

Indawgyi Lake

The One and Only Tectonic Lake in Myanmar

Experimental report of reconnaissance survey on 4-13 January 2015



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Nevertheless, the team could not present a complete picture of the area. Subsequently, the report has many shortcomings, pitfalls and errors, for which the team is solely responsible. The team, therefore, would welcome any suggestions, advice and corrections from readers for its improvement in the future.

Thank you

The Reconnaissance Team

25 March 2015

Acronyms

ANA	All Nippon Airways
ASEAN	Association of South East Asian Nations
ACB	ASEAN Center for Biodiversity
AWS	Asian Wetland Symposium
BANCA	Biodiversity & Nature Conservation Association
CEO	Chief Executive Officer
CEPA	Communication, Education, Participation & Awareness
FFI	Fauna & Flora International
FOW	Friends of Wildlife
GEF	Global Environment Facility
IBA	Important Bird and Biodiversity Area
IUCN	International Union of Nature Conservation
KIA	Kachin Independence Army
MFA	Myanmar Forests Association
MOECAF	Ministry of Environmental Conservation & Forests
NGO	Non-Governmental Organization
NWCD	Nature & Wildlife Conservation Division
PPT	PowerPoint Presentation
PRCF	People Resources & Conservation Foundation
RCJ	Ramsar Center Japan
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organizations
USD	United States Dollar
YCDC	Yangon City Development Committee

Executive Summary

Indawgyi Lake is the only and one tectonic lake in Myanmar. General consensus is that it is also the largest lake in the country. It occupies the area of 98 sq. mile and fed by some 30 streams of different sizes. Its outflow is called Indaw Chaung, which is the headwater of Ayeyarwady River, the largest river in Myanmar.

In addition to abundant freshwater fish species, the lake has 2 oceanic fauna; sea-horse and trumpet fish families. It is the breeding ground for the Black-necked Crane, which is endemic to the Tibetan plateau. The lake harbours endemic species of plankton, fishes (four species), rice (two species) and has the highest density of the Eastern Hoolock Gibbon.

The lake is surrounded by 37 villages under 11 village tracts. According to the field survey of 2011, the surrounding has the total households of 7,131 that has 45,345 population. The lake area is known to house the major tribes; Shan, Kachin, Bamar and Katu. It is also the home to sub-tribes of the Shan; *Tai-lain*, *Tai-lae* and *Tai-kanti*. Culturally, Shwe Myint Zu Pagoda is the most sacred lake and draws annually about 100,000 domestic tourists.

Indawgyi Lake is an ASEAN Heritage site and has recently been included in the tentative list of the World Heritage Site. In addition to Indawgyi Wildlife Sanctuary, four partner organizations are actively engaged in the management of lake resources. These partner organizations are FFI, FOW, Inn Chit Thu Group and several community forestry groups.

The common problems of the area include pollution, presence of *Tilapia*, an alien species, siltation caused by the conversion of Swidden land into plantation, trespassing into the core zone, jurisdictional issues over fishing and armed conflict in the area.

On the basis of our interaction with the staff members, field visit and secondary information the team has come up with the following suggestions to support the ongoing conservation status of the lake through the organization of a symposium, preparation of educational materials, establishing an emergency fund, supporting participatory action research, expanding community-based tourism and enhancing capacity of partners including stakeholders.

Part 1

Introduction

1.1 Guess the largest lake in Myanmar

Indawgyii Lake is the largest inland lake of all in Myanmar. It is located in the north-west part of Kachin State in Myanmar. Its length is 14 miles north-south and width of 7 miles east-west, which make the area of 98 sq. mile. The lake lies within the geographical coordinates of $25^{\circ} 6'' - 25^{\circ} 10''$ North and $96^{\circ} 6'' - 96^{\circ} 15''$ East. The lake lies inside the Indawgyi Wildlife Sanctuary.

The phrase “Indawgyii” is made up of three Burmese words; *In*, *Daw* and *Gyi*, in which *In* means lake, *Daw* means Royal and *Gyi* means Honorific or the Great. The literal meaning of the phrase is “*the Great Royal Lake*” (Tun, 2015 Personal Communication)

Basic information about the lake is given below in Box A as Indawgyi Lake at a Glance.

Box A: Indawgyi Lake at a Glance

Location: Mohnyin Township, Myitkyina District, Kachin State, Myanmar

Watershed : Indawgyi Watershed

Watershed Boundary: North = Kamai Township, South = Hopin Region, East= Moe Gaung Township, and West = Homemalia & Kamai Townships.

Access: Yangon-Myitkyina – Namte –Moe Gaung- Sirhmaw – Hopin- Nan Mun - Lonton

Coordinates: $25^{\circ} 6'' - 25^{\circ} 10''$ North latitude and $96^{\circ} 6'' - 96^{\circ} 15''$ East longitude

Climate: Sub-tropical region

Altitude: 175 masl

Area: 98 sq. mile (N to S = 14 miles, E to W = 7 miles)

Major Inflows: 30 streams but three major streams

(1) Nanyinkha Chaung; (2) Namsand Chaung; (3) Nammu Chaung

Outflow: Indaw Chaung (Headwater of Ayeyarwady River)

Nearest Town: Hopin

Total Village Tracts: 11 (Administrative Unit)

Total Villages: 37

Major villages: Western side: Lon Ton (229 HH); Nyaung Bin (500 HH);

Eastern side: Nan Mun (200 HH); Hepu (350 HH); Lon Sant (250 HH)

Major Tribes: Shan, Bamar, Katu, Kachin

Total Households: 7,131 (FD, 2011)

Total Population: 45,345 (FD, 2011)

Population density: 416/sq mile

Best time to visit: May–July.

There is a unanimous consensus that the Indawgyi Lake is the largest lake in Myanmar. Other attributes of the lake can be summarized as follows.

