown	http://www.asahidake-toki.jp/
Hotel Bearmonte	Partially	http://www.bearmonte.jp/index.html

5.3 Comparing the Accessibility between Malaysia's Kinabalu Park and Japan's Daisetsuzan National Park to People Who Use Wheelchairs

As the Mount Kinabalu is a very high mountain, both KP and DNP have four similar vertical vegetation zones, namely lowland forest, montane forest, subalpine forest and alpine forest. Another similarity between KP and DNP is that not all facilities and services available in the park are accessible to the people who use wheelchairs. Some may be accessible, partially accessible or inaccessible. DNP has accessible ropeways which can bring the people who use wheelchairs to enjoy the scenery and atmosphere of higher elevation but KP does not have it. Besides, the facilities prepared for the people who used wheelchairs in KP are limited, only one PwDs toilet at the headquarters but the toilet is locked (during my visit in Feb). Though the movement of people who used wheelchairs may be limited at DNP, usable PwDs toilets to the people who use wheelchairs are at least available.

Besides, DNP is more accessible as it has 52.8% of total distance of trails and roads are accessible while KP has only 22.5%. Other than unpaved path, other type of roads and paved paths are accessible by the people who use wheelchairs in DNP either by car or by wheelchairs. Other than unpaved path which is inaccessible to the people who use wheelchairs, KP has asphalt road which can access by the people who use wheelchairs by car but the paved paths are only partially accessible. Even though the people who use wheelchairs can go up to higher elevation at KP than DNP, they can only experience two types of forest zones, lowland and lower montane, when compare to three types of forest zones, montane, subalpine and alpine in DNP.

For the transportation to KP, the long distance buses are inaccessible to the people who use wheelchairs. The alternative is private car or taxi but there is no taxi specifically for them. Though some buses and train towards DNP are accessible, it may be quite troublesome for the people who use wheelchairs to travel too because they need to make prior reservation etc. Another alternative is to hire an accessible tour taxi which is not available in Malaysia's.

Table 5.2.14: The similarity and differences of accessibility between Malaysia’s Kinabalu Park and Japan’s Daisetsuzan National Park.

Kinabalu Park (KP)	Daisetsuzan National Park (DNP)
Similarity	
<ul style="list-style-type: none"> - Not all facilities and services are accessible. Some may be partially accessible while the rest are inaccessible. - All four vertical vegetation zones, lowland, montane sub-alpine and alpine in DNP are available in KP, though the biodiversity may differ. 	
Differences	
75,370 ha (66.8% smaller than DNP)	Area 226,764 ha
40,796 m	Distance of Trail & Road 646,399 m
9,185 m (22.5% of total distance)	Accessible Distance 341,020 m (52.8% of total distance)
<p>Asphalt Road: Accessible by car only cause high slope percent.</p> <p>Paved Path: are either with steps or uneven surface and inconsistent width</p> <p>Unpaved Path: are not accessible</p> <p>Unpaved Forest Road and Town Road: Nil</p>	Road/ Trail
486 m asl to 4,046 m asl	Elevation 331 m asl to 2,279 m asl
486 m asl to 1,918 m asl 1,432 m (40.2%)	Accessible Elevation 331 m asl to 1,604 m asl 1,273 m (65.3%)
<p>6 zones according to Kitayama 1987:</p> <ul style="list-style-type: none"> - Lowland - Lower Montane - Upper Montane - Subalpine - Ecotone 	Vegetation (Vertical)
	<p>4 zones according to Biodiversity Center of Japan:</p> <ul style="list-style-type: none"> - Lowland - Montane - Subalpine - Alpine

- Alpine		
lowland, lower montane	Accessible Zones	montane, subalpine, alpine
<ul style="list-style-type: none"> - No accessible taxi specially designed for people who use wheelchair. - All public buses to Kinabalu Park are not accessible. 	Public Transportation	<ul style="list-style-type: none"> - Accessible tour taxi are available - JR train is partially accessible because you need the staff to take you the ramp to close the gap between the train and the platform. - Highway bus and local bus are partially accessible because not all buses are accessible (have to contact the relevant company to make reservation or obtain the schedule)
<p>Accommodation: Partially (most are inaccessible)</p> <p>Toilet for People who use wheelchairs: Partially/ Inaccessible</p> <p>Visitor Center: accessible</p> <p>Gift shop/ souvenir shop: partially or inaccessible</p> <p>Restaurants: partially or inaccessible</p> <p>Gazebo/ View Point: Accessible or inaccessible</p> <p>Ropeway and Chairlift: Nil</p>	Facilities/ Services	<p>Accommodation: Partially (some are inaccessible while some's accessibility status are unknown)</p> <p>Toilet for People who use wheelchairs: Accessible</p> <p>Visitor Center/ Information center: accessible</p> <p>Gift shop/ souvenir shop: No information</p> <p>Restaurants: No information</p> <p>Gazebo/ View Point: Accessible or inaccessible</p> <p>Ropeway: Accessible</p> <p>Charlift: Inaccessible</p>

5.4 Database Sharing

All the data I used in this study are shared in ArcGIS Online platform where the users can download the whole .mxd file and edit according to their own need. Figure 5.4.1 to Figure 5.4.4 below are to prove that the files have been shared while Figure 5.4.5 to Figure 5.4.8 show how it is look like when you download and open with ArcGIS Desktop.

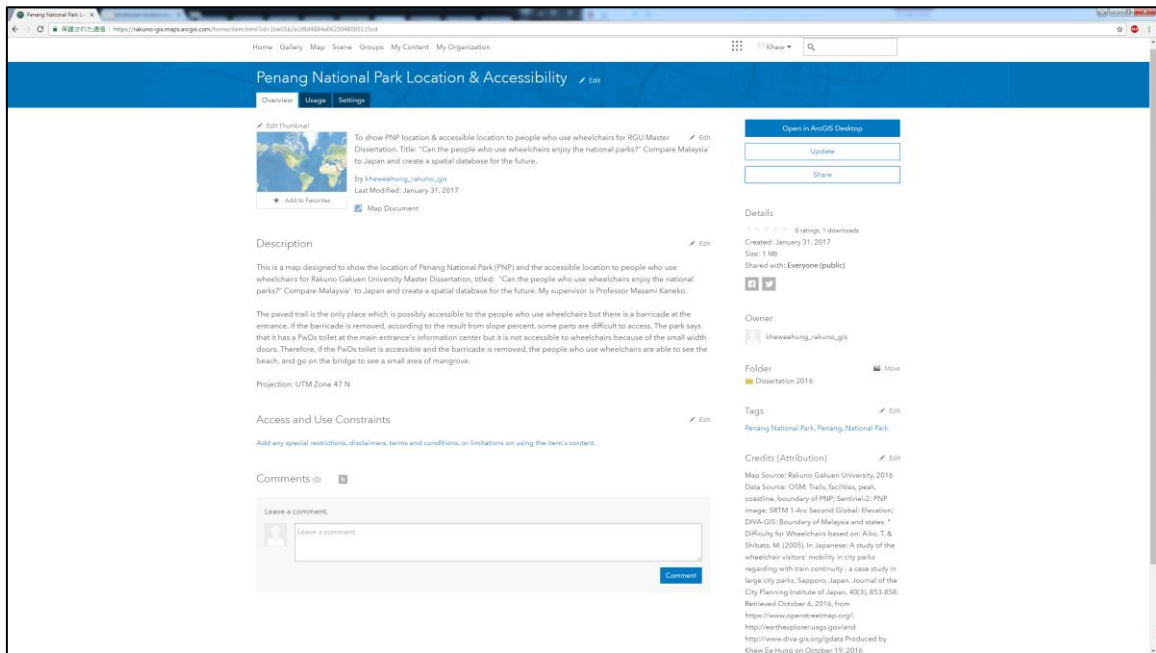


Figure 5.4.1: Penang National Park's .mxd file shared on ArcGIS Online.

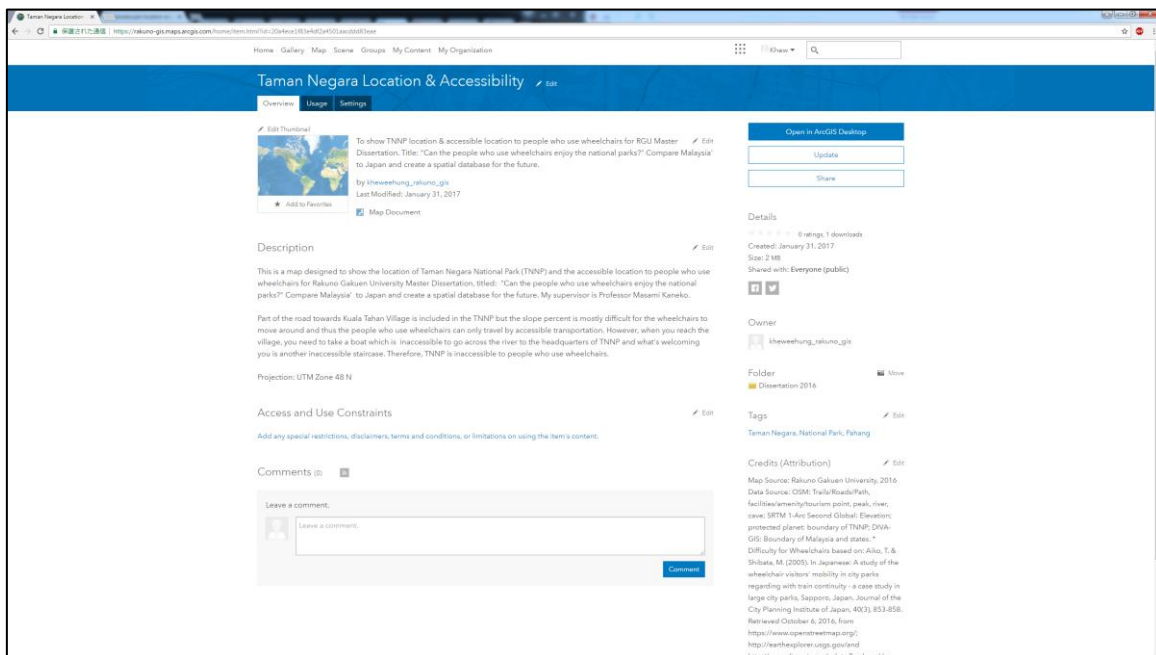


Figure 5.4.2: Taman Negara National Park's .mxd file shared on ArcGIS Online.

