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WETLAND MANAGEMENT OF KUALA SELANGOR NATURE PARK, MALAYSIA

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ABSTRACT

Malaysia is a country blessed with wetlands of various sizes, types and functions. They are economically, socially, culturally and recreationally significant. Wetlands management in Malaysia has advanced from the traditional approach to modern one with strong support of governmental and nongovernmental organisations, legislation, and sophisticated technologies. Wetland is associated with values; among them are hydrological functions such as flood protection, maintenance of stream flow, recharging ground water. It serves as recreational area, habitats for both flora and fauna, and also promotes educational and research grounds. The study area, i.e. Kuala Selangor Nature Park is among the wetlands of significant role. Questionnaire survey was conducted on 100 respondents, asking their opinion on the aspect of wetland management of the site. Study indicated that relatively local visitors acknowledged the importance of wetland though they felt that government should enforce relevant legislation pertaining to wetland more seriously. Moreover, respondents thought that legislation can be used as a means to manage wetlands. In addition, there is a need to sustain the natural environment due to its combined effects as well as its relevancy towards sustaining the natural setting, so that man will continue enjoying the beautiful contributions of the natural environment.

Keywords: wetland management, Kuala Selangor Nature Park, local visitors, legislation.

INTRODUCTION

This research studies the wetland management practice with respect to the perception of local visitors and involvement of private sector. Wetlands are integral component of the environment and they are valuable environmental resource. Nowadays, wetlands are highly affected by the current trend in urbanisation process due to high rate of population increase that leads to high demand of land for development. Various human activities in alteration of the natural settings of the system resulted in degradation of these wetlands (Gillespie, 2007). There are both direct and indirect impacts of development on wetlands such as infrastructural expansion, which leads to alteration of hydrological cycle among others. Due to the land use and climate change as a result of varying human activities, there is a strong need to manage wetlands in a holistic approach so as to strengthen the efforts made by other bodies in maintaining the natural setting of the environment and sustainability.

In the light of growing concern of sustainable wetland management, this paper reports the perspective of local visitors in terms of managing wetland. Wetlands management is seen as part of the effort to control the devastation done on natural resources. It is important to protect the wetlands as it has many functions and values that are beneficial to the ecosystem, in which it is very essential to ensure quality and comfortable life for us. Thus, this paper investigates how visitors perceive the management of wetland areas towards the goal of sustaining wetland areas.

THEORITICAL CONSIDERATIONS: DEFINITIONS AND FUNCTIONS

To date, there is no such thing as a universally applicable definition to formally summarise what the phrase “wetlands” mean. Academicians, biologists, environmentalists and geologists each have differing terms on what constitutes a wetland. Controversial was the subject, since wetlands have different subdivisions that can mean many things to many people. The term “wetlands” originated from the United States of America and have since expanded into many conventional phrases. Words such as bog – a ground too soft to bear the weight of the body; swamp – a tract of low-lying ground in which water collects; and marsh – a watery tract of land, can all define a wetland but each of these have specialised uses, though their meanings point out the same (Dennison & Berry, 1993). Other terms that points out wetlands include fen, meadow, mire, moor and slough; each of these may differ in its location – bogs are widely used in England, while swamp originated in North America; vegetation – meadows are grassland near water bodies mowed for hay, while mire is mostly filled with soft mud and dirt; and the level of water – fens are lowlands covered by whole or part with shallow water, while marshes are usually flooded in winter (Haslam, 2003). Dictionary definitions also give different statements to interpret what wetlands mean. Macmillan Dictionary (2002) defines wetlands as “low land... often covered with water from the lake, river or sea next to it”, while Merriam-Webster Dictionary (2002), explains that wetlands are “land containing much soil moisture, as swamp or bog, usually used in the plural”.

According to Asmawi (2007), the definition of wetland depends on three strong characteristics, namely the presence of water, type of soil and type of vegetation. These factors will determine the definition based on its local geographical setting. In any case, the definition of wetlands stated in the Convention of Wetlands of International Importance, also known as Ramsar Convention 1971, is widely accepted when discussing about mutual cooperation for the sustainable management and conservation of wetlands (Davis, 1999). The widely known symposium where like-minded experts in the field of wetlands research, management and conservation, has agreed that the definition of wetlands should be as follows:

“Land inundated with temporary or permanent water that is usually slow moving or stationary, shallow, either in fresh, brackish or saline, where the inundation determines the type and productivity of soils and the plant and animal communities”.

Wetlands are an interface between the terrestrial and aquatic environments and their evolution and expansion depends largely on the rate of water saturation of the area (Bhatti *et al.*, 2006). They are environmentally sensitive areas and therefore, sensitive to environmental changes. Climate change is a major factor that affects wetlands in a very short period of time through various ways, such as surface runoff, evaporation, infiltration among others.