1. One and only tectonic lake in Myanmar (Myitkyina University, 2003:7; Myanmarpedia), pre- pleistocene lake, which means detached from Gondwanaland in the late Jurassic (**cf. Dumont & Green 2005 as quoted in Audley-Charles 1987**). The lake is ancient like the Baikal Lake of Russia or Lake Biwa of Japan.
2. Paradise for Ichthyologists. In addition to rich fish species, the lake also has oceanic fauna like sea-horse family (also Pipe Horse) and trumpet fish family (**Myitkyina University, 2003**).
3. Home to three ethnic sub-tribes of the Shan people; *Tai-lain*, *Tai-lae* and *Tai-kanti* and the *Kachin* and the lesser known primitive sub-tribe, *Phon-shan*. (**Myitkyina University, 2003**).
4. Sacred Shwe Myint Zu Pagoda.
5. Headwater of the Ayeyarwady River.
6. Tentative List of the World Heritage Site. It is a pre-qualification to be included in the List.
7. Breeding ground for the Black-necked Crane, which is endemic to the Tibetan plateau (Myitkyina University, 2003).
8. Harbors many endemic species; pelagic *Eodiaptomus* species of plankton (**Dumont & Green, 2005:41**), *Euryole ferox* (**Myitkyina University, 2003**), 4 species of fishes (3 species reported in 1929 & 1 in 2004 by **Davies et. al**), two species of rice (*Oryza officinales* and *Oryza granulator*) (**Myitkyina University, 2003**), and highest density of the Eastern Hoolock Gibbon found here (**FFI Information Sheet, nd**).

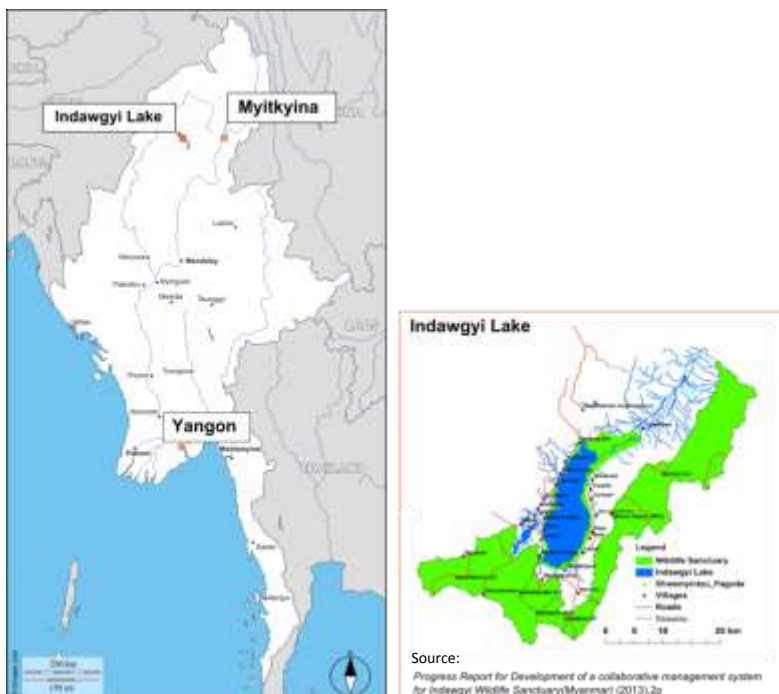


Fig.1 Map of Myanmar and Indawgyi Lake

Part 2

Rationale, Objective & Methods

As has been mentioned above, Indawgyi Lake is the largest and unique lake in terms of bio-diversity and bio-cultural resources. Like Lake Baikal of Russia and Biwako of Japan, it is the ancient lake in Myanmar. The lake is in a pristine condition. Basic data and information are lacking due to its remote location, inaccessibility and a difficult-to-reach situation. In order to get the first-hand information, a rapid reconnaissance trip was organized by Ramsar Center Japan in collaboration with FFI Myanmar. A multi-disciplinary team of 3 experts conducted the study, which is as follows.

1. Dr. Bishnu B. Bhandari (Sociology-*cum*-Wetlands) – Team Leader (Nepal)
2. U Hidestugu Nakamura (Wildlife) – Member (Japan)
3. Daw Shiina Suzuki (Environmental Law) – Member (Japan)

U Myint Shwe, Project Coordinator of FFI Field Office at Nan Mun, served as guide and translator to the team and was with the team from the beginning to the end.

The trip took place from 4-12 January 2015. The itinerary is given in **Annex I**.

The principal aim of the study is to make a first-hand rapid assessment of the Indawgyi Lake, its resources and conservation status. Under this assessment, the team set forth the following objectives.

1. Determine the overall conservation status of the lake
2. Find out the provision of legal and institutional arrangement for its management
3. Characterize the socioeconomic status of the lake.

The method adopted by the team is Participatory Rapid Appraisal. The data collection techniques included (1) review of secondary sources, (2) direct observation, (3) focus group discussion, (4) meeting with professionals, and (5) briefing.

In connection with data collection, several individuals were contacted and major institutions were visited, the list of which is presented in **Annex II**. The names of important institutions and key persons are also provided in **Annex III**.

Part 3

Field Diary

This part deals with the record of our daily activities, the team had taken during their reconnaissance trip that was organized from 4-12 January 2015. The schedule is attached as an **Annex 1**. The primary purpose of this part is to give its readers some basic information about place, distance and time taken to reach the destination so that they can better plan and budget their time, resources and activities when they visit the place. This also attempts to show how the team used their time for their rapid exploration.

Total distance from Myitkyina to Lon Ton (Indawgyi) is 180 kilometers (112 miles) and it takes about 5 hours and a half to reach there (3.5 hours from Myitkyina to Hopin and 2 hours from Hopin to Lon Ton). Major places from Myitkyina to Indawgyi are given below.

Myitkyina – Shwe Traung - Namte Town – Mo Gaung Town – Sarhmaw – Kanyin Kyang – Mingon – Bin Baw - Hopin Town - Ywathit – Lwinn Oo – Base Camp – Nan Mun Viewpoint – Nan Mun Village – Lon Ton

While travelling from Myitkyina to Indawgyi, the road crosses the Mandalay- Myitkyina Railway Line for 7 times, the first being at the village of Myan and the last one at Hopin Town.

Day One: Sunday, 4th January

On 4 January Bishnu Bhandari arrived in Yangon earlier in the morning and upon his arrival, he telephoned U Zau Lunn, Coordinator of FFI Program to confirm the time of meeting with the team and flight schedule to Myitkyina for the next day. The flight to Myitkyina was in the afternoon and the time was scheduled to meet him at 8 am next day. Then he called U Htun Paw Oo for the appointment with him as well as with the officials of the Yangon City Development Committee (YCDC) responsible for the management of two urban lakes, Inya and Kandawgyi in Yangon. U Htun Paw Oo confirmed the appointment with him at 10 am and 3 pm with the officials of the YCDC for the 9th January. Likewise Bishnu contacted the office of BANCA but in vain due to National Holiday. The team members from Japan finally reached Yangon and were together in Yoma Hotel at about 7 pm. Then, they had a short briefing, after which they went out for dinner and returned to the hotel for retirement.