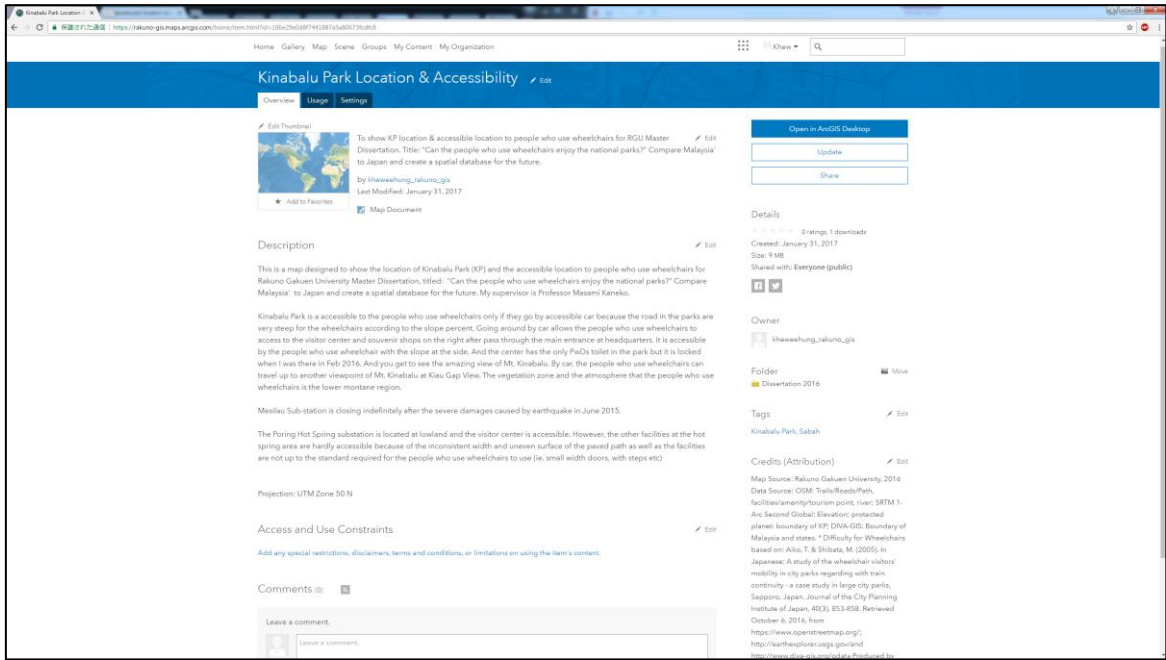


Figure 5.4.3: Kinabalu Park's .mxd file shared on ArcGIS Online.

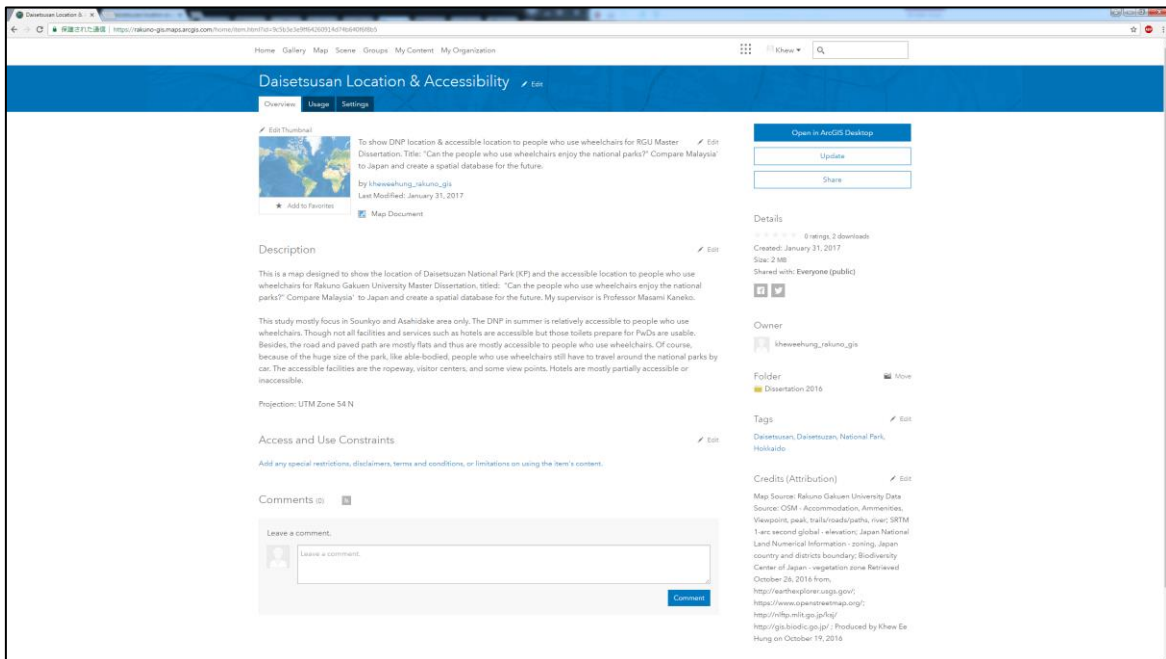


Figure 5.4.4: Daisetsuzan National Park's .mxd file shared on ArcGIS Online.

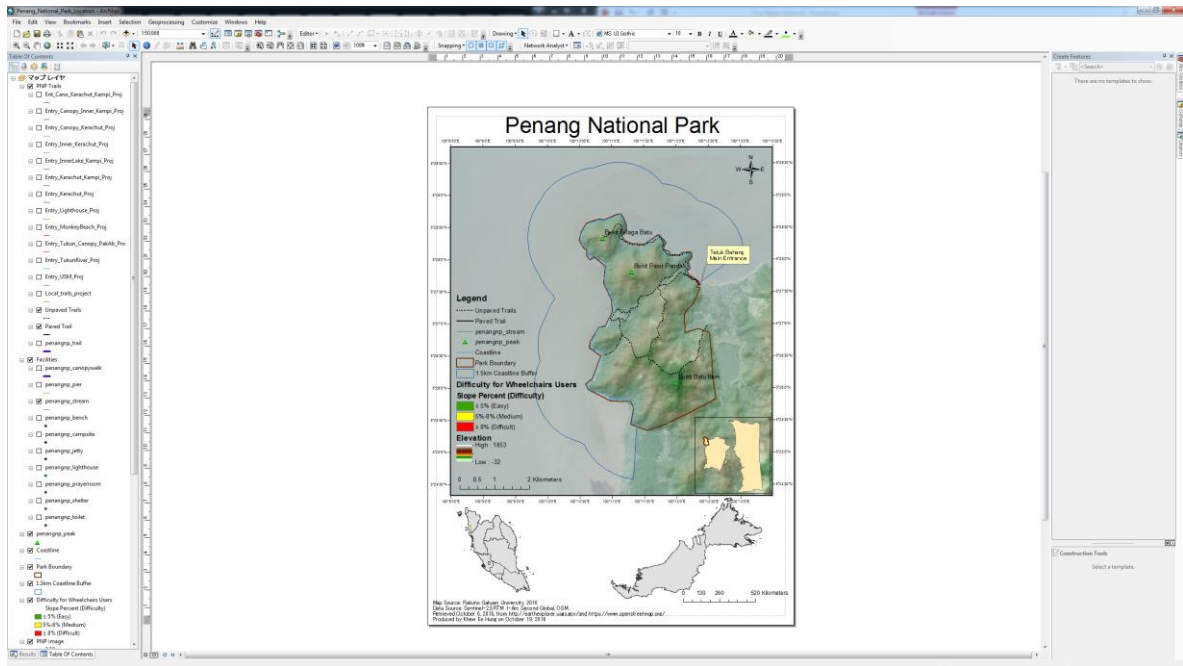


Figure 5.4.5: Penang National Park’s .mxd file downloaded from ArcGIS Online and opened with Dekstop ArcGIS .

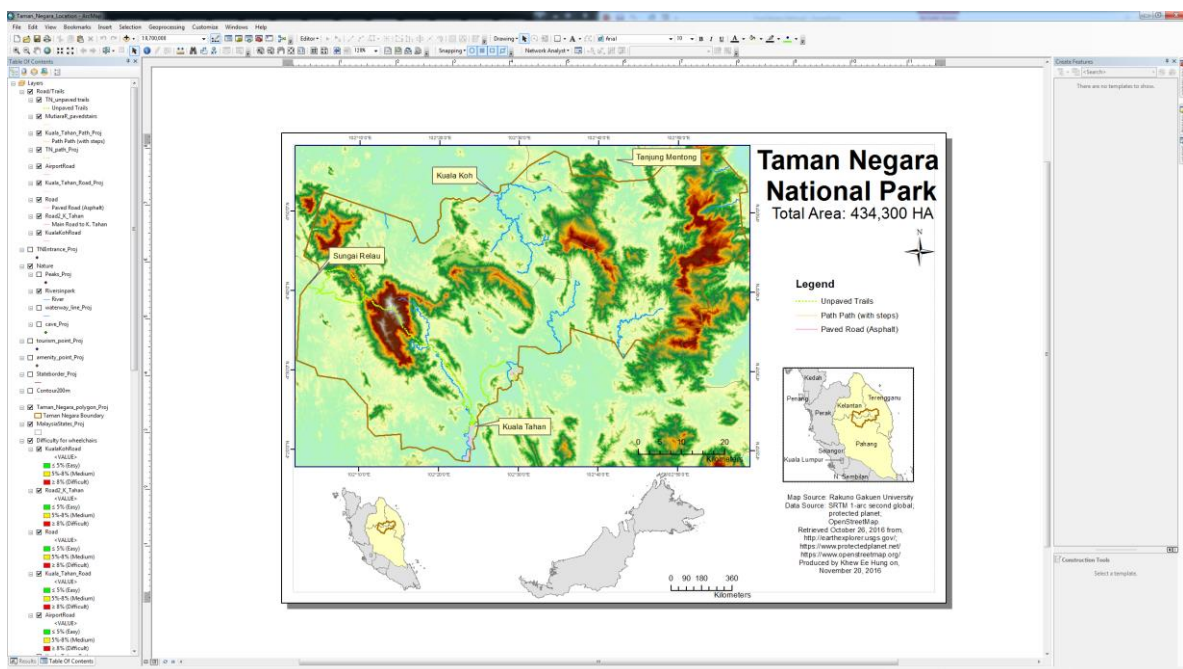


Figure 5.4.6: Taman Negara National Park’s .mxd file downloaded from ArcGIS Online and opened with Dekstop ArcGIS .

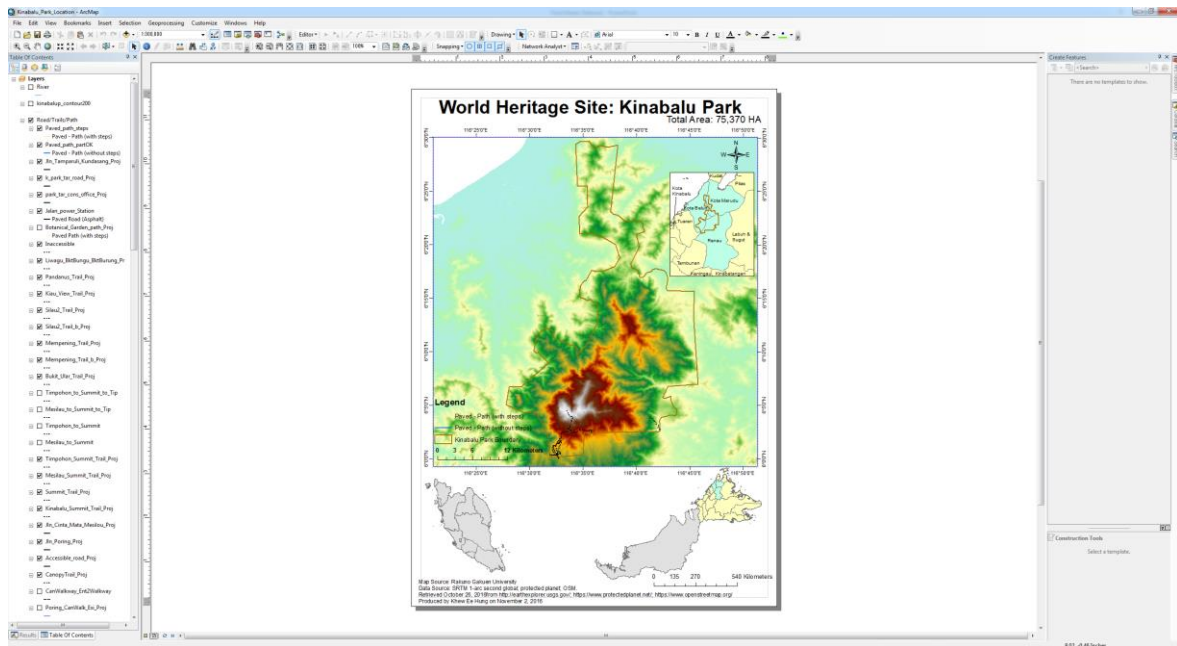


Figure 5.4.7: Kinabalu Park’s .mxd file downloaded from ArcGIS Online and opened with Dekstop ArcGIS .