Wetlands are highly recognised due to its multiple potential values and functions such as *inter-alia*, water supply, biochemical functions, wildlife habitats, food security, defence and control against natural disasters like flood, tsunami, and drought among others. Wetlands like mangrove swamps act as a natural barrier for the protection of shoreline against tidal waves and strong winds. According to Kuenzler (1989), wetlands can filter 90% of sediments, 89% nitrogen and 80% phosphorous from surface runoffs. It has a strong tendency to absorb nutrients from pesticides, heavy metals and other toxins such as chlorination and petroleum hydrocarbons. They provide the oxygen humans breathe in, moderate the local climate.

They serve as habitats to wildlife of various species. Dennison and Berry (1993) state that wetlands provide nurturing grounds for a number of bird species during their early developmental stage. It is an important natural resource for both local and global communities and is rich with flora and fauna. It also serves tourism attraction places. It prevents floods and protects river banks from the erosion effects of high peak flow rates (Azous and Horner, 2001).

AN OVERVIEW OF WETLANDS MANAGEMENT IN MALAYSIA

The ecosystem of wetlands in Malaysia is facing overwhelming threats from rapid development and urbanisation of its many hinterlands. This, added with unregulated industrial expansion, has caused lifelong damages to these naturally resilient interfaces between land and sea. Natural disasters such as the tsunami of 2005 triggered the drive to protect these natural environments. Several legal avenues have been taken and the government steadily increases

attention to the environment by including them as environmentally sensitive areas.

What are wetlands in Malaysia and how do they contribute to the country? Wetlands in Malaysia are mostly mangrove forests found in coastal regions and along riverbanks near to the sea. Such places are complex and dynamic ecosystems with the abundance of flora and fauna. According to a recent study, wildlife alone includes not less than 60 species of plants and a variety of fishes, mammals, avian and insects, all providing for the food chain between them (Muzzneena *et al.*, 2005). Mangroves are deemed natural barriers against the furious waves of the sea and protect the coastal areas from storms that cause flooding and coastal erosion.

Nevertheless, mangrove forests are eventually threatened and not just in Malaysia, for around the Southeast Asian region, threats come from various sectors, mostly human activity. These range from hunting, logging and shrimp farming. The recent industry of shrimp farming has further threatened the ecosystem of mangroves; shrimp farmers cut a large portion of mangroves to clear the way to expand their shrimp farms. This is further encouraged by the increasing demand in food supply and shrimp farming is a profitable industry in many parts of Malaysia.

Wetlands in Malaysia are mostly mangroves, they account for about 11.7% of the total area of Southeast Asia mangroves. The mangroves consist of species such as *cryptocoryne ciliate*, *najas* and *ruppia* maritime. It is categorised as exposed mangroves that can be found growing seawards and along large water bodies, they are flooded during medium tides. Malaysia presently has five sites designated as Wetlands of International Importance, with the total surface area of 55,355 hectares, as shown in the following Table 1.

Table 1: Designated Wetland Areas in Malaysia

No	Area	Remarks
1	Kuching Wetland National Park, Sarawak	<ul style="list-style-type: none"> Designated as a Wetland of International Importance on the 8th November, 2005 Surface area is 6,610 hectares
2	Pulau Kukup, Johor	<ul style="list-style-type: none"> Designated as a Wetland of International Importance on the 31st January, 2003 Surface area is 657 hectares Also identified as one of the Important Bird Areas (IBA) for Malaysia
3	Sungai Pulai, Johor	<ul style="list-style-type: none"> Designated as a Wetland of International Importance on the 31st January, 2003 Surface area is 9,126 hectares Largest riverine mangrove system in Johor, located at the estuary of Sungai Pulai

4	Tanjung Piai, Johor	<ul style="list-style-type: none"> • Designated as a Wetland of International Importance on the 31st January, 2003 • Surface area is 526 hectares • Consists of coastal mangroves and inter-tidal mudflats located at the southernmost tip of continental Asia
5	Tasik Bera, Pahang	<ul style="list-style-type: none"> • Designated as a Wetland of International Importance on the 10th November, 1994 • Surface area is 38,446 hectares

Source: Ibrahim, Aminuddin and Abdullah, 2007

Wetland management refers to the activities that take place either within or in the wetlands so as to protect, conserve and boost their functions and values. Wetlands management in Malaysia has advanced from the traditional approach to modern one with strong support of governmental and nongovernmental organisations, legislation, and sophisticated technologies. This is mostly the responsibility of both state and federal government with the aid of other non-governmental bodies through the provision of legal and administrative structure; enforce laws and guidelines governing these wetlands. Wetland management in Malaysia is supported by various legislations administered by government agencies (Asmawi, 2007). Each of legislation or regulation administers different scope of wetland management, such as planning and development, engineering approach, forestry practices and laws, and land administration (Table 2).