Day Two: Monday, 5th January 2015

1. Early in the morning, Dr. Saw Mon Theint, Chairperson of BANCA, who participated in the last AWS in Cambodia was contacted for an appointment. But the appointment could not be arranged as her office was closed for the whole week. The team was told that she would be out of the office in the second week and the senior staff members were also busy to meet with us. Thus, we were not successful to visit the BANCA office during our trip.

2. At about 7:30 am the Hotel staff arranged a taxi to take us to the office of FFI at Myay Ni Gone Market Street, San Chaung Township. The taxi took almost half an hour to reach there, where we were welcomed by the staff. We were there half an hour earlier than the fixed time. After the arrival of U Zau Lunn we were introduced to U Ngwe Lwinn, another coordinator for north Myanmar followed by U Myint Shwe, Project Coordinator of the FFI Field Office at Indawgyi. U Myint Shwe was our guide for the trip. After a short conversation, we made payment of USD 2151 to the office for our package tour of the Indawgyi area.

3. U Ngwe Lwinn gave us an interactive tour of the Indawgyi lake. Following his presentation, U Myint Shwe gave us an overview of our packaged trip to Indawgyi and informed us that due to late arrival at Myitkyina at 5 pm, the team had to stay at Myitkyina for the night and would be able to travel to Indawghyi only next day. Likewise he also informed us that due to heavy construction works on the road it would be difficult to retrun to Myitkyina on time on the 8th January to catch the plane for Yangon at 2 pm. So the team would stay at Hopin, not in Lon Ton as planned earlier. While in Myitkyina the team would be able to visit the 67th State Festival that began on the 5th January.

5. After a brief orientation at the FFI Office, the team along with U Myint Shwe left the FFI office at 11am for the Yangon Domestic Airport. After the check-in, the team went upstairs to have a quick lunch at Cosmos Bar and Restaurant. We placed our order but the service was so slow that we were about to miss our flight as there was only 35 minutes left for departure. Somehow food was served and we took no time to eat. At the waiting hall, it was announced that plane was delayed by half an hour. While we were sitting on the chairs, U Myint Shwe was kind enough to contact for us our friend U Tin Tun, the former Director-General of the Department of Planning and Statistics of the Ministry of Environmental Conservation and Forests (MOECAAF). We had a short conversation with U Tin Tun and agreed to meet at 1 pm on the 11th January at Yoma Hotel.

6. The plane took off at about 2:30 pm and took us at an altitude of 1700 feet. In about one and a half hour flight, the plane stopped by at Mandalay, the second largest city in Myanmar. While the plane was preparing to land, many Pagodas, both big and small, were seen from the window of the plane. The plane stopped there only for about 15 minutes and we all were asked to be seated inside the plane. The plane took off at 4:15 pm and in about an hour, it landed at the Myitkyina Airtport. Mytkyina is the capital of Kachin State and lies on the western bank of Ayeyarwady River. Ayeyarwady's former name is Irrawaddy and it is the largest and most important commercial waterway in Myanmar. After Ayeyarwady, the river, dolphin and delta were named as Ayeyarwady River, Irrawaddy dolphin and Ayeyarwady delta in Myanmar.

7. At the Myitkyina Airport, foreigners must report to the Immigration Office. We were asked to submit the photocopies of our passports. While walking from the plane to the arrival hall, I noticed one gentleman looking at me rather curiously. As I handed down the passport copy to the Immigration Office, he came forward and asked me if I were a Nepali. As soon as he heard yes

from me, he was excited to speak with me in Nepali. He was speaking loudly whereas my voice was low. After exchanging a few words, I asked him what part of Nepal he was from. He did not know the place from where he was from as his parent died while he was too young. His name is Dhrub Timilsina but his Burmese name is U Kyaw Kyaw. All Nepali have two names, a Nepali as well as a Burmese. I was surprised to know his two names. To my query he said that without a Burmese name, they are not allowed to enroll in the school. So they are compelled to have Burmese name. He is an Immigration Officer there and has been working there for the past 20 years. He gave us his contact telephone and Hide-san took our photo. I wanted to send him the picture but no email address. He also gave his daughter's (Daw Thi Da Kyaw) telephone address. He said he has one son and one daughter, both university graduates. We planned to meet at the hotel in the evening but we went to see the Kachin Festival at Manau Park. We did not know if he showed up in the hotel. The next morning we checked out the hotel early in the morning hoping that I would be able to contact him on our return to Yangon. But we did not see him there on duty. And then I tried to contact him from Yangon, but the telephone could not connect.

8. A four-wheeler Grand Tiger along with driver, **U Myint Oo** and his assistant was waiting for us outside the airport to transfer us to Two Dragons Hotel. We collected our luggage and loaded them in the pickup van. Then, our four-wheeler headed for the hotel. We checked in the hotel, where I shared the room with Hide-san and another single room for Shiina-san.

9. Our stay in Myitkyina was full of sightseeing. First of all we all went to a newly constructed Shree Ram Janaki Temple about 300 meters from our Hotel. The temple was a three-storied golden building with South Indian architecture. The temple has four images in the first floor; the first of Ram, Laxman and Sita, the second of Lord Krishna and Radha, the third of Lord Shiva and Parvati and the fourth of Lord Buddha in the line from left to right. Plus there were many images of other deities. Near the entrance, we met Madhav Pundit, head priest of the temple. According to him, the temple was built 3 years ago with contribution from all Hindus of Myanmar. According to the Pundit, the temple is the largest and biggest one in Myanmar. To our query, he said that in Myanmar the image of Lord Buddha is a must in the temple. Otherwise it is difficult to construct a temple in Myanmar. The Priest also has one assistant named U Zaw Lwinn Oo, an Indian Burmese.