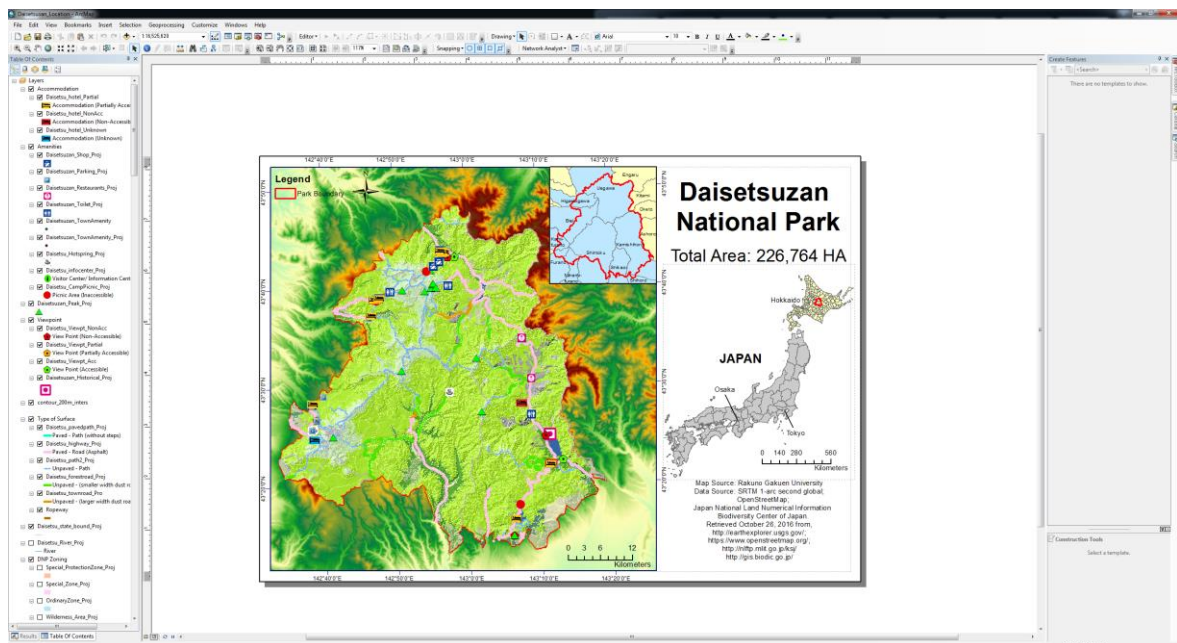


Figure 5.4.8: Daisetsuzan National Park’s .mxd file downloaded from ArcGIS Online and opened with Dekstop ArcGIS .

Lastly, the accessibility of some facilities are marked on the Wheelmap at <https://wheelmap.org/en/map>. Figure 5.4.9 to Figure 5.4.12 are to show the before and after the marking. Most marked are red in color or inaccessible, followed by orange color or partially accessible and lastly green color or accessible.

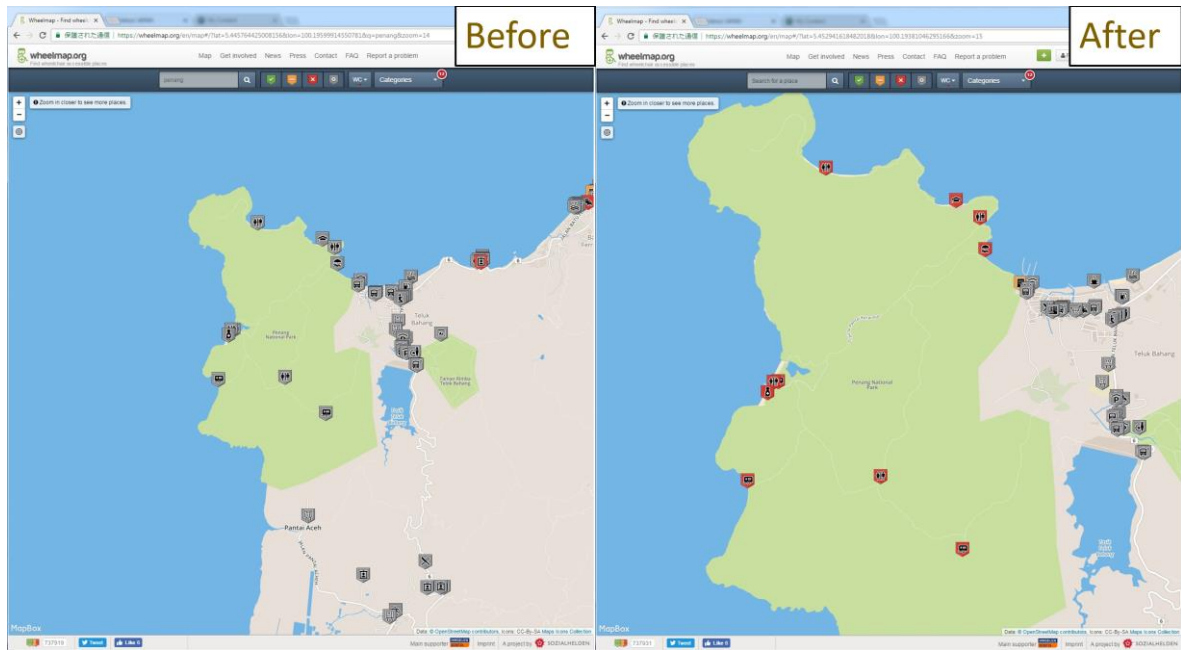


Figure 5.4.9: Before and after marked of the accessibility to people who use wheelchairs at wheelmap.org for Penang National Park.

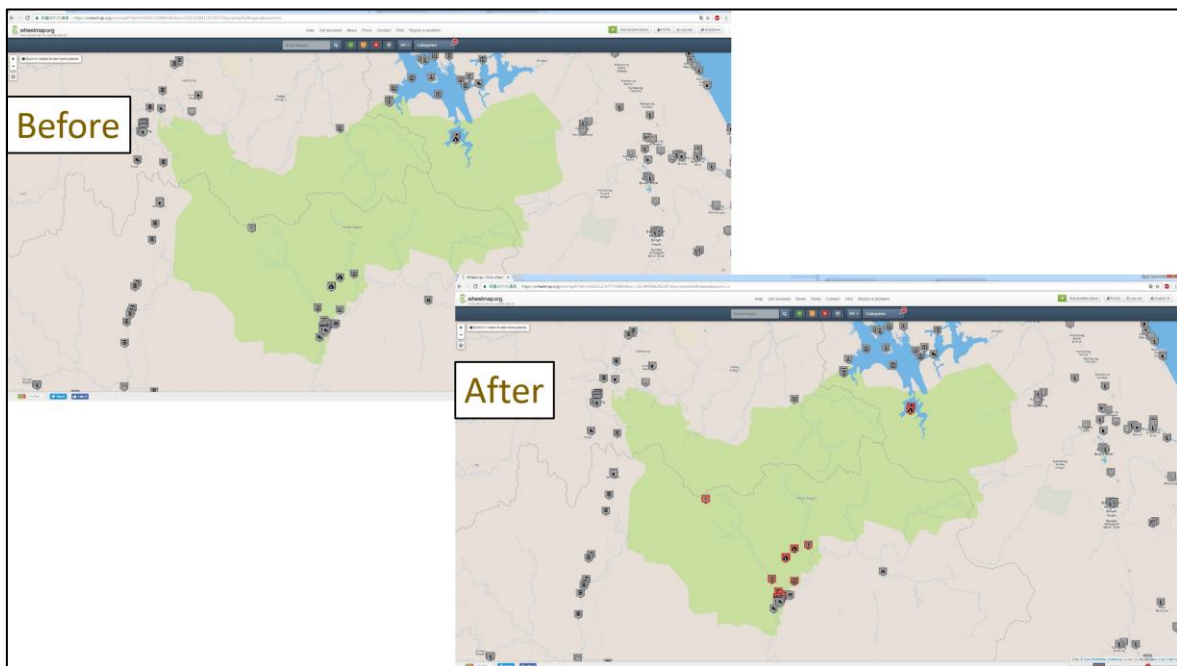


Figure 5.4.10: Before and after marked of the accessibility to people who use wheelchairs at wheelmap.org for Taman Negara National Park.

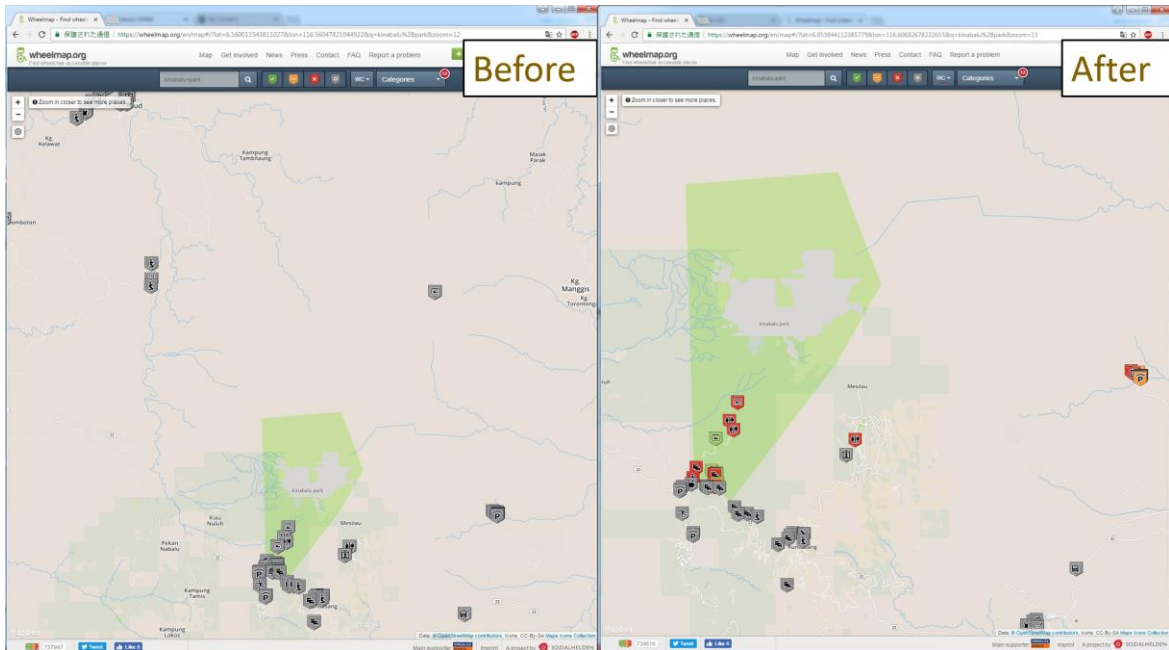


Figure 5.4.11: Before and after marked of the accessibility to people who use wheelchairs at wheelmap.org for Kinabalu Park.