Table 2: Government agencies involved in wetland management in Peninsular Malaysia

No.	Agency	Relevant legislation or regulation	Concern for:
1	Economic Planning Unit	<ul style="list-style-type: none"> • Federal Constitution • National Land Code 1965 	<ul style="list-style-type: none"> • Wetland habitat issues that affect the state's interests in terms of environment
2	Town and Country Planning Department, Ministry of Housing and Local Government	<ul style="list-style-type: none"> • Town and Country Planning Act 1976 • Guidelines for Development and Planning in Coastal Areas (Planning Standard JPBD 6/97) 	<ul style="list-style-type: none"> • Development plans (eg. policies on wetland habitat)
3	Local Planning Authorities	<ul style="list-style-type: none"> • Town and Country Planning Act 1976 	<ul style="list-style-type: none"> • Local forward planning and planning control (eg. implementation of policies on wetland habitat)
4	Department of Irrigation and Drainage (DID), Ministry of Agriculture	<ul style="list-style-type: none"> • Administrative circular no. 5/87 (requires all development submit plans to DID) • Guidelines on Erosion Control for Development Projects on the Coastal Zone, Guidelines no. 1/97 	<ul style="list-style-type: none"> • Engineering approach to protect the environment (eg. wetland habitat) • control and management of flooding (natural way-wetland areas)

5	Department of Environment, Ministry of Science, Technology and Innovation	<ul style="list-style-type: none"> • Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987 • Environmental Quality Act 1974 	<ul style="list-style-type: none"> • EIA prescribes activities such as land reclamation, (eg. development in wetland habitat)
6	Department of Forestry, Ministry of Primary Industries	<ul style="list-style-type: none"> • National Forest Act 1984 • Forest Rules 1986 	Planning, managing and enforcing forestry laws and practices with respect to wetlands.
7	Fisheries Department	<ul style="list-style-type: none"> • Fisheries Act 1985 	<ul style="list-style-type: none"> • Activities result in the creation of artificial wetlands such as aquaculture ponds for prawns and fish.
8	Land and Mines Department	<ul style="list-style-type: none"> • National Land Code 1965 	<ul style="list-style-type: none"> • Land administration (eg. wetland habitat) • Demarcation for wetland areas
9	Ministry of Culture, Arts and Tourism	<ul style="list-style-type: none"> • Ecotourism guidelines for coastal development, (Beach) 	<ul style="list-style-type: none"> • Coastal wetland resources
10	Department of Wildlife and National Park	<ul style="list-style-type: none"> • Marine Parks Regulations, sections 41-45 of Fisheries Act 1985 • Protection of Wildlife Act 1976 	<ul style="list-style-type: none"> • Conservation area with important wetland resources

Source: Asmawi, 2007

In the National Physical Plan, mangrove swamps are considered as one of the Environmentally Sensitive Areas (ESA), categorised under its three categories as Rank 1. ESA Rank 1 is described in the National Physical Plan as “all protected and potential protected areas, wetlands and turtle landing sites, catchments of existing and proposed dams, as well as highlands of more than 1000 m; where only low-impact nature tourism, education and research activities are allowed”. This is as stipulated in the NPP18 of the National Physical Plan, where “Environmentally Sensitive Areas (ESA) shall be integrated in the planning and management of land use and natural resources to ensure sustainable development” (Town and Country Planning Department, 2001).

KUALA SELANGOR NATURE PARK

Introduction

Kuala Selangor Nature Park, located at the latitude 3°20'N and longitude 101°15'E, was established in 1987 near the town of Kuala Selangor at the foot of Bukit Melawati (Plan 1). The park, also known as Taman Alam, is a nature

reserve currently under the management of the Malaysian Nature Society (MNS) in conjunction with the Selangor State Government. Located approximately 70km from Kuala Lumpur on the west coast of Malaysia along the Selangor River and bordering the Straits of Melaka, the park contains three distinct habitats including secondary forest, mangrove forest and a man-made brackish water lake system that is now home to a myriad of species.

According to the Kuala Selangor Local Plan (2007-2015), the area of Kuala Selangor Nature Park is gazetted as a public park. On both sides of the nature park is a coastal bund build as the delineation and to ensure smooth flow of the water system between the wetlands and the sea. The seaward side facing the Straits of Melaka contains a mangrove forest strip with various mangrove trees, including the species of *Avicennia*, *Bruguiera* and *Rhizophora*. Landwards, the nature park contains a degraded mangrove area that has since been replaced with secondary forest, and home to large number of monkey species. In between these two areas, a brackish man-made lake system was constructed that became the habitat of a large number of storks and egrets.