10. From the temple we went directly to the Kachin Day Festival, called Manau Festival, at Manau Park. Kachin State is celebrating the 67th anniversary of Kachin State Day. The Kachin State Day falls on the 10th January. In fact this is the first day of the preparation for the State Day. We went around the park to see stalls, events and activities. Then the team went to eat Kachin Food in one of the stalls; two glutinous (sticky) rice balls, tomato relish and pork curry, all wrapped in *Taung Sin* leaf (Burmese name but its local name is *Tsa Pyi*) separately and a bottle of water. We all ate rice with chopsticks. We were provided with specially green bean curry as complimentary.

11. After Kachin dinner, we returned to the hotel whereas U Myint Oo went to his own office for the night.

Day Three: Tuesday, 6th January

1. The team woke up early in the morning to eat breakfast at the hotel's topmost floor, from where Ayeyarwady River could be seen in the east. We ate buffet breakfast, which included noodles, fried rice, juice, strawberry, poach, coffee and tea. As soon as breakfast was over, we were down at the lobby to check out at 7:30 am. After loading our luggage, we headed for Lon Ton at 8 am. On the way in the city, we noticed a temple of Lord Viswanath. We passed through the Myitkyina Airport and the army head quarter of Northern Commander. Our first stop was in the Immigration Check Point at Shwe Taung, where the photocopies of our passports were submitted and our name was entered into the register. U Myint Shwe told us that it is desirable for foreigners to carry the photocopies of the passports inside Myanmar. Otherwise, the Immigration Officials would put on stamp, signature and date on the passport at each stop.

2. Our second stop was on the hilltop of Nanmti town from where we could see the flat and wide valley of the Nam Yin River. The valley stretches up to the Maw Han in the North and is famous for sugarcane and sugar mills. Our 15 minute brief stop was for a short toilet and photos. Just below at the foothill lies the Mandalay-Myitkyina Railway line. The hilltop has a small tea shop (in the Burmese language, the tea shops are called *Let Phet Yi Sai* and the coffee shop, *Let Phet Coffee Sai*). About a kilometer west from here on the highway lines the town of Nanmti. As our vehicle moved ahead, for the first time we saw famers ploughing the land with a pair of bullocks in one plot and with another pair of buffalos in another plot. Also the buffalo-drawn cart and bullock-drawn cart were seen on the road carrying big loads of rice straw and other goods.

It is at Nanmti town, where the highway bifurcates into two ways. One that goes straight North-West is the Ledo Road. India is about 200 miles away from here. The Road leads to a famous Tiger Reserve in India. The Road was built by the American Army during World War II to supply military goods to China to stop the Japanese invasion. The Road goes to Myitkyina and then to Shan State from where it enters into the People Republic of China. The other leading to South goes to Hopin and then to the Indawgyi valley.

3. The non-stop drive from Namti took us to the Mo Gaung (also called Mong Kawang) River at 9:30 am and then Mo Gaung Town, named after this very river. As suggested by our driver, U Myint Oo, we again ate Burmese noodle called *Mohinga*, which is a popular breakfast in Myanmar. We stayed here for about 30 minutes. It is at the village of Kanyin Kyaung, where the road again bifurcates. The one leading to north goes to Jade mine and the one to the west goes to the Indawgyi. From here to Indawgyi, the road is under heavy construction and is scheduled to be completed by March 2015 for a big annual festival at Shwe Myint Zu Pagoda.

4. At 10 am we were again on the road from the town of Mo Gaung. At 10:45 am we passed by the town of Sarhmaw. It is about 55 mile away from Myitkyina. This is the place from where the road again crosses the Myitkyina-Mandalay railway line.

5. After driving on the road about 30 minutes we passed through the towns of Kanyin Kyang and Mingon at 11:15. Within another 30 minutes we reached the town of Binbow. Two big wooden houses were noticed on the right side of the road. Our guide told us that these buildings belong to the Government and are used for storing rice and grains for off-season supply.

6. Exactly at 12 noon we reached the town of Hopin, where we stopped for about 45 minutes to book the hotel for us when we return back to Myitkyina the next day. Our driver, U Myint Oo told us that we have already travelled about 80 miles from Myitkyina and about 32 miles to Indawgyi. This is the place where there is a railway station and our road crossed the railway line the 7th times. At this town too, the highway bifurcates into two, one that goes southwards is the highway of Mandalay-Myitkyina road. It takes about 8 hours to reach Mandalay and the Mandalay can be reached by taking the Mandalay-Myitkyina Railway as well. The highway that goes to the West leads us to Indawgyi. Now it is already 12:45 and we continued our travel to Indawgyi Lake.

7. We left Hopin at 12:45. Then we drove through the villages of Ywathigyi and Lwinn Oo to reach the base camp. From this small village our driving continues uphill in the Nan Mun Mountain which has dense forests on either side. The forest, after the name of the mountain is known as Nan Mun forest. We reached there at 1:20 pm. On the top of the pass, there is a small settlement, called Nan Mun View Point, or Eleven Mile Station (it is 11 miles away from Hopin), where there is a Pagpda also called Nan Mun Pagoda. Its elevation, according to our driver, is 1500 feet high. This is the rest place and we can see the half of the Indawgyi valley including the lake. On the top there are shops commonly carrying the advertisements of Myanmar Beer, Myanmar Rum, Grand Royal Whisky, High Class Whisky, Tea, Coffee, Soap and so forth, which has dominated the scene of the settlement like elsewhere on the road.

8. As we drove 4 miles downhill to the Indawgyi valley, we reached a village of Nan Mun, where the FFI has its field office with 5 staff members including a coordinator. Other staff members include a Community Forestry Officer, Extension Officer, Finance Officer and Village Facilitator. After a short rest we headed west for Lon Ton, which is about 10 miles away. We were told by the FFI staff that the area does not have any elephant. About 3 years ago, a wild elephant appeared in the area. Since then no elephant has sighted in the area. Our conclusion is that the tiger and elephant are only in the report, not any more in the area.

9. Our journey continued passing through the settlements of Maing Naung and Memon Kaing to Lon Ton village where we would be spending the night. It took us almost an hour to reach there. On the way we crossed two major streams that flows into the lake of Indawgyi. They are the Nanyinkha Chaung, which flows into the south-western area of the lake and the Namu Chaung

from the southeast to the lake. Then we reached Indaw MaHar Guest House for accommodation. This is the only guest house in the area. The other is the military owned Indaw Two Guest House, where tourist can stay overnight if the Indaw Mahar Guest House is fully occupied.