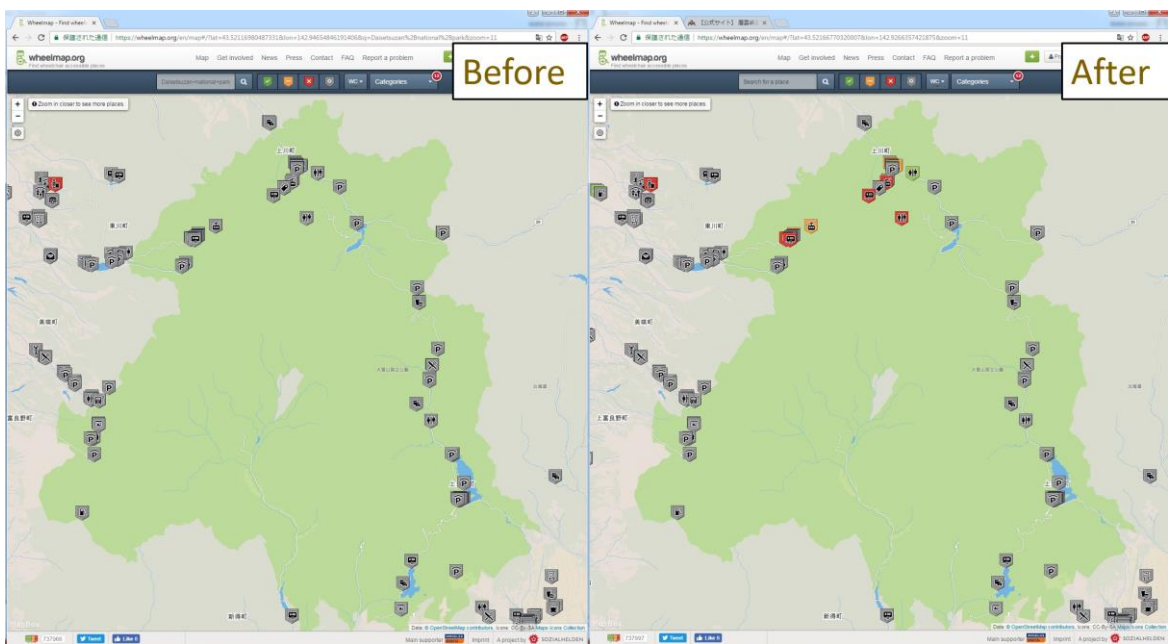


Figure 5.4.9: Before and after marked of the accessibility to people who use wheelchairs at wheelmap.org for Daisetsuzan National Park.

CHAPTER 6: DISCUSSION

6.1 The Issues and Measures for the People who Use Wheelchairs (or People with Disabilities) at National Parks

The results in this study shows that the national parks management in Malaysia are still in need of more improvement. Even though both Penang National Park's Concept Plan and Taman Negara National Park's Master Plan 1987 stated that people from all walks of life, including the PwDs and elderly should be able to access the park with special facilities such as accommodation, toilet, trails and slopes prepared, the management bodies seem did not ratified those plan and do accordingly. On the other hand, Kinabalu Park which seems to be more accessible than the rest, has inadequate accessible facilities and transportation too. This may be unimportant in the past, but recently the barrier free environment or accessible national parks is gradually gaining attention throughout the world when the number of disability started to increase and the population started to aged (World Health Organization, 2011).

With the rising awareness, more studies either academically or locally by NGOs and volunteers have been carrying out to audit the accessibility of built environment but most of the results show the inadequacy of inaccessible facilities (Soltani et al., 2012; Abdul Rahim & Abd. Samad, 2010; Chua et al., 2013; Abdul Kadir & Jamaludin, 2012; Kamarudin et al., 2014). It is even worst in national parks which are usually located at rural area. A recent study shows that a national park in Johor State, Malaysia has neither accessible transportation nor sufficient accessible facilities essential to the PwDs because there are very limited tourists with disabilities, only one or two once a while (Sanmargaraja & Seow, 2015). Therefore, the finding of this study is not surprising.

Nonetheless, the social stigma and discrimination towards the people with disabilities are still present today, though may have improved (Yau et al., 2004, Bi et al., 2007, Bizjak et al., 2011). Despite the existence of People with Disability Act in Malaysia, discrimination towards the people with disability is still occurring. Therefore, majority of people with disabilities are usually hiding themselves from the society, do not have high education level and are usually unemployed or work as supporting staffs (Tiun & Khoo, 2013). Low income has directly affecting the likelihood of PwDs especially people who use wheelchairs to travel, including travelling to national parks as traveling cost for a person with disability is usually much higher than an abled-bodied tourist (United Nations, 2003). In addition, the legislation and guidelines such as Uniform Building By-Laws and Malaysian Standards are inefficient without much enforcement and implementation (Tiun & Khoo,

2013; Hussein & Mohd Yaacob, 2012). This have caused many facilities which are supposedly preparing for the people who use wheelchairs became inaccessible or partially accessible at national parks of Malaysia, eg. PwDs toilet at Penang National Park.

Fortunately, according to the study by Bizjak and his colleagues in 2011, we can easily change the attitude of the public especially among the industry service providers towards the people with disabilities by providing short period education relating to people with disabilities. Besides, Tiun and Khoo also say in 2013 that the existing legislation in Malaysia such as Disability Act 2008 is insufficient and should be revised to prevent discrimination towards the people with disabilities.

6.2 The Possible Impacts in Building Accessible Facilities in National Parks and Counteracts

People who use wheelchairs are unlike the able-bodied, they need more space with flat surface to maneuver around. Thus, to allow them to enjoy the national parks, man-built facilities are needed. Designing and building accessible facilities at all places, including national parks according to many developed countries in the world such as England, Europe, United States and Australia, it is not only for human rights but also a profitable obligation. In order to make national parks accessible to the disabled and the elderly, building facilities such as paved-trails or roads, accessible toilets etc. are inevitable. The development of these facilities may raise critics and discontent voices from the NGOs and environmentalists who claim this move may increase visitor arrival and affecting the sensitive natural environment (Hong & Chan, 2010). Even though Hong & Chan were targeting Penang National Park when saying so, it could be apply to the other national parks too. For example, the privatization of the facilities and services and the redevelopment of the park headquarter at Kuala Tahan since 1980s have caused exponential increase of visitors within two decades (Shuib, 1995). Over-crowding is not only an issue in preserving and conserving the nature, but also reduces visitor experience (Buultjens, et al., 2005; O'Reilly, 1986).

However, providing accessible facilities does not mean “paving the wilderness” because like the able-bodied nature lovers, people who use wheelchairs want the nature quality maintained and protected (as cited in Williams et al., 2004). Furthermore, the purpose of national parks does not only to conserve and preserve the nature and resources but also to provide recreation opportunities for the public. Therefore, we should find a balance between environment protection and recreation. As the definition of a “quality” varies among people and circumstances (Reeves & Bednar, 1994), the quality recreation setting is varied among the recreationists too. For instances, some people may think that a quality recreation is to

camp at a primitive area while some may think that camping near a less usable logging road or at the camping site with complete sets of equipment located near the boundary of the national park is considered quality recreation. This is supported by Dorfman (1979) who concluded that measuring recreational satisfaction cannot be relied only on a method because of the psychological processes of each individuals varied.

Therefore, I would like to suggest that the national parks in Malaysia to refer to the concept of Recreation Opportunity Spectrum (ROS) which diversify the recreation opportunity and classify them in a spectrum to meet peoples' various preferences (Clark & Stankey, 1979). Specific information about what a place is like can be provided to potential visitors for them to choose from. Together with other spatial data such as zoning, biodiversity and environmental information of the national parks, the park manager can identify the spectrum from developed to wilderness area by using Geographical Information System technology. However, I am not sure whether the park management agencies such as Department of Wildlife and National Parks and Sabah Parks have all the data as they do not share their data openly.

Examples of developed areas for Penang National Park is the Teluk Bahang Entrance, for Taman Negara National Park is Kuala Tahan and area of Mutiara Resort, while for Kinabalu Park, it is Kinabalu Park Headquarter and Poring Hot Spring Sub-Station only as Mesilau Sub-Station is yet to be opened. At these areas, the facilities must be accessible to accommodate the people with disabilities and the people who use wheelchairs. As Malaysia does not has any standards for outdoor recreation and trails yet, I would suggest that the park managers refer to United States Department of Agriculture's Accessibility Guidebook for Outdoor Recreation and Trails which provide guidelines in constructing the accessible facilities for recreation, especially in national parks (Zeller et al., 2012). Besides, the park managers can consider consulting and hiring the people with disabilities to identify the obstacles that they are facing while using the facilities in the national parks and remove them (William et al., 2004).

6.3 Lessons Learned from Japan's National Park

From the study of Japan's national park, the Ministry of Environment divided the national parks into zones with different level of restriction. Less restricted areas are where the recreation facilities such as accommodation, restaurants, gift shops, ropeways etc. are built. As the park included private lands, there are many private facilities which are more accessible to the people who use wheelchairs. Therefore, national parks in Malaysia should not privatized the right to build facilities such as accommodation, restaurants etc to only a

company but companies to encourage healthy competition. Then, they may ensure that their facilities are accessible and usable by all, including elderly and people who use wheelchairs. Also, national parks in Malaysia should ensure that the zones and accessible area be shown to the public and for purposes such as environmental education, researches and park and vicinity development.

Also, Malaysia government should enforces the law and ensures that the national parks do have accessible facilities especially toilet, restaurants, accommodation and the existing PwDs facilities do comply with the standards. Even though I have not seen any people who use wheelchairs visited the Daisetsuzan national park in Japan during my visitation, the accessible facilities are available and are readied to be used at all times. With these facilities available, someday, people with disability can go visit and then spread through mouth-of-words or via their own websites or blogs. Examples in Japan can be seen in the Barrier-Free Consulting website (<http://www.kijikiji.com/consultant/japan/souunkyo.htm>) and a local blog created by the people who use wheelchair (<http://kurumaisugurentai.net/?p=9357>).

The information of whether the facilities in the national parks are accessible should be stated in the official website(s). This is because study shows the people who use wheelchair are spending more time in researching the accessibility before decided to visit the particular location (as cited in United Nations, 2003; Ray & Ryder, 2003). Though not all official websites of facilities in the national park in Japan show the accessibility of their facilities and services directly at their top page, most of them have them posted at their Q&A page. And such information are totally not available for Malaysia's. Both Taman Negara National Park and Penang National Park do not have official websites as they are under the management of Department of Wildlife and National Parks but the information pages do not have the accessible information at all (<http://www.wildlife.gov.my/index.php/en/public/2016-05-10-02-34-43/peta>; <http://www.wildlife.gov.my/index.php/en/public/2016-05-10-02-34-43/taman-negara-pahang-kuala-tahan>) . Sabah Parks which manage Kinabalu Park, does not include the accessibility information in their page too (<http://www.sabahparks.org.my/the-parks/kinabalu-park>).

6.4 Limitation of the Study

6.4.1 The Lacking of Open/ Free Spatial Data

The main limitation of this study is that Malaysia is lacking of open GIS data. Malaysia's

government is well known for not having open datasets for the general public. Even if you are willing to pay to get the datasets, you may need to go through all the inconveniences and difficulties at the government offices and still return empty handed (Lee, 2004). Malaysia started to realize the importance of spatial data since 1970s but started sharing the spatial data only in 1997. In year 2002, Malaysia Geospatial Data Infrastructure which is under the authority of Malaysian Centre for Geospatial Data Infrastructure (MaCGDI), unified all Geospatial Initiatives of governments, local communities and international Spatial Data Infrastructures (SDI) in a website to share for free among the government agencies. However, other private companies and public will have to purchase the data with a price.