The park is situated at the mouth of Selangor River and extends over approximately 240 hectares of mangroves and mudflats. The area is home to various wildlife such as smooth otters *Lutra perspicillata* and monkeys (long-tailed macaques *Macaca fascicularis* and silvered leaf monkeys *Trachypithecus aurata*). More than 140 species of birds have been sighted, including Nordman's greenshank *Tringa guttifer* and the mangrove *Pitta megarhyncha*. The park is also involved in a milky stork *Mycteria cinerea* reintroduitory programme. Fireflies inhabit the nearby *Sonneratia* trees lining the Selangor River near Kampong Kuantan, and form a night time attraction for tourists.

History of Wetlands Management in Selangor

Wetlands in the state of Selangor consist mainly of mangroves (Nik Mohd Shah, n.d.). Mangrove forests in Selangor can be found along the stretch of land facing the Straits of Melaka – within the districts of Kuala Selangor, Sabak Bernam, Klang, Kuala Langat and Sepang. These mangrove forests are under the jurisdiction of the Pantai Klang District Forest Office. According to Nik Mohd Shah (n.d.), an area of 14,987 hectares of mangrove forests are currently under the Permanent Forest Reserve status. The mangroves of this state play a major role in the socio-economic sector of the state; the abundance of natural resources provided income for the local communities where the mangrove forests are located.

Plan 1: Location of Kuala Selangor Nature Park



Sumber : Pusat RND, Unit Perancangan Ekonomi Negeri Selangor

The history of wetlands management in Selangor goes back to the 1920s, where most of the mangrove forests in the state were already gazette as

Permanent Forest Reserve. For a period of 39 years from 1922 to 1961, six working plans for the management of mangroves in Selangor have been developed. The first working plan was prepared by A.E. Sanger Davis in 1922 for an effective period of 3 years. This was then followed by the working plan made by A.B.S. Boswell for the periods 1926 to 1930, and two working plans prepared by D.H. Hudgson, each for the years of 1931 to 1935 and 1936 to 1940. Boswell resumed creating two subsequent working plans, the first for 1941 to 1945 and the second for 1945 to 1951. The subsequent two plans encountered difficulties; the second plan had not gone into full effect as Malaya was under the Japanese Occupation, while the third plan was made just after World War II ended and the Forestry Department was just about to be organized. The sixth and final working plan was prepared by Mahidin Rashed effective for 9 years from 1952 to 1961.

However, even with the working plans under effect, much of the mangroves in Selangor were converted into various types of land uses, making effective implementation of the six working plans difficult to achieve. After the sixth working plan, the Department of Forestry began to adopt the Annual Felling and Treatment Plan, one which is deemed more flexible and has successfully managed the mangroves in Selangor. According to the State Forestry Department of Selangor, another plan is currently being conceived – the Selangor Mangroves Management Plan 2006 – 2015 – where the options of management for timber and non-timber mangroves, including wildlife conservation and protection will be incorporated into this plan.

Nevertheless, the area of mangrove forests in Selangor has seen a major decline, the largest from 1957 to 2002. The role of Selangor as a rapidly developed state resulted in the increasing demand for land to be developed and cultivated for various economic sectors. Selangor as one of the main gateway to the capital city of the nation meant that various infrastructures had to be developed. As a result, much of the mangrove wetlands had to be converted to other land uses, including the development of sea port infrastructures – since mangroves wetlands are in close proximity to the sea. Other mangrove areas have been opened for agriculture use; these include palm oil plantations, coconut plantations, and more recently, aquaculture sector. Residential and industrial land uses have also encroached into wetland areas. Over a period of 45 years, a total area of 14,000 hectares had been converted.

According to Nik Mohd Shah (n.d), due to the pressing issues of wetland conversion into other land uses, the Forestry Department of Selangor has attempted to apply to the Selangor State Government to grant a total 4,606 hectares of mangrove forests as part of the permanent forest reserve. The area is found in the Pulau Ketam area, an island with an abundance of mangrove forests away from the mainland shores of the state.

However, as the study discovers, some of these wetland areas are not being managed fully by the state government or the forestry department. One of the areas discovered by this study is the Kuala Selangor Nature Park. This area is under the management of the Malaysian Nature Society, a non-governmental

organisation that attempts to conserve a tract of wetlands area in the district of Kuala Selangor.

The Management of Kuala Selangor Nature Park

The area that is Kuala Selangor Nature Park and its surroundings was once a lush area of mangrove forests. In the 1940s, the Malaysian Nature Society (MNS) was established with the aim to promote the study, appreciation, conservation and protection of Malaysia's natural heritage. In the area that was to be Kuala Selangor Nature Park, the Malaysian Nature Society, in conjunction with Universiti Malaya conducted one of its first activities which is bird tagging – a process of identifying bird species and recording their presences in the areas where the birds can be found.