10. In the guest house, young fishermen were waiting for us. As soon as we reached there we had the first meeting with them and then we went to the presentation made by the rangers of the Indawgyi Wildlife Sanctuary. Then in the evening we went to the office of the Friends of Wildlife (FOW) for a short meeting. After the meeting we ate our dinner at Hepu Restaurant and retired for the day. The summaries of these meetings are in **Part 4**.

Day Four: Wednesday, 7th January

1. We woke up early in the morning to take our breakfast at Hepu Restaurant. The menu consisted of sticky brown rice, plain rice, curry and tea. After the breakfast we headed toward the lake where two employees (U Soe Myint, Ranger and U Kyi Oo, Range Officer of the Indawgyi Wildlife Sanctuary) along with a motor boat were waiting for us to go to Hepu village. We rowed for about 30 minutes to reach Hepu. We rowed the boat for about 8 miles straight east from Lon Ton for Hepu. We were taken to the Guard Post at Hepu to meet a group of about 10 farmers and the Sanctuary staff members. We discussed with them about the situation of farming and crops. The meeting lasted for about an hour. After the meeting, we went to the boat for the village of Lon Sant up in the north.

2. We rowed for about 45 minutes and stopped at the bank of Lon Sant. Then we went on foot to the village to observe the conditions and learn about the activities of the community forestry group. The rangers accompanied us along with some villagers. And then we had a meeting with the office bearers of forestry group at a tea shop. The meeting lasted for about one hour.

3. Then we walked back to the bank of the lake and continued our boating to the northern base of the Shwe Taung (hill) for about 40 minutes and then hiked to the Shwe Taung for about 30 minutes to see the Pagoda under construction and then we observed the lake from the top. From here we could see a village called Chaungwa. This is the northernmost boundary of the Sanctuary and the head water of the Ayeyarwady River. As we climbed the hill, we could see several pagodas on the trail. Near the top at the shoulder there is a monastery, where there are one head monk and his other monk staff. A golden pagoda is on the top, which is under construction. We stayed there for about 30 minute and trekked back to the boat to go to Nyaung Bin for lunch.

4. We had lunch at Hin Pale Restaurant in Nyaung Bin at 3pm. Then we rowed back to Lon Ton. On the way we passed by Shwe Myint Zu Pagoda, which is in the middle of the lake. A natural causeway connects the Pagoda to the bank but at this time the water level is high and the Pagoda looks like in the middle of water. Only in March, the water level goes down and visitors can walk to the Pagoda through the causeway. Because of late arrival, we rowed around the Pagoda and headed back to the town of Lon Ton. While circumscribing the Pagoda, we fed the brown-

headed geese. At about 4:20 pm, we left the Pagoda for Lon Ton and reached there at about 5:20 pm.

5. At Lon Ton, the team has a short meeting with the Inn Chit Thu (Lovers of Lake) Tourism Group and acquired information about their activities. The information was given to us by Daw Eima Soe, Secretary of the Inn Chit Thu. After the meeting at about 5:45 we left for Hopin where we spent night there. We said "Good Bye" to all including the rangers and left for Hopin. On the way we stopped by briefly at the FFI Field Office at Nan Mun, where our guide U Myint Shwe stayed back in the Indawgyi and the team headed for Hopin.

6. It took us about 2 hours to reach Hopin from Lon Ton. The time was 7:45 pm. We had dinner there in one of the restaurants and then retire for the night at Hopin Star Hotel. Hide and Bishnu shared a twin bed room. The driver told us that the distance from Lon Ton to Hopin is about 32 miles. From Hopin to Myitkyina, the distance is 80 miles. In terms of time, it takes another 3.5 hours to Myitkyina. The place also did not have electricity. Electricity was generated only from 6 to 10 pm. Then we had to rely on candles. Emergency light was provided in the room.

Day Five: Thursday, 8th January

1. We were ready at 6:45 am to check out from the hotel. Then we went out in search of a restaurant for dumplings. According to the driver, the dumplings from this place are famous. Unfortunately the restaurant had stopped cooking chicken dumplings for a few weeks. So we bought and shared a pack of pork dumplings and then headed for Bing Bang Restaurant for the Burmese breakfast. After the breakfast, we headed for Myitkyina at about 7:30 am. We had to detour the village of Sarhmaw as the train was passing by and the traffic was stopped. The station is called Mingo Station. We drove non-stop until we reached at 9:45 am the town of Moe Gaung which lies at the bank of the Moe Gaung River. We stopped there for about 20 minutes for a short toilet. Then our vehicle stopped at the Immigration Check Point at Shwe Taung in Myitkyina.

2. We arrived at Myitkyina at about 10:45 and went straight to the Manau Festival. We saw Manau dance, where over 500 peoples were performing dance. We were told that in Manau dance over 2000 people can dance at a time. Then we went to the pavilion built for Maigan Manam (Foreign Guests). We were served local wine in a bamboo cup with banana and coconut cakes and oranges. Then at last we were served with rice wrapped with a broad leaf locally called *Taung Sin*. We also took some pictures. In the meantime, about 20 ladies dressed up with the Kachin tradition began dancing in the front of the hall. Then they sang for us a song and the meaning of the song was "Good Bye and Come Back Again" in the Kachin language.

3. At about 2 pm we took the flight of Asian Wings Airways bound for Yangon. The plane flew at the height of about 17,000 feet and took one hour to reach Mandalay. Stopping there for about 30 minutes, the plane again took off and reached Yangon at about 5 pm. From the Yangon

Domestic Airport, we took a taxi to Yoma Hotel at 146, Bogyoke Aung San Street, Pazundaung Township. We checked in the hotel and went to eat dinner. We had a debriefing of our trip and discussed a modality of writing the trip report. Then we called U Htun Paw Oo, U Ngwe Lwinn and U Tin Tun to confirm our next appointments for the next few days.

Day Six: Friday, 9th January

1. After our breakfast at the hotel, we left at 8:30 am for the Yangon University Library to look for some literature. While there, we also visited the Central Library at the University of Yangon. To our dismay, no literature was found on Indawgyi. Then we hurried to meet our friend U Htun Paw OO at the office of Myanmar Forest Association (MFA) at Gyagone Forest Compound, Bayintnaung Road, Insein. We were already late by an hour. He helped us make an appointment with the officials of YCDC and the librarian of Dagon University. According to his arrangement, the team would meet the YCDC officials today at 3 pm and the librarian of the Dagon University at 10 am on Monday 12th January.