Later in year 2014, we saw a ray of hope with the establishment of Malaysia's Open Data Portal which has five objectives: to increase government services transparency, to enhance creativity and innovation by Malaysian and business community, to act as a mean to obtain feedback from Malaysian through information provided, to be more efficient in providing Malaysians the open data and to save the cost of government agencies. Up to January 8, 2016, there are 1,649 datasets, 1550 format files with 99 unknown format files shared in the portal from a total of 50 government bodies and agencies (Chart 6.3.1). However, most are tabular data (eg. XLSX, CSV and XLS) for attribute data, and only about 1% is spatial data with XML and KML formats (see Chart 6.3.1). Thus, I think it is not surprising when the Global Open Data Index ranking for Malaysia's government dropped from #98 in 2014 to #112 (10%) in 2015 (<http://index.okfn.org/place/malaysia/>). Therefore, in this study, I have to obtain GIS data of Malaysia from non-governmental websites and crowd-sourcing website, ie. Open Street Map in which the data may not accurate.

On the other hand, Japan has more open/ free GIS data. Japan is promoting the use of open data to enhance transparency and build public confident, to promote collaboration between the public and private sectors and to increase government efficiency (Hiramoto, 2013). From Chart 6.3.2, Japan Open Data Portal has 17,861 datasets and 22,944 format files. In another words, some datasets may have more than one format. Also, Japan has a better Global Open Data Index ranking, which was #31 in 2015. However, the ranking has dropped from #19 in 2014 (<http://index.okfn.org/place/japan/>). Thus, I would not say that the open/ free GIS data are sufficient, at least insufficient for my study. For instance, I cannot find the data I want from the Japan Open Data Portal. The Japan National Land Numerical Information has free (not open) transportation data but does not include the spatial data for path/ trails in national park. Therefore, I still have to obtain the data from Open Street Map. Also, the GIS data that Japan has are not unified in a website. I have to look into different websites for different sources of GIS data. For example, I obtained country, states and district boundaries spatial data from Japan National Land Numerical Information and vegetation

spatial data from Biodiversity Center of Japan. The scattering data over the web have caused inconveniences for the users.

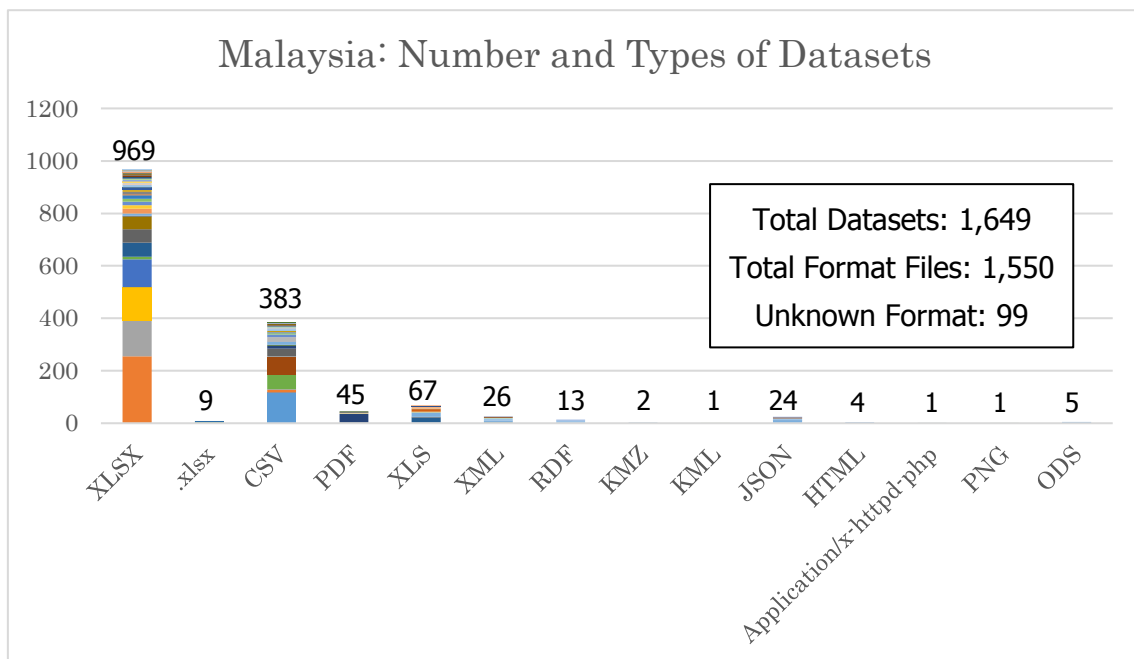


Chart 6.3.1: The total number of open datasets and their format shared by Malaysia’s government bodies and agencies until January 8, 2016. (<http://www.data.gov.my/>)

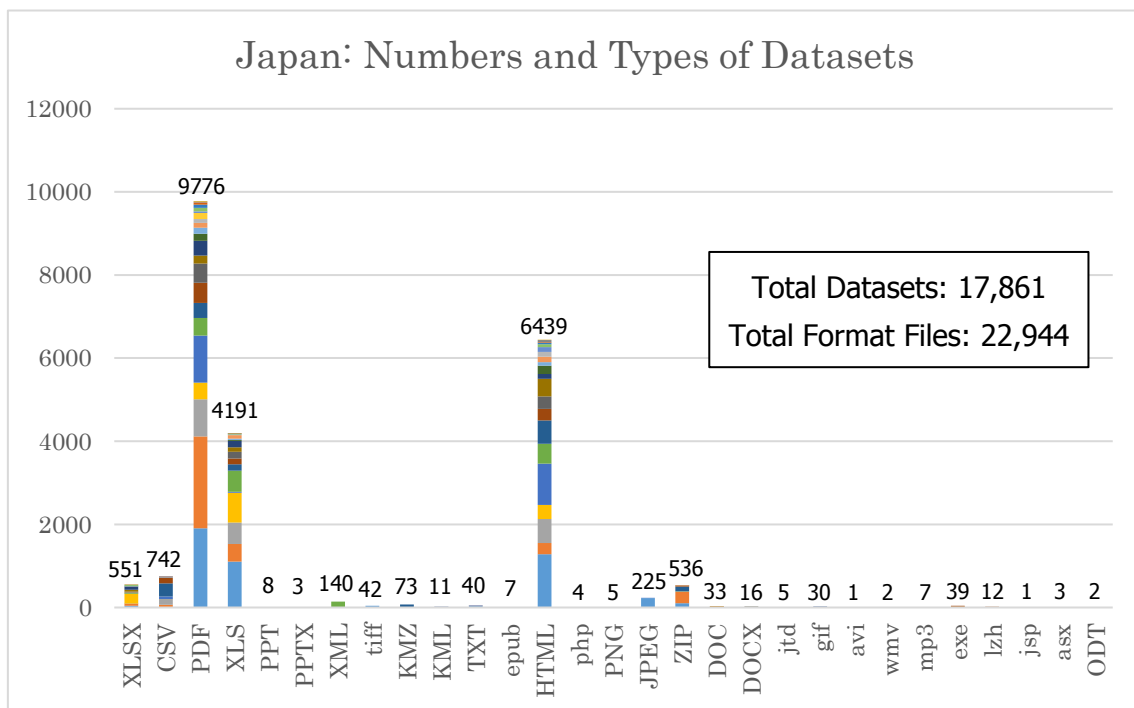


Chart 6.3.2: The total number of open datasets and their format shared by Japan’s government bodies and agencies until January 8, 2016. (<http://www.data.go.jp/>)

CHAPTER 7: CONCLUSION

This study shows the current accessibility of the people who use wheelchairs to the selected national parks. Even though Malaysians are getting more aware of the right of the people with disability, we are still not doing enough in creating barrier-free environment for all. This can be seen in the result of this study which proved that the national parks we have are mostly inaccessible by the people who use wheelchairs. Even though both PNP and TNNP have park's plan saying that the park must be accessible by everyone, the goal is yet to be achieved as most interesting places of the park are inaccessible. TNNP is totally inaccessible with the need of crossing the river by inaccessible boat and then climb the staircase. Also, the people who use wheelchairs can access up to Kuala Tahan Village of TNNP by private accessible transportation only but maneuver the wheelchairs around the village could be difficult because of the steep slopes (or high slope percent). PNP is much easier to reach by the people who use wheelchairs than TNNP and KP because Penang has accessible Public Rapid Bus. However, most roads, path and trails which I identify as accessible or partially accessible, either by car or wheelchairs do have steep slopes according to the SRTM 1-arc second global data and thus are difficult for the people who use wheelchairs to maneuver around. Besides, some facilities which are built for people with disability are inaccessible or difficult to access. Examples are the PNP's PwDs toilet which is not complying with Malaysian Standard 1184:2002 and the locked PwDs toilet in KP. Also, the park managers may not be aware of the importance to have barrier-free park because the paved trail at PNP is blocked by a barricade, the paved path in KP has inconsistent width and is uneven and the slope in KP has small width. In KP, the people who use wheelchairs can only experience two types of vertical vegetation zones, namely lowland and lower montane.

During the non-winter season in Hokkaido, DNP, on the other hand, has more accessible public transportation though the people who use wheelchairs may have to arrange with the company in advance. More than half of the road and path are identified as accessible by the people who use wheelchairs via car or wheelchairs and most parts are flat areas where they can easily maneuver around. The facilities and services such as toilet specially built for PwDs are definitely usable by the people who use wheelchairs. Also, some of the facilities such as visitor center, ropeway, some accommodation and view point were built to be accessible for all, including both able-bodied and people who use wheelchairs. Of course, some other facilities such as accommodation, view point and chairlift are partially accessible or totally inaccessible by the people who use wheelchairs. In DNP, the people who use wheelchair can experience three types of forest zones, namely montane, subalpine and alpine.

One of the causes of having partially to inaccessible national parks in Malaysia is

the social stigma and discrimination towards the people with disabilities are still existing today. Besides, the legislations to protect the welfare of people with disabilities and guidelines for accessible built building are not enforced and implemented effectively and efficiently. As the facilities for people who use wheelchairs usually require larger space, some people may argue that such move may increase visitor arrival and affecting the sensitive natural environment.

Therefore, education relating to people with disabilities should be given to the park managers, staffs and the any parties involving in managing the national parks and/or providing the facilities and services to the visitors to create awareness. Also, the government should revise the legislation to reduce discrimination, enforce the laws stricter and ensure people are complying with the guidelines in built environment. Besides, providing accessible facilities does not mean “paving the wilderness” because the people who use wheelchairs would want to experience the quality nature too. Therefore, the park managers shall refer to the concept of Recreation Opportunity Spectrum (ROS) to diversify the recreation opportunity to meet people’s various preferences. Additionally, the park managers should consider working together with people who use wheelchairs in eliminating obstacles.

We can also learn from Japan’s national park to divide the parks into zones with different limitations and planning for conservation and also facilities constructions. Also, Malaysia government should enforce the law and ensure that the national parks do have accessible facilities even there are less visitation from people with disabilities because they will spread through mouth-of-words or social media. Even better, the accessible information should be make available in the parks official websites as the people who use wheelchairs usually spend more time in researching the accessibility before decided to visit the particular location.

Lastly, I hope that this study will create awareness among the public and provide some insights of the current accessibility of people who use wheelchairs to selected national parks in Malaysia and Japan. Also, with the database created and shared, I hope that more people can realize the important of free/ open spatial data and that more people including the government of Malaysia are willing to share more freely or openly the spatial data that they have.

ABSTRACT

Title: “Can the people who use wheelchairs enjoy the national parks?” Compare Malaysia’s to Japan’s and create a spatial database for the future.