By the 1960s, the wetlands area has been regarded as nothing more than wasteland. Because of its status as a mangrove forest, early perception was that the land could be developed to become more profitable. According to the Malaysian Nature Society, the original proposal was to convert this wetland area into a golf course. Seeing this as a threat to the existing ecosystem, the Malaysian Nature Society attempted to acquire the mangrove area and consider the protection and conservation of the ecosystem within.

In 1987, after negotiation between the state government and the MNS has been conducted, it was decided that the wetlands area granted to the MNS. The area was named Kuala Selangor Nature Park, also known as Taman Alam. To keep true to its original mission, the park was open for three purposes; education, conservation and research.

The Kuala Selangor Nature Park has been well established since its first opening to the public in 1987. With the rapid development going on in its surroundings, the park is still attempting to maintain the mangrove forest in its area. Its surroundings have since been cut and converted from an area of lush mangrove forests to human settlements, commercial land uses and, in recent years, aquaculture farms.

Steps are being taken by the state government, the local authority as well as the NGO involved in managing the area, to preserve the environmental conditions of the park. The Kuala Selangor Nature Park is used for educating the public on the importance of environmental protection, and instilling awareness of the public over environmental issues. Adding to this is the potential of the Kuala Selangor Nature Park as well as Kampung Kuantan to be a destination for eco-tourism.



Photo 1: Mudskippers in the river system.

Within the Kuala Selangor Nature Park is a river system that flows from the man-made brackish lake system. Certain species of fish such as the mudskipper are found in this area.



Photo 2: Monkeys along the jungle trail

Primates such as the long-tailed macaques and silvered leaf monkeys can be found within the entire boundary of the park. The wildlife depended much on the forest for its nourishment and food – they are not fed by MNS officers.



Photo 3: Signs of private company effort

Along the wetlands areas are these signs that indicate the contribution of the private sector to the Kuala Selangor Nature Park. Certain private companies such as the ExxonMobil donated a large number of mangrove saplings to restore the wetlands area in the park.



Photo 4: Young trees growing

Naturally occurred mangrove growth is not uncommon in the park. The mangroves dropped their seeds into the soft soil below, which will then grow into large adult trees.



Photo 5: Birds found in the trail

There are also a number of bird species found in the habitat of Kuala Selangor Nature Park. One of the most common is the white milky stork that can be found in the brackish lake system area.



Photo 6: Sluice gate

The brackish man-made lake is made to cope with the rising levels of the ocean during full moon. In the evening, the water levels rise, flooding the area of wetlands. The sluice gate is opened to ensure proper flow.

4.4 Visitors' Perception of Wetland Management

This section reports local visitors' perception of managing Kuala Selangor Nature Park on the questionnaire survey. A set of questionnaire form was created for the visitors. The questionnaire designed using structured questions that focuses on their perception of management of the wetlands in the study area. The questionnaire was distributed randomly among the visitors, and the number of respondents for the questionnaire survey was 100 people.

Respondents' Background

Because of the wide range of visitors' age, it was classed based on the age grouping of ten years per group. The lowest variable is below ages 21 years old, the highest variable being 60 years old and above. According to Figure 1, most of the respondents are of the age group "31 to 40 years old" – the working age group - being 40% of the respondents interviewed. Additionally, the age group "21 to 30 years old" is a close second, with 37%. Possibly, these may be students or people seeking knowledge and information on wetlands by visiting such areas.

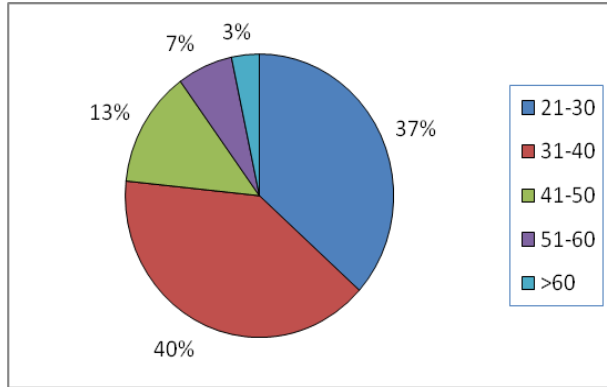


Figure 1: Age Group

Figure 2 shows the number of respondents based on gender, with the highest being male with 60%. This may indicate that males are more likely to visit the wetlands than females.

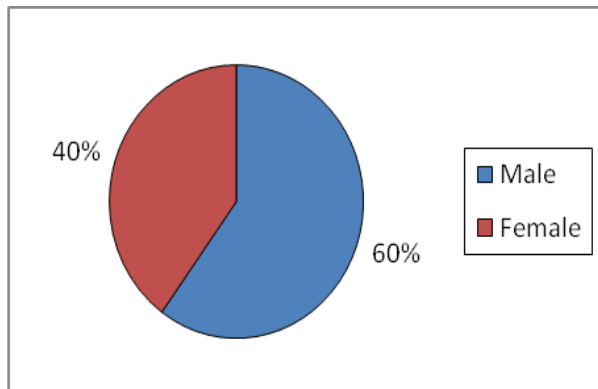


Figure 2: Gender

Education level denotes the educational background of a respondent. As shown in Figure 3, most visitors of the study area have high educational background. 53% of the visitors are of tertiary education level, while 40% have at least a secondary level of education. This indicates that people with higher educational background are more aware of issues pertaining to the society, or have a better understanding of issues than most. It may also indicate that they may have high appreciation for the natural environment.