2. At 1 pm we took a taxi to the office of FFI to meet U Ngwe Lwinn. We briefed him about the trip. Since he was preparing to leave for Indawgyi the next day, we had had a short meeting with him. Since we were also to visit the officials of the Yangon City Development Committee (YCDC), there was not much time for us to be in the FFI office. We also received from him the photocopy of the *Biodiversity and Ecological Perspective of Indawgyi Lake* by Myitkyina University. Offering our heartfelt thanks to Ngwe Lwinn and his team, we took the leave of him to go to the YCDC.

3. Our next meeting was with the officials of YCDC at Barkaya Road near Sule Pagoda. We met U Thein Min (Deputy Chief Engineer) and Daw Khin Aye Myint (Engineer) of Engineering Department (Water and Sanitation) for about 45 minutes. We were informed that Inya Lake and Kandawgyi Lake belongs to the YCDC and were the only sources of drinking water at the time they were constructed in 1884. But these days the waters from these lakes are used only in water festival in April. The Committee is involved only in purification of water in the lake as water algae is the chief source of pollution. The YCDC has several methods of purification such as the use of chemicals, water fountain using filters and dredgers. Nowadays, the drinking water for the city is supported by four reservoirs that are used to collect rain as well as spring water. The City has taken measures such as preventing runoff and disposal into the lake to control pollution in the lake. Every hotel has to have a small treatment facility. Any shopkeeper who violates the law is punished, first by educating them, second by penalty and third by stopping the facilities. For the future, the City is planning to develop a master plan, collect more rain water, replace the old pipes and so forth.

4. Our last meeting for the day was with U Saw Dow Wah, Programme Analyst, UNDP. He shared his experiences of working with stakeholders in Inle Lake. He said that the capacity of FD needs to be enhanced for wetland conservation. According to him, the Ministry of Tourism and

the Ministry of Environmental Conservation and Forestry in cooperation with ADB are about to finalize the Eco-Tourism Management and Strategy for Myanmar. To our query as to how local people should be involved, he said that the best way to involve local people is to give priority to their felt-needs and survival mechanism, for which we should have sound knowledge about the community and then only can we decide what needs to be done in the community, by whom and by what means.

5. After this meeting at UNDP, the team returned to the hotel and had quick dinner. Since Shiina Suzuki-san was to leave Yangon for Japan, she had already checked out hotel. She collected her luggage and put them in the taxi to the Yangon International Airport. Saying a cordial good bye to Shiina-san, the two members, Hide Nakamura and Bishnu Bhandari discussed the plan for the next day. The team did not have any appointment for the next day because of weekend. So they decided to visit the Zoological Garden of Yangon on Saturday.

Day Seven: Saturday, 10th January

As mentioned earlier, the team decided to go to the Yangon Zoological Garden. So they left the hotel for Zoological Garden at 11 am. They bought ticket for Kts 3,000 for each and entered the zoo. The Zoo is an oldest and second largest one in Myanmar. It occupies 70 acres in the Kandawgyi Lake and houses a Museum of Natural History, Aquarium and Amusement Park. Some 2.2 million people visit the zoo annually. Previously, it was operated by the Forest Department but now it is managed by a private firm. They also participated in the animal show program run by the zoo. Then the evening was set free for the team.

Day Eight: Sunday, 11th January

Today the team met U Tin Tun, former Director-General of the Department of Planning and Statistics who was recently retired from his job. The team went with him to eat launch and visited the Kandawgi Lake. The team had only informal talks. Mr. Tin Tun said that he is also thinking of establishing an NGO in Myanmar and use his knowledge for the cause of wetlands in Myanmar. The team supported his idea. However, he said that he would be taking full rest for some time to come. With regard to the RCJ work in Myanmar, he suggested that RCJ should directly work with NWCD. Other organizations are neither effective, nor efficient. Concerning NGO, he was critical of BANCA and said that BANCA is not an efficient organization.

Day Nine: Monday, 12th January

1. Today was the last day for the team in Myanmar. So the team wrapped up the things for check out in the hotel. Since it was a week day, the team had a few things to do in Yangon. As per the U Htun Paw Oo's arrangement, the team took a taxi to meet Daw Nu Nu Aung, the Librarian of Dagon University at 10 am. The Librarian was kind and cooperative to search the materials. Although they were shifting from the old building to a new one, she helped us find the material.

Because of copyright issue the team could not photocopy the document "*A Geographical Study on the Socio-economic Development of Indawgyi Lake Environment Area at Kachin State.*" Instead, we took the photos of the papers and then left the University for Yangon.

2. After returning to the hotel, the team went out for launch and then checked out in the hotel. They took their luggage and headed for the FFI office. The appointment with Mark Grindley, Technical Advisor of FFI could not take place as he was busy with other meeting elsewhere. Thus the team worked in the office for sometimes and left the place at about 4 pm for the Yangon International Airport to take their flights to the respective countries. On the way they stopped by at the University of Yangon to give the publication, *Asian Wetland Symposium: A Journey from Otsu to Wuxi*, one each to the Yangon University Library and Central Library. From there, the team directly went to the airport. They reached the airport at about 5 pm. Then Bishnu Bhandari went to check in the counter of Thai International, whereas Hide Nakamura had to wait until the counter of ANA opens in the evening. So finally saying "Good Bye" to each other, the team formally dispersed at the Yangon International Airport at 6:30 pm on Monday 12 January.

Note: Bishnu Bhandari had a night halt at Suvarnabhumi International Airport, Bangkok. He took the Thai plane for Kathmandu next morning at 10:30.

Part 4

Indawgyi: The One and Only Tectonic Lake

The findings of the trip including literature review are summarized in this part. The first part, **Physical Characteristics** provides basic information on geography, topography and hydrology. The second part, **Wildlife**, gives information on birds, mammals, reptiles amphibians and fishes based on direct observation, interview, meeting and secondary sources. The third part, **Policy, Institution and Legal Status**, discusses the main obligations, rules and regulations, penalties and some important legal issues. Finally, the fourth part, **Socio-economic Status**, focuses on landownership, economic activities, cultural significance, and community-based tourism in the lake.