Background and Objectives:

The accessibility of national parks towards the people who use wheelchairs has become more significant with the expanding population of people with disabilities (PwDs), including the elderly due to better awareness of human right, advancement of healthcare, and the increasing aged population and traffic accidents in the world. Accessible national parks are not only important because of the right of the PwDs and elderly but also able to maintain the health and well-beings of them as well as a business opportunity for many. Thus, the objectives are to identify the accessibility of people who use wheelchairs to selected national parks in Malaysia and Japan; compare the accessibility of Kinabalu Park and Daisetsuzan National Park and to create a spatial database for future’s park planning and researches.

Methods:

Penang National Park (PNP), Taman Negara National Park (TNNP), Kinabalu Park (KP) and Daisetsuzan National Park (DNP) are chosen in this study because of their short distance to a city or they are popular or both. This study utilize descriptive research method to examine the current accessibility of people who use wheelchairs to the selected national park based on collected data. Firstly, free/open GIS data to identify and show the location of the parks, the accessible area, the location of facilities, services and/or experiences accessible by the people who use wheelchairs are collected through websites. Verification of the accessibility was done by collecting the primary data via on-site observation and telephone interview as well as secondary data from the online survey. Slope percent calculated from DEM (digital elevation model) data is used to identify the accessibility and difficulty of the road and trails to people who use wheelchairs by comparing to the accessible scales.

Results:

This study collected and used only free/open GIS data. The least accessible distance and least accessible elevation range in the park is PNP, followed by TNNP, KP and DNP. In Malaysia, people who use wheelchairs are mostly cannot access to the parks or access with difficulties and much inconveniences as the accessible facilities such as toilets are either not provided or provided but not usable. The paved path may have obstacles such as barricade, uneven surface and small width that stop people who use wheelchairs to use them or may threaten their safety.

As a result of comparing KP to DNP, people who use wheelchairs can travel to DNP

with more transportation choices but they can only travel to KP by private car or taxi which is not specifically designed for them. Besides, in DNP, they can access to more area, more facilities and services and can enjoy more types of nature or vegetation zones than KP. However, the movement people who use wheelchairs are still limited by some inaccessible areas and facilities in the park.

Therefore, GIS database was created in a hope that it may be useful in future's park planning and researches to build accessible national parks for all.

タイトル：“車椅子利用者は、国立公園を楽しめないのでしょうか？” マレーシアと日本の国立公園の比較から、未来のために GIS データベースの作成

背景と目的：人権意識や医療の改善、世界人口における高齢化の進展や交通事故の増加が原因で、国立公園のバリアフリー化は重要性を増してきている。国立公園のバリアフリー化は、障がい者や高齢者たちの人権を守るだけでなく、彼らの健康や幸福を確保すること、及び、多くのビジネスの機会の増加に繋がる問題である。そこで、本研究の目的は、マレーシアと日本の国立公園を対象とし、公園内において、車椅子利用者がアクセス可能な場所を明らかにする。さらに、キナバル公園と大雪山国立公園の公園内の各種施設へのアクセシビリティの比較を行い、最後に未来のより良い公園計画と研究のために、GIS データベースの作成を行う。

方法：都市の近くにあり、人気が高い、もしくは、両方の理由で、ペナン国立公園、タマンネガラ国立公園、キナバル公園と大雪山国立公園を本研究では対象とする。車椅子の利用者を想定し、まずは国立公園の各種施設へのアクセシビリティの現状に関する資料を集め、それを調査した。対象となる国立公園に関する施設配置等の資料を web サイトから集め、特にマレーシアの公園に関しては、公園内の宿泊施設へ電話インタビューを行い、資料を収集した。GIS データに関しても、車椅子の利用者を想定し、各種散策路におけるバリアフリーの現状、公園内の各種サービス施設へのアクセシビリティの検証を行った。特に DEM（標高モデル）データから算出された散策路の急峻な傾斜角は、アクセシビリティの阻害要因となり、車椅子利用者が散策路を利用する困難な状況が示された。

結果：本研究では、無料、もしくはオープンソースの GIS データだけを収集・利用し、データベースを作成した。解析結果から、アクセシビリティが低く、標高の高低差が少ない公園は、ペナン国立公園であった。そして、タマンネガラ国立公園、キナバル公園と大雪山国立公園の順番でアクセシビリティが高く、標高の高低差が大きくなる。マレーシアの公園において、トイレ等の施設へのアクセス状況を考察すると、利用可能な施設が提供されないケースが多くみられ、車椅子の利用者にとって、たいへん不便な状況があることが

明らかになった。それ以外にも、散策路上におけるバリケード（車椅子利用者が通ることのできないゲート）や、階段、凹凸面や幅員の狭い舗装路等の物理的な障壁が多くみられ、それらの多くが車椅子利用者にとって危険な状況になる可能性が示唆され、社会福祉上の問題点が多くみられた。

キナバル国立公園と大雪山国立公園の比較をした結果、車椅子利用者にとって、大雪山国立公園は公共交通機関で複数の行き方が選択できるが、キナバル公園へは、専用車かタクシーしか選択肢がなく、しかも、そのタクシーも普通車だけであった。さらに、大雪山国立公園において、車椅子利用者がアクセス可能な場所、さらに植生、自然環境、利用可能なサービス施設はキナバル公園より多いことが明らかになった。しかし、大雪山国立公園においても、車椅子利用者がアクセスできない場所や、利用できない施設もあり、彼らの施設利用には限界もある。

そのように、作成した GIS データベースは、今後の公園計画や公園に関する研究へ有用性を指摘することができる。今後、未来へ向けて、健常者も障がい者も含め、全ての人々が利用し、アクセス可能な国立公園を展望することができた。

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REFERENCES

- Accessible. (n.d.). *Oxford Dictionaries*. Retrieved November 2016 from <https://en.oxforddictionaries.com/definition/accessible>
- Abdul Rahim, A., & Abd. Samad, N.A. (2010). Accessible Built Environment for the Elderly and Disabled in Malaysia: Hotels as Case Studies. *Journal of Construction in Developing Countries*. **15**(2):1-21.
- About Us. (n.d.). Retrieved August 2, 2016, from Official Portal of Ministry of Natural Resource and Environment, <http://www.nre.gov.my/en-my/CorporateInfo/Pages/default.aspx>
- Aiko, T. & Shibata, M. (2005). In Japanese: A study of the wheelchair visitors' mobility in city parks regarding with train continuity – a case study in large city parks, Sapporo, Japan. *Journal of the City Planning Institute of Japan*, 40(3), 853-858.
- Ang, S.C. (2004). Conservation and Ecotourism in Penang National Park. (Degree of Master Thesis, Atlantic International University). Available from Scrib Library. Retrieved 25th October, 2016 at <https://ja.scribd.com/document/18802712/Conservation-and-Eco-Tourism-in-Penang-National-Park>
- Ashton, P.S. (2008). Changing values of Malaysian forests: the challenge of biodiversity and its sustainable management. *Journal of Tropical Forest Science*. **20**(4):282-291.
- Azizan, H. (2015, July 5). Need to improve lives of the disabled. *The Star Online*. Retrieved October 17, 2016 from <http://www.thestar.com.my/news/nation/2015/07/05/need-to-improve-lives-of-the-disabled/>
- Bi, Y. (2006). Accessibility and Attitudinal Barriers Encountered by Travelers with Physical Disabilities in China. (Master Dissertation, University of Missouri-Columbia). Available from <https://mospace.umsystem.edu/xmlui/bitstream/handle/10355/4537/research.pdf?sequence=3>
- Bi, Y., Card, J.A., Cole, S.T. (2007). Accessibility and Attitudinal Barriers Encountered by Chinese Travelers with Physical Disabilities. *International Journal of Tourism Research*, 9(3), 205-216. doi: 10.1002/jtr.603
- Bizjak, B., Knežević, M., Cvetrežnik, S. (2011). Attitude Change Towards Guests with Disabilities: Reflections from Tourism Students. *Annals of Tourism Research*, 38(3), 842-857. doi: 10.1016/j.annals.2010.11.017
- Blakeney J. (2001). Overview of Forest Law Enforcement in East Malaysia. WWF Malaysia. Retrieved from http://www.academia.edu/7783065/Overview_of_Forest_Law_Enforcement_in_E

ast_Malaysia

- Brasor, P. (2016, April 16). Accommodating disabilities, but only within reason. *The Japan Times*. Retrieved from <http://www.japantimes.co.jp/>
- Buultjens, J., Ratnayake, I., Gnanapala, A., Aslam, M. (2005). Tourism and Its Implications for Management in Ruhuna National Park (Yala), Sri Lanka. *Tourism Management*, 26, 733-742. Doi: 10.1016/j.tourman.2004.03.014
- Cabinet Office of Japan. (2011). Annual Report on Government Measures for People with Disabilities 2011. Retrieved November 17, 2016 from the Cabinet Office of Japan website:
<http://www8.cao.go.jp/shougai/whitepaper/h23hakusho/zenbun/honbun/index.html>
- Chan, B. (2008). Institutional restructuring in Sarawak, Malaysia. In Durst, P., Brown, C., Broadhead, J., Suzuki, R., Leslie, R. & Inoguchi, A. (Eds.), *Re-inventing forestry agencies: Experiences of institutional restructuring in Asia and the Pacific*. Food and Agriculture Organization of the United Nations.
- Chin, C. (2015). Making accessible tourism a reality. Retrieved November 29, 2016, from The Star Online website:
<http://www.thestar.com.my/travel/malaysia/2015/03/28/making-accessible-tourism-a-reality/>
- Chua, F.Y., Mohd Yaacob, N., & Hussein, H. (2013). Achieving Sustainable Development: Accessibility of Green Buildings in Malaysia. *Procedia-Social and Behavioral Sciences*. **101**:120-129.
- Clark, R.N. & Stankey, G.H. (1979). The Recreation Opportunity Spectrum: A Framework for Planning, Management and Research. USDA Forest Service General Technical Report PNW-98, USDA Forest Service, Portland, Ore. 32 pp.
- Department of Standards Malaysia. (2009). MS1184:2002 Code of Practice on Access for Disabled Persons to Public Buildings (First Revision). Retrieved on January 5, 2016 from http://okujobs.com.my/wp-content/uploads/2011/03/MS_1184_2002-1-CODE-OF-PRACTICE-ON-ACCESS-FOR-DISABLED-PERSON-TO-PUBLIC-BUILDINGS.pdf
- Department of Wildlife and National Parks Peninsular Malaysia. (n.d.). Retrieved August 2, 2016, from Official Website, <http://www.wildlife.gov.my/index.php/en/>
- Description. (n.d.). Retrieved on December 2, 2016, from Cambridge Dictionary website:
<http://dictionary.cambridge.org/dictionary/english/description>
- Disabled World. (2010, March 14). Disability in Japan. Retrieved November 17, 2016, from Disabled World website: <https://www.disabled-world.com/>
- Dorfman, P.W. (1979). Measurement and meaning of Recreation Satisfaction. *Environment and Behavior*, 11(4), 483-510. doi: 10.1177/0013916579114004