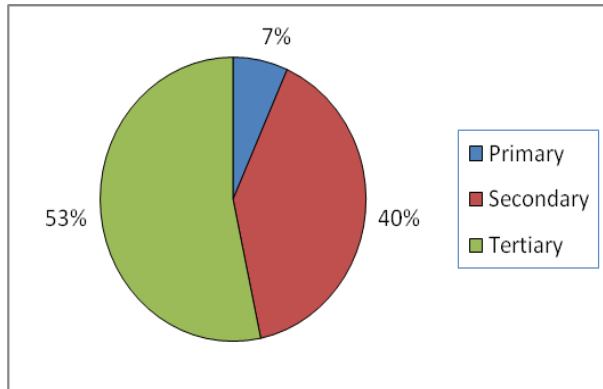


Figure 3: Highest Education Level

Employment indicates the sectors where respondents are working. The attribute is divided between those who work in the government sector, the private sector, those who are unemployed, and additionally those who are still studying – they may arguably fit the unemployed class, although students are known to carry odd-jobs to earn their income. As shown in Figure 4, 64% of respondents worked in the government sector. Because this survey was done in the weekends, it is likely that the majority who visited are there to enjoy the sights in their day off from work.

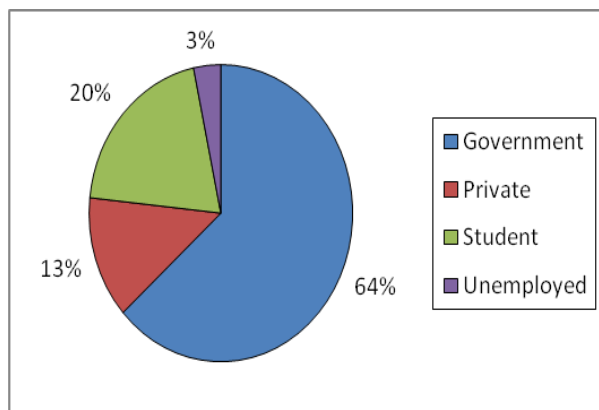


Figure 4: Employment

The purpose of visiting wetlands may be different from one individual to another. Undoubtedly, the natural environment is thought to be a place to escape hectic urban environment. Additionally, nature attracts those who are curious of the workings of the natural world. Moreover, the prospect of earning from these two parties is highly likely, thus some may come to parks and other natural areas to earn income from visitors. Thus, the study divided the purpose of visit into three areas – recreational, educational and commercial – while not ignoring that other purposes may exist. From the study, as shown in figure 5, people who visited the wetlands were mostly there for recreational reasons. When asked, most of the 60% of respondents believed that the area

is place to unwind and relax, because of its peaceful natural surroundings. It is a fact that there are chalets available for the visitors to spend the night there.

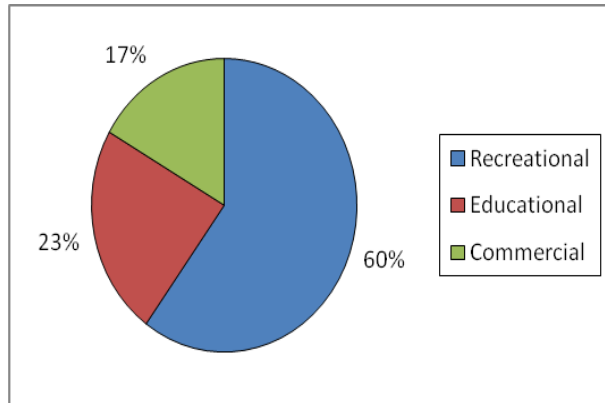


Figure 5: Purpose of visit

Respondent's General Opinion on Wetland Management

The next section of the questionnaire survey deals with the respondent's perception on public awareness towards the importance of wetlands.

When asked on the public awareness of the importance of wetlands, 60% of the respondents agreed that many are unaware of the importance of wetlands (Figure 6). Some of the respondents noted that they themselves have little knowledge on wetlands. Due to the media attention some time ago which was given on the relations between wetlands and floods, now they have a bit of understanding on the way wetlands work.