4.1. Physical Characteristics

The Indawgyi Lake is the largest lake in Myanmar. It is the one and only tectonic lake in the entire country. It harbors many endemic species of fauna. It is the breeding, nesting, resting and mottling ground for migratory water birds that come from all the way from the Siberia. This part briefly deals with its geography, topography and hydrology.

1. Geography

Indawgyi Lake lies in the Mohnyin Township, Myitkyina District of Kachin State in the northern Myanmar. The lake is about 180 kilometers (112 miles) south-west from Myitkyina, the main town of Kachin State. The closest town is Hopin, which is 32 miles away from Lon Ton, the main village at the bank of the lake. The lake can be reached in a five and a half hours drive from Myitkyina. The highway starts from Myitkyina and passes through Namte, Moe Gaung, Sarhmaw, Hopin, Nan Mun and Lon Ton. It has been reported that the lake can also be reached through another route; Belu Town and Mammon pass from the Mohnyin on the Mandalay-Myitkyin Railway (**Myitkyina University, 2003: 7**).

The geographical position of the lake area lies between $25^{\circ} 6''$ and $25^{\circ} 10''$ North and $96^{\circ} 18''$ and $96^{\circ} 23''$ East. The lake covers an area of 98 sq. mile. Its length from the north to south is 14 miles and breadth from the east to west is 7 miles (**Latt, 2010**). The lake is situated at the altitude of 175m. Its maximum depth has been recorded at 60 feet.

The area has sub-tropical monsoon climate. The mountain and its rims have dense forests. In general, June-October is wet; November-February, cold; and March- May, dry & hot (**Aung, 2011:3**).

The lake area is surrounded with over 37 villages under 11 village tracts (administrative unit). These tracts are (1) Nan Mun, (2) Mamon Kaing, (3) Lon Ton, (4) Lwain Mon, (5) Nyaung Bin, (6) Lon Sant, (7) Maipok, (8) Chaung-wa, (9) Panla, (10) Hepu, and (11) Mapyin (**Latt, 2010:1**). According to the Forest Department (2011), the area has 7,131 households with the total

population of 45,345. The population density is 416 per square mile. (Forests Department 2011 as quoted in Aung, 2011).

2. Topography

The lake is situated in the depression area between the **Mhanking mountain** range. Some of its ridges are as high as 3000 feet. Its feature comprises mountains, lowland, swampy/marsh land and lake. The mountain ridge (Ba Wa) has red and yellow brown soil, where the top has 30" thick black humus soil in the Nan Yin Ka forest (Myitkyina University, 2003). The low land around the lake has alluvial soil. Because of clay content the grey soil is sticky and is found in the poorly drained area.

3: Hydrology

The main sources of the lake are the inflows from the surrounding. It is reported that there are 30 streams flowing into the lake (Myitkyina University, 2003, pp. 9 & 10), of which the major ones are (1) Nam Yin Kha Chaung, (2) Nam Sanda Chaung, (3) Nan Mun Chaung, (4) Lepon Chaung and (5) Maing Naung Chaung. The lake drains in the northeast through Indaw Chaung, which travels 50 miles to join first to the Moe Gaung and then after travelling another 100 miles to the Ayeyarwady River. Therefore, the Indawgyi is the headwater of the Ayeyarwady River.

4.2 Wildlife

This part gives an overview of wildlife situation of Indawgyi Lake. The information contained in the part is based on interviews, rapid surveys, direct observation, talking with different stakeholders, meetings from the 7th to 8th January and secondary sources. It includes information on mammals, birds, amphibian, reptiles and fish.

Method and materials

1. Field survey

Field survey was done from 7 to 8 January in 2015. Survey methods were simple interviews and direct observation. The simple interviewing was about wildlife information from local people (fishermen, farmers, wildlife officials, NGO people). The direct observation techniques included visual, call, traces, remain around lake area during the survey. The places visited by boat and car are shown in Figure 2.

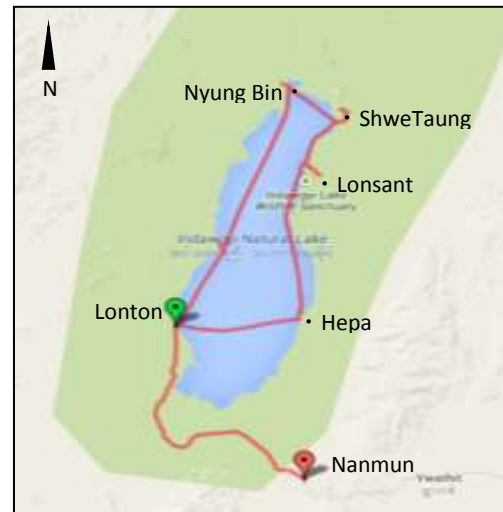


Fig.2 Places Visited in Indawgyi Lake

The summary of the field survey is presented below

1. The bird records of this survey are based on direct observation on the lake. The mammal records are extracted from observations and interviews with local peoples (fishermen, farmers, forest and wildlife officers, NGO people and youth and experts). A total of 42

bird species (Table 2), 4 mammal species (Table 3) and 2 amphibian species (Table 4) were recorded during the survey. Of these, 5 bird species and 2 mammal species are considered globally threatened (IUCN, 2014).

2. The threatened bird species were observed in Indaw Chaung, north-west past of the lake and included Sarus Crane (*Grus antigone*), Asian Open-bill Stork (*Anastomus oscitans*) and Spot-billed Pelican (*Pelecanus philippensis*). Because of reeds, submerged and floating leaved macrophytes, the area is the most favorable habitat for these birds.
3. The threatened Asian Elephant (*Elephas maximus*) was sighted some 10 years ago in north hill area. It is, no more, there.
4. According to villagers in Lon Ton, golden jackal (the villagers call it fox) is found in the area. It could not be verified as the fox looks similar to golden jackal in north Burma area.
5. Reptile and fish could not be sighted during the survey.