- DWNP. (1987). Taman Negara Master Plan. Retrieved on December 6, 2016, from Department of Wildlife and National Parks website:
http://www.wildlife.gov.my/images/stories/penerbitan/lain_lain/TmnNegaraMasterPlan.pdf
- DWNP. (n.d.). Penang National Park. Retrieved August 18, 2016, from <http://www.wildlife.gov.my/index.php/en/public/2016-05-10-02-34-43/peta>
- Economic Impact and Travel Patterns of Accessible Tourism in Europe – Final Report.* (2014). Retrieved November 28, 2016, from European Commission website, http://ec.europa.eu/index_en.htm
- Esri. (n.d.). ArcGIS 9: What is ArcGIS? Retrieved November 23, 2016, from http://downloads.esri.com/support/documentation/ao_/698What_is_ArcGis.pdf
- European Commission. (2013). *Economic Impact and Travel Patterns of Accessible Tourism in Europe – Final Report.* Retrieved August 30, 2016, from European Commission website:
<http://ec.europa.eu/DocsRoom/documents/7221/attachments/1/translations/en/renditions/pdf>
- Fallah, M., Makmom, A., Aziz, A., Bose, M.M., Adamu, A., Mazlina, J., Hosea, M., Ghadimzadeh, A., & Shadi, K.M. (2014). A Fuzzy Analytic Hierachy Approach for Ranking and Prioritizing Sustainability Criteria and Indicators of Ecotourism Management. *IOSR Journal of Environmental Science, Toxicology and Food Technology*, 8(12), 64-73. doi: 10.9790/2402-081246473
- Forestry Department Peninsular Malaysia. (2014). Annual Report 2014. Retrieved August 2, 2016, from Official Website Forestry Department Peninsular Malaysia:
http://www.forestry.gov.my/index.php?option=com_flippingbook&view=book&id=30:laporan-tahunan-2014&catid=6:laporan-tahunan&Itemid=945&lang=en
- Forestry Department of Peninsular Malaysia. (n.d.). Introduction: Function of the Department. Retrieved August 2, 2016, from Forestry Department of Peninsular Malaysia website <http://www.forestry.gov.my> on 2nd August 2016.
- Forest Legality Alliance. (2013). Risk Tool: Malaysia. Retrieved August 2, 2016, from website <http://www.forestlegality.org/risk-tool/country/malaysia>
- Goh, G. C. and Yusoff, M. M. (2010). Sustaining Tourism Development in Protected Areas. A Case of Kinabalu Park. *International Journal of Trade, Economics and Finance*, 1(2), 179-183.
- Goodchild, M., Haining, R., Wise, S., Arbia, G., Anselin, L., Bossard, E., Brunsdon, C., Diggle, P., Flowerdew, R., Green, M., Griffith, D., Hepple, L., Krug, T., Martin, R., & Openshaw, S. (1992). Integrating GIS and spatial data analysis: problems and possibilities. *International Journal Geographical Information Systems*, 6(5), 407-423. doi: 10.1080/02693799208901923

- History of Establishment. (n.d.). Retrieved August 2, 2016, from Official Portal for Department of Marine Park Malaysia, http://www.dmpm.nre.gov.my/history_of_establishment.html?uweb=jtl
- Hiramoto, K. (2013). E-Government and Open Government Data in Japan. Retrieved on January 9, 2017, from Japan Government Chief Information Information Officer's Portal: https://cio.go.jp/assets/JAPN_OGD.pdf
- Hong, C.W., & Chan, N.W. (2010). The Potentials, Threats and Challenges in Sustainable Development of Penang National Park. *Malaysia Journal of Environmental Management*, 11(2), 95-109.
- Hussein, H. & Mohd Yaacob, N. (2012). Development of Accessible Design in Malaysia. *Procedia-Social and Behavioral Science*, 68, 121-133. doi: 10.1016/j.sbspro.2012.12.212
- Indian Institute of Tourism and Travel Management. (2010). A Report on Problems and Prospects of Accessible Tourism in India. Retrieved on December 16, 2016, from <http://incredibleindia.org/lang/images/docs/trade-pdf/surveys-and-studies/study-reports/Problems%20And%20Prospects%20Of%20Accessible%20Tourism%20In%20India.pdf>
- IUCN. (2006). The Future of Sustainability: Re-thinking Environment and Development in the Twenty-First Century. Report of the IUCN Renowned Thinkers Meeting, 29-31 January, 2006. Retrieved October 14, 2016 from http://cmsdata.iucn.org/downloads/iucn_future_of_sustainability.pdf
- Ishida, S., Kameyama, S., Kubo, K. & Kashima, S. (2009). In Japanese: Study on Methodology of Phased Construction of Barrier-Free Sidewalk Utilizing Barrier-Free Aid System. *Doboku Gakkai Ronbunshuu D*, 65(1), 53-63. doi: <http://doi.org/10.2208/jscejd.65.53>
- Jabatan Kebajikan Masyarakat. (2014). Laporan Statistik 2014 - Buku JKM. Retrieved August 30, 2016, from Jabatan Kebajikan Masyarakat website: <http://www.jkm.gov.my/jkm/uploads/files/pdf/Buku%20JKM%202014.pdf>
- Jabatan Taman Laut Malaysia. (2011). Laporan Tahunan 2012 JTLM. Retrieved August 2, 2016, from Official Portal for Department of Marine Park Malaysia: [http://www.dmpm.nre.gov.my/files/Jabatan_Taman_laut_Annual_Report1%20\(2\).pdf](http://www.dmpm.nre.gov.my/files/Jabatan_Taman_laut_Annual_Report1%20(2).pdf)
- Japan Times News. (2016). Japan's Population Drops at Fastest Pace on Record. Retrieved October 11, 2016 from The Japan Times News website: http://www.japantimes.co.jp/news/2016/07/13/national/japans-population-drops-fastest-pace-record/#.V_t3qY-LQuU
- Johor National Parks Corporation. (n.d.) Retrieved August 2, 2016, from Official Blogspot of Johor Parks, <http://johorparcs.blogspot.jp/>

- Johnson, L.H. (1953). Limitations of the Descriptive Method. *The Phi Delta Kappan*, 34(6), 241-245. Retrieved on December 2, 2016, from <http://www.jstor.org/stable/20332351>
- Jones, T.E. (n.d.) Retrieved September 23, 2016, from <http://www.kisc.meiji.ac.jp/~follow/topics/AP/TomJones2re.pdf>
- Jones, T. & Ohsawa, T. (2016). Monitoring Nature-Based Tourism Trends in Japan's National Parks: Mixed Messages from Domestic and Inbound Visitors. *Parks*, 22(1), 25-35. doi: 10.2305/IUCN.CH.2016.PARKS-22-1TJ.en
- Jusoh, A.T.M., Mapjabil, J., Samat, N., & Marzuki, A. (2010). Pembangunan Sumber Hutan Sebagai Destinasi Pelancongan Lestari di Pulau Pinang. Paper presented at Prosiding Persidangan Kebangsaan Ekonomi Malaysia Ke V 2010. Retrieved October 14, 2016 from <http://www.ukm.my/fep/perkem/pdf/perkemV/PERKEM2010-2-32.pdf>
- Kamarudin, H., Muhamad Ariff, N.R., Wan Ismail, W.Z., Bakri, A.F. & Ithnin, Z. (2014). Malaysian Scenario on Access and Facilities for Persons with Disabilities: A Literature Review. *MATEC Web of Conferences*, 15, 1-7, 01019. doi: 10.1051/mateconf/20141501019
- Kareem, A. (2003). Review of Global Menace of Road Accidents with Special Reference to Malaysia – A Social Perspective. *The Malaysian Journal of Medical Sciences :MJMS*, 10(2), 31-39.
- Kaffashi, S., Radam, A., Shamsudin, M. N., Yacob, M. R., & Nordin, N. H. (2015). Ecological Conservation, Ecotourism and Sustainable Management: The Case of Penang National Park. *Forests*, 6, 2345-2370. Doi: 10.3390/f6072345
- Keniger L.E., Gaston K.J., Irvine K. N. and Fuller R.A. (2013). What are The Benefits of Interacting with Nature? *International Journal of Environmental Research and Public Health*, 10, 913-935. doi:10.3390/ijerph10030913
- Kinne, S., Patrick, D.L. & Doyle, D.L. (2004). Prevalence of Secondary Conditions among People with Disabilities. *American Journal of Public Health*, 94(3), 443-445.
- Kitayama, K. (1992). An Altitudinal Transect Study of The Vegetation on Mount Kinabalu, Borneo. *Vegetatio*, 102: 149. Doi: 10.1007/BF00044731.
- Krishnan, R. & Radin Sohadi, R.U. (1997). An Update on Road Traffic Injuries in Malaysia. *The Journal of Health and Translational Medicine, JUMMEC*, 2(1), 39-41.
- Kuzuya, M. (2012). Process of Physical Disability among Older Adults – Contribution of Frailty in the Super-Aged Society. *Nagoya Journal of Medical Science*, 74, 31-37.
- Laws of Malaysia. (2013). Act 226 : National Parks Act 1980. Retrieved August 18, 2016 from <http://www.agc.gov.my/agcportal/uploads/files/Publications/LOM/EN/Act%2022>

- 6%20-%20National%20Parks%20Act%201980.pdf
- Laws of Malaysia. (2014). Act 685 : Persons with Disabilities Act 2008. Retrieved October 17, 2016 from
<http://www.ilo.org/dyn/natlex/docs/ELECTRONIC/86297/117930/F139356912/MYS86297.pdf>
- Lee, L.M. (2004). Free Download of Penang GIS Maps. Retrieved January 8, 2017, from University Science Malaysia's School of Housing, Building and Planning old website:
<http://www.hbp.usm.my/itsupport/FreeDownloads/PgGISFreedownloadIntro.htm>
- List of Protected Areas in Peninsular Malaysia. (n.d.). Retrieved August 3, 2016, from
http://awsassets.wwf.org.my/downloads/list_of_pa.pdf
- Maller, C., Townsend, M., Pryor, A., Brown, P. & St. Leger, L. (2005). Healthy Nature Healthy People: 'Contact with Nature' as an Upstream Health Promotion Intervention for Populations. *Health Promotion International*, 21(1), 45-54. doi: 10.1093/heapro/dai032
- Md Bakri, H. 2005. Felda's experience in the commercialization of herbal products. In: Azhar Muda, Mohd. Hamami Sahri, Ahmad Said Sajap, Faridah Qamaruz-Zaman, Nor Aini Ab. Shukor, Jalil Md. Som, and I. Faridah-Hanum. (Eds). *Proceedings of the International Conference on Medicinal Plants*. Universiti Putra Malaysia dan Jabatan Perhutanan Semenanjung Malaysia, Kuala Lumpur. pp. 40-48.
- Ministry of Education, Culture, Sports, Science and Technology. (2007). Case Studies Concerning the Development of Barrier-Free School Facilities. Retrieved November 17, 2016 from Japan National Institute for Educational Policy Research website: <https://www.nier.go.jp/shisetsu/pdf/e-baria.pdf>
- Ministry of Environment Japan. (n.d.). In Japanese: The number of visitors to the national parks. Retrieved on November 25, 2016 from Ministry of Environment Japan website: https://www.env.go.jp/park/doc/data/national/np_91.pdf
- Ministry of Environment Japan. (n.d.). In Japanese: Estimation of the number of foreign visitors to the national park in Japan. Retrieved on November 25, 2016 from Ministry of Environment Japan website:
<http://www.env.go.jp/press/files/jp/27557.pdf>
- Ministry of Health, Labour and Welfare. (2013). Japanese Version: 平成 25 年版 : 障害者白書 (概要) . Retrieved October 15, 2016 from Cabinet Office, Government of Japan website:
http://www8.cao.go.jp/shougai/whitepaper/h25hakusho/gaiyou/h1_01.html
- Ministry of Health, Labour and Welfare. (2015). Japanese Version: 平成 27 年版 : 障害者白書 (概要) . Retrieved October 15, 2016 from Cabinet Office, Government of Japan