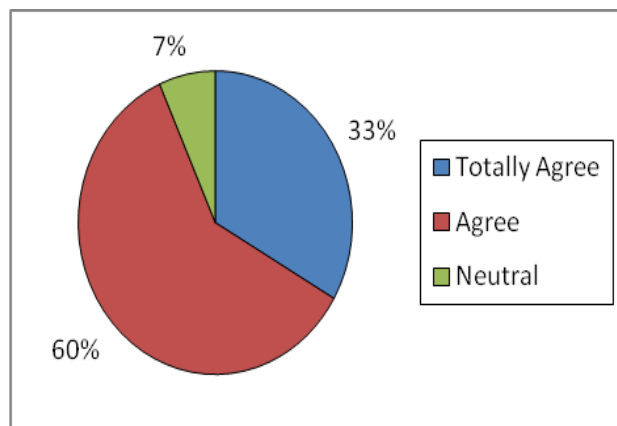


Figure 6: Opinion on whether the public lacks awareness on wetlands importance

The study then asked if the public should be taught, or at least be exposed to the importance of wetlands. The results in Figure 7 presents the general opinion that they agreed on the statement, but noticeably those who were in

total agreement of the statement before had dropped by 10%. This may indicate that some of the respondents felt that education is not the only means to increase public awareness of the importance of wetlands.

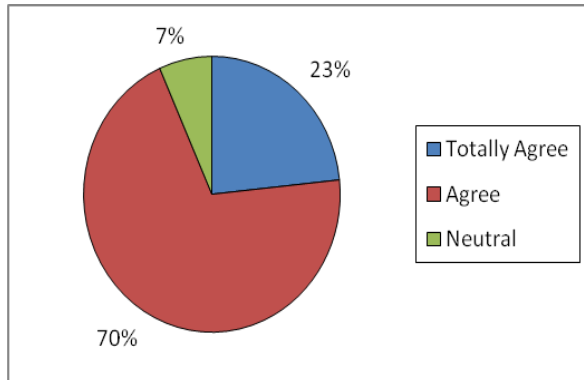


Figure 7: Opinion on whether the public should be taught wetlands importance

Law exists to protect the public interest, and it is for the same reason that legislation may be used to safeguard the environment, and particularly the wetlands. The respondents were asked on their opinions towards laws and legislations. The first statement was about the importance of wetlands to be protected by legislation. Based on Figure 8, the respondents were inclined to agree with the statement, with those who totally agreed being 27% of the respondents. Some commented that despite the enactment or legislation, they believed this will be useless if enforcement is not carried out by those with the authority to do so.

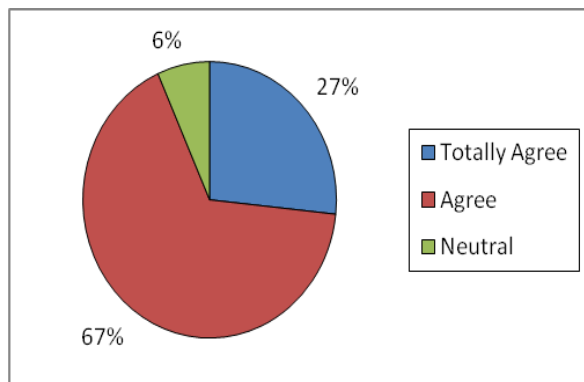


Figure 8: Opinion on whether wetlands should be protected with legislations

Next, the study believes that an authority that is legally bound should be able to protect the interests of wetlands. When asked for their opinion to this statement, respondents were in agreement; 20% were in total agreement (Figure 9). Again, several respondents question if such legal body would do

so, as they believed that there are loopholes in existing legislations related to the environment, and that there is no serious effort to use environmental legislation as there are still cases where the environment is spoiled, even with the adequate legal protection.

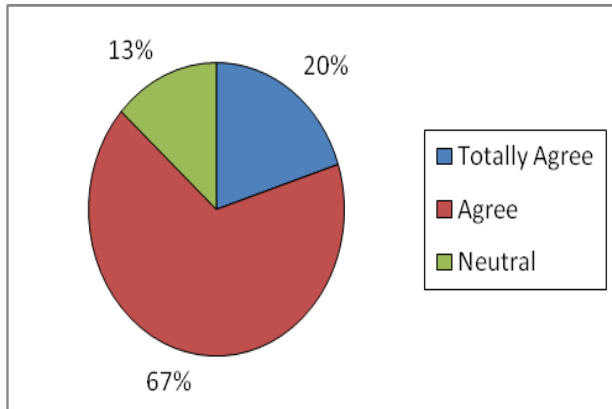


Figure 9: Opinion on whether a legal body should be founded for protection of wetlands

Finally, the second section asked the respondents on their own opinion towards the wetlands. The study attempted to highlight the importance of wetlands, and would like to understand whether the public holds the same opinion – that wetlands are important assets to the environment and also to the public.