- website: http://www8.cao.go.jp/shougai/whitepaper/h27hakusho/zenbun/h1_03_03_01.html
- Minagawa, T. (2016, April 1). In Japanese: An urge for an active compromise - the enforcement of “Law to Eliminate Discrimination against People with Disabilities”. *Tokyo Shimbun*. Retrieved from <http://www.tokyo-np.co.jp/>
- Munyi C.W. (2012). Past and Present Perceptions Towards Disability: A Historical Perspective. *Disability Studies Quarterly*. 32 (2) DOI: <http://dx.doi.org/10.18061/dsq.v32i2.3197>
- Nais, J. (1996). Kinabalu Park and the Surrounding Indigenous Communities. *Working Papers No 17, 1996: UNESCO (South-South Co-operation Programme for Environmentally Sound Socio-Economic Development in the Humid Tropics)*. Retrieved October 31, 2016 from <http://unesdoc.unesco.org/images/0011/001139/113901Eo.pdf>
- National park. (n.d.). *Dictionary.com Unabridged*. Retrieved September 22, 2016 from Dictionary.com website <http://www.dictionary.com/browse/national-park>
- National park. (n.d.). *American Heritage® Dictionary of the English language, Fifth Edition*. (2011). Retrieved September 33, 2016 from <http://www.thefreedictionary.com/national+park>
- National park. (n.d.). *Collins English Dictionary – Complete and Unabridged, 112th Edition 2014*. (1991, 1994, 1998, 2000, 2003, 2006, 2007, 2009, 2011, 2014). Retrieved September 33, 2016 from <http://www.thefreedictionary.com/national+park>
- NRE Organization Chart. (n.d.). Retrieved August 2, 2016, from Official Portal of Ministry of Natural Resource and Environment, <http://www.nre.gov.my/en-my/CorporateInfo/NREProfile/Pages/NRE-Organisation-Chart.aspx>
- Okuno, E. (1998). Disability Statistics in Japan. *Asia and Pacific Journal on Disability*, 1(3). Retrieved October 15, 2016 from Disability Information Resources website: <http://www.dinf.ne.jp/doc/english/asia/resource/z00ap/003/z00ap00309.html>
- O'Reilly, A.M. (1986). Tourism Carrying Capacity: Concept and Issues. *Tourism Management*, 7(4), 254-258. doi: 10.1016/0261-5177(86)90035-X
- Otake, T. (2016, May 2). New law bans bias against people with disabilities, but shortcomings exist, say experts. *The Japan Times*. Retrieved from <http://www.japantimes.co.jp/>
- Pakhriazad, H.Z., Mohd. Hasmadi, I., Aida, H.M.K. & Jusoff, K. (2009) Historical and Current Legislations of Taman Negara National Park, Peninsular Malaysia. *Journal of Politics and Law*, 2(1), 44-49.
- Pelan Konsep Taman Negara Pulau Pinang. (n.d.) Malay:Retrieved October 14, 2016, from http://www.wildlife.gov.my/images/stories/penerbitan/lain_lain/PlanKonsepTmnP

P.pdf

- Protected Areas Division. (n.d.). Retrieved August 2, 2016, from Forestry Department of Peninsular Malaysia website <http://www.wildlife.gov.my/index.php/en/2013-02-08-11-40-37/fungsi-bahagian/kawasan-perlindungan.html?showall=&start=5>
- Rimmer, J.H. (2005). The Conspicuous Absence of People with Disabilities in Public Fitness and Recreation Facilities: Lack of Interest or Lack of Access? *American Journal of Health Promotion*, 19(5), 327-329.
- Road Transport Department Malaysia. (n.d.). Statistics. Retrieved November 11, 2016, from the Official Portal of Road Transport Department Malaysia: <http://www.jpj.gov.my/en/statistics>
- Sabah Forestry Department. (2014). Annual Report 2014. Retrieved August 4, 2016, from the Official Portal of the Sabah Forestry Department: <http://www.forest.sabah.gov.my/annual-reports/2014>
- Sabah Wildlife Department. (n.d.). Protected Areas. Retrieved August 3, 2016, from the official website of Sabah Wildlife Department: <http://www.wildlife.sabah.gov.my/?q=en/content/protected-areas>
- Samdin, Z. (2008). Willingness to Pay in Taman Negara: A Contingent Valuation Method. *International Journal of Economics and Management*, 2(1), 81-94.
- Sanmargaraja, S & Seow, T.W. (2015). Accessible Transportation System for the Disabled Tourist in the National Park of Johor State, Malaysia. *International Journal of Social Science and Humanity*, 5(1), 15-21. doi: 10.7763/IJSSH.2015.V5.414
- Shields, N. & Synnot, A. (2016). Perceived Barriers and Facilitators to Participation in Physical Activity for Children with Disability: A Qualitative Study. *BMC Pediatrics*, 16(9). doi: 10.1186/s12887-016-0544-7
- Shuib, A. (1995). Tourism in Taman Negara Malaysia: Its Contribution as Perceived by Residents of Ulu Tembeling. *Akademika*, 47, 37-48.
- Soltani, S.H.K., Sham, M., Awang, M., & Yaman, R. (2012). Accessibility for Disabled in Public Transportation Terminal. *Procedia-Social and Behavioral Sciences*. 35:89-96.
- Tennison, J. (2016, April 5). When data is free but not open. *Open Data Institute*. Retrieved from <https://theodi.org/blog/when-data-is-free-but-not-open>
- The Basic Law for Persons with Disabilities. (n.d.). Retrieved November 17, 2016, from Japan Cabinet Office website: <http://www8.cao.go.jp/shougai/english/law/no84.html>
- The Commonwealth Health Hub. (n.d.). Malaysia: Findings from the Global Burden of Disease Study. Retrieved November 17, 2016 from <https://www.thecommonwealth-healthhub.net/practice-centre/view-country-profiles/>

- Tiun, L.T. & Khoo, S.L. (2013). Challenges Faced by Malaysians with Disabilities in the World of Employment. *Disability, CBR and Inclusive Development*, 24(1), 6-21. doi: 10.5463/DCID.v23i1.142
- United Nations. (2003). Barrier-Free Tourism for People with Disabilities in the Asian and Pacific Region. Retrieved November 28, 2016 from Australian Disability & Development Consortium Website:
http://www.addc.org.au/documents/resources/barrier-free-tourism-for-people-with-disabilities-in-the-asian-and-pacific-region_1062.pdf
- UNESCO. (n.d.). Kinabalu Park. Retrieved October 31, 2016 from
<http://whc.unesco.org/en/list/1012/>
- United Nations. (2007). Accessibility: A Guiding Principle of the Convention. Retrieved October 17, 2016 from United Nations website:
<http://www.un.org/esa/socdev/enable/disacc.htm>
- United Nations. (n.d.). Convention on the Rights of Persons with Disabilities. Retrieved November 16, 2016 from United Nations website:
<http://www.un.org/disabilities/convention/conventionfull.shtml>
- United Nations Development Programme. (2012). Project Document: Enhancing effectiveness and financial sustainability of Protected Areas in Malaysia. Retrieved August 3, 2016, from UNDP website:
<http://www.undp.org/content/dam/malaysia/docs/Protected%20Areas%20ProDoc.pdf>
- United Nations, Department of Economic and Social Affairs, Population Division. (2015). World Population Ageing 2015. Retrieved on December 16, 2016 from United Nations website:
http://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA_2015_Report.pdf
- United States Holocaust Memorial Museum. (2016). The Murder of the Handicapped. *Holocaust Encyclopedia*. Retrieved from
<https://www.ushmm.org/outreach/en/article.php?ModuleId=10007683> on 28th July 2016.
- UNWTO. (2016). World Tourism Day 2016: “Tourism for All – promoting universal accessibility” – Good Practices in the Accessible Tourism Supply Chain. Retrieved November 28, 2016 from United Nations World Travel Organization website: <http://ethics.unwto.org/en/content/accessible-tourism>
- What is Marine Park. (n.d.). Retrieved August 2, 2016, from Official Portal for Department of Marine Park Malaysia, <http://www.dmpm.nre.gov.my/what-is-marine-park.html?uweb=jtl>
- Wheelchair Traveller. (2014). Malaysia with a wheelchair – a résumé. Retrieved October

- 31, 2016 from <http://www.reisenmitrollstuhl.de/en/malaysia/malaysia-with-a-wheelchair-a-resume/>
- WHO. (n.d.). Ageing and health. Retrieved on 28th November, 2016 from World Health Organization website: <http://www.who.int/mediacentre/factsheets/fs404/en/>
- WHO. (n.d.). Disability and health. Retrieved on November 28, 2016 from World Health Organization website: <http://www.who.int/mediacentre/factsheets/fs352/en/>
- World Health Organization. (2016). Road Traffic Injuries. Retrieved November 11, 2016 from World Health Organization website: <http://www.who.int/mediacentre/factsheets/fs358/en/>
- World Health Organization. (2001). *International Classification of Functioning, Disability and Health:ICF*. Retrieved from http://psychiatr.ru/download/1313?view=1&name=ICF_18.pdf on 11th June 2015.
- World Health Organization. (2011). *World Report on Disability*. Retrieved from http://www.who.int/disabilities/world_report/2011/report.pdf?ua=1 on 11th June 2015.
- Williams, R., Vogelsong, H., Green, G. & Cordell, K. (2004). Outdoor Recreation Participation of People with Mobility Disabilities: Selected Results of the National Survey of Recreation and the Environment. *Journal of Park and Recreation Administration*, 22(2), 85-101.
- WTTC. (2016). Travel & Tourism: Economic Impact 2016 Japan. Retrieved on November 28, 2016 from World Travel & Tourism Council website: <http://www.wttc.org/-/media/files/reports/economic-impact-research/countries-2016/japan2016.pdf>
- WTTC. (2016). Travel & Tourism: Economic Impact 2016 Malaysia. Retrieved on November 28, 2016 from World Travel & Tourism Council website: <http://www.wttc.org/-/media/files/reports/economic-impact-research/countries-2016/malaysia2016.pdf>
- WTTC. (2016). Travel & Tourism: Economic Impact 2016 World. Retrieved on November 28, 2016 from World Travel & Tourism Council website: <http://www.wttc.org/-/media/files/reports/economic-impact-research/regions-2016/world2016.pdf>
- WWF. (n.d.). Marine. Retrieved August 3, 2016, from WWF website: http://www.wwf.org.my/about_wwf/what_we_do/marine/
- WWF. (n.d.). Sabah. Retrieved August 3, 2016, from WWF website: http://www.wwf.org.my/about_wwf/what_we_do/forests_main/forest_protect/protect_projects/sabah/
- WWF. (1986). The Development of Taman Negara. A Submission by World Wildlife Fund Malaysia. Retrieved on December 5, 2016 from <http://repository.wwf.org.my/WWFReports/TheDevelopmentOfTamanNegaraASubmissionByWorldLifeFundMalaysia.pdf>

- Yayasan Sabah Group. (n.d.). Conservation & Environmental Management: Biodiversity & Protected Areas. Retrieved August 4, 2016, from Yayasan Sabah Group website, http://www.yayasansabahgroup.org.my/conservation_management.cfm#tabr2
- Yau, M.K., McKercher, B. & Packer, T.L. (2004). Traveling with a Disability: More than an Access Issue. *Annals of Tourism Research*, 31(4), 946-960.
Doi:10.1016/j.annals.2004.03.007
- Zeller, J., Doyle, R., & Snodgrass, K. (2012). Accessibility Guidebook for Outdoor Recreation and Trails. *United States Department of Agriculture (USDA) Forest Service Missoula Technology and Development Center*. Retrieved on December 2, 2016, from USDA Forest Service website: <http://www.fs.fed.us/>