The first statement asked whether wetlands are important assets to the natural environment. This statement is related to sub-title 2 (Theoretical considerations: definitions and functions), where it talks about how wetlands are important sources of nutrition and shelter for a large number of flora and fauna, and how wetlands act as agents of flood control, soil nutrients as well as protection against natural disasters. As shown in Figure 10, while 67% of the respondents agreed to this statement, 17% were neutral to the statement. This means that respondents were aware of the wetlands importance in the entire natural cycle, conforming to the literature on the increased awareness of the importance of wetlands for mankind.

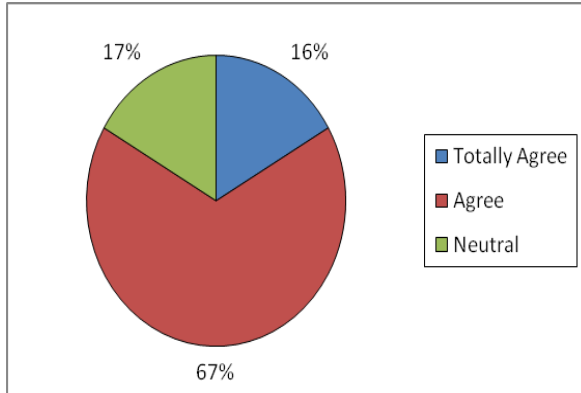


Figure 10: Opinion on whether wetlands are an important asset of the natural environment

Next, the respondents were asked whether wetlands hold important benefits that can be utilised by the public. According to Figure 11, respondents were in full agreement of the statement, with 27% in total agreement. This indicates that respondents have knowledge of how wetlands could benefit them. However, when randomly asked on the benefits to the public, the respondents have mixed opinions – some thought of the wetlands as places for recreation, while others believed that the plant species found in wetlands have medicinal properties which are good for human health.

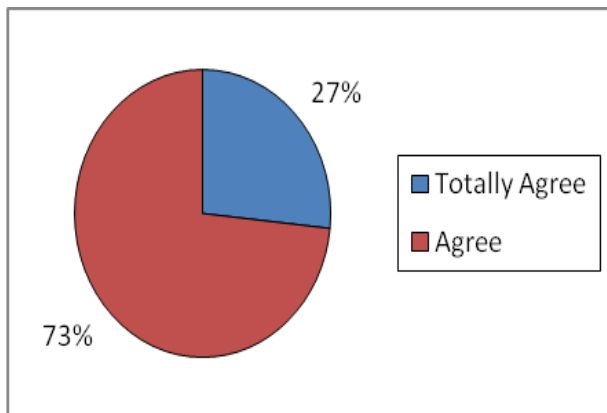


Figure 11: Opinion on whether wetlands are beneficial to the public

Last but not least, for the statement on whether wetlands should be accessible to the public, the respondents were agreed to the statement (Figure 12). This shows that the public is interested in knowing more about wetlands, and would make an effort to visit the areas if more are made known to the public.

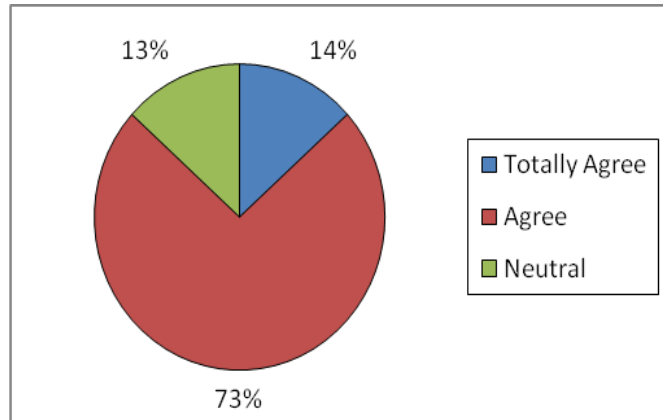


Figure 12: Opinion on whether wetlands should be accessible to the public

CONCLUSION

The results and discussion above have revealed some useful findings. Firstly, on the management issue in which currently Kuala Selangor Nature Park is managed by a non-governmental organisation, i.e. MNS. Even with the lacking of the role played by the relevant legislations in the management of wetlands, the MNS have managed to at least protect by their own effort to ensure that the park is well-protected within their limitation of budget and power. As a result, government agencies should support the wetland management as they have the power to execute legislation, particularly pertaining to wetland management.

In term of public awareness on the importance of wetlands, the study demonstrated that the level is relatively low and respondents suggested that public should be taught about having the appreciation towards wetlands. This indicates that efforts from various players such as government and NGOs are essential to ensure that our valuable wetlands are protected for future generations. Consequently, general public felt that enforced legislation by a legal body is crucial to support managing wetlands practice.

In the perspective of wetland management, this paper illustrates that while general public have low consideration of wetland management, they admitted that vigorous efforts from various parties are necessary to improve the *status quo* of Kuala Selangor Nature Park.

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