2. Literature Survey

1. Literature survey included published, unpublished reports, documents and the Internet. A total of 286 bird species (Table 5), 47 mammal species (Table 6), 6 reptile species (Table 7) and 89 fish species (Table 8) were documented. Of these, 12 birds, 25 mammals, 6 reptile, 6 fish species are listed as globally threatened in IUCN red list (IUCN, 2014).
2. The threatened bird species, namely Sarus Crane and Spot billed pelican were mostly observed in the Indaw Chaung area (Geissmann, 2010, Mytkyina University, 2003).
3. Geissmann *et. al*, 2010 reported that the density of the Eastern Hoolock Gibbon (*Hoolock hoolock*, EN on IUCN Red list) is highest in forest area surrounding Indawgyi Lake. Other threatened mammal species were recorded from interview but could not be verified.
4. Myint Shwe and Grindley (2012) have reported in their research report titled "*Preliminary Turtle Conservation Status, Indawgyi Lake, Kachin State*" that only *Testudines* species of turtle occurs in the area. U Myint Shwe, who is the principal author of the paper is also our guide and confirmed the above statement during our interaction. He also told us that the population of turtle is low in the Indawgyi Area.

3. Environment and habitat

Indawgyi Lakes has several habitats; hill and evergreen forest, streams, water, marsh and rice paddy. These habitats are important for a diversity of wildlife. These habitats are used by at least 8 endangered bird species and many migratory birds. Therefore, it was designated Important Bird Area (IBA) (BirdLife International, 2015) .

4.3. Policy, Institution and Legal Status

Basic Obligation

Myanmar is a signatory to a number of international agreements, conventions and protocols related to environment. In a remarkably short time, Myanmar is very much involved in issues of environmental conservation at all levels.

The Union Government has already enacted several national laws¹. For example, the Constitution of the Republic of the Union of Myanmar (2008) seems particularly important. It states “*The Union shall protect and conserve natural environment*” in Chapter 1 Article 45. It is one of the basic principles of the Union. The Constitution also states “*Every citizen has the duty to assist the Union in carrying out the following matters : (a) preservation and safeguarding of cultural heritage; (b) environmental conservation; (c) striving for development of human resources; (d) protection and preservation of public property*” in Chapter 8 Article 390. The stipulation clearly shows that protecting environment is not only the duty of the government but also of the citizen.

There are no specific law which applies directly to conserve wetlands. Conservation of national wetlands are covered by some national legislations such as the Environment Conservation Law (The Pyidaungsu Hluttaw Law No. 9 / 2012) in the existing circumstances.

Implementation

The activities of CEPA, monitoring and patrolling can be regard as implementation of legal obligations.

Monitoring

The latest regulation which focuses on environmental matters is the Environment Conservation Law. It is required to execute Monitoring Program.

The monitoring activity in Indawgyi Lake is carried out every month for two days from 2009. Fauna & Flora International (FFI) is in charge of monitoring birds and the Friends of Wildlife is in charge of monitoring fishes. Relating to water quality studies just started from December 2014. Every information is regularly shared with each other.

Patrolling

The Community Ranger is in charge of patrolling in their area. The patrolling activities are carried out twice a month, mainly at night, for seven to ten days. The activity is done on a boat with seven or eight people.

There are nine patrolling areas and fishing is prohibited in these areas. The patrolling team finds two or three violators a year. However, the boat which is used for patrolling is very old. Ironically, even rangers find violators, who uses powerful engine boat and run away quickly. It is difficult to capture them. Also, some fishermen argue with the patrolling team and disagree with the patrolling team.

Rules and Penalties

As mentioned earlier, FFI is one of the representative environment non-government organizations (NGO) in Myanmar. It has projects almost all over the country. It has a field office in Indawgyi area. Primarily FFI provides technical assistance to local communities. It is particularly worth noting that FFI makes an agreement with each community beforehand and explain them to ensure that they understand the issue related to wetland conservation. In Lon Ton, FFI provided a kayak to local people, which is part of their life¹. This has brought them together to initiate eco-tourism by themselves. The relationship between NGO and local community is not an one way traffic. The agreement between them should help them design an effective system for implementing the legal obligation.

Incidentally, in this research we could not find their **local rules between local communities but they have common view. The Freshwater Fisheries Law** (The State Law and Order Restoration Council Law No.1/91) states *“No one shall do the following in any freshwater fisheries waters: (a) catching fish or causing mischief with explosive substance, poison, chemicals and dangerous material of a like nature; (b) catching fish by a prohibited method and fishing implement; (c) catching fish of a prohibited species and size; (d) catching fish during a prohibited period and at a prohibited place.”* in Article 34. Local communities should understand that it is illegal to fish in the protected as well as in the prohibited period.

2. Penalties

Fishery: Any violation of Article 34 of the Fisheries Law shall be punished with a fine. In the **Freshwater Fisheries Law**, Article 45 **originally states** *“Whoever violates any provision of Section 34 shall, on conviction be punished with fine which may extend to kyats 30,000 or with imprisonment for a term which may extend to 3 years or with both.”* However, its amendment stipulates as follows; *“Whoever violates any provision of Section 33, Section 34 or Section 40 shall, on conviction be punished with imprisonment for a term which may extend to 10 years or with fine which may extend to kyats 300,000 or with both.”*

Nevertheless, in reality, when rangers find violators, they follow three steps to deal with the problem. In the first step, they provide counselling and education to violators and urge them not to fish in the restricted area. The violators will be, in the second step, required to sign a promissory paper not to reoffend. In the final step, all fishing gears are seized from the violator so that he or she may not able to fish anymore. Besides, when the violator is found around the Pagoda, which is also a prohibited zone for fishing, the Buddhist monk tries to educate them

¹ FFI field office also provides three days intensive study training of forestry for environmental protection actions for each village. As of the 5th January, 25 people have taken the training.

through the principles of non-killing life. On many occasion, religious faith often helps prevent illegal activities but does not bring a complete change in their attitude.

Forestry: The Forest Law (The State Law and Order Restoration Council Law No. 8/92) states the environmental conservation policy of the Government as one of the basic principles. The forestry officer's main activity is providing environmental education program to people in the village. That is why the education program is held once a month in the village.

Even after the environmental education program, there are still some people logging trees illegally. In this case the forestry officers do not have police power to stop it.

For the violator of forest laws, there are two steps of penalty. The first step of penalty gives an opportunity of counselling the violator, where he is explained of disadvantages of illegal logging and is persuaded not to commit offences again. However, if he or she is found engaged in illegal activities, then the officer will send him to the local administrative office for necessary legal action including deciding the level and type of penalty.

Major Concerns

1. Chemical Use

The most serious concern is the chemical use. Article 5 of the Fertilizer Law (The State Peace and Development Council Law No. 7/2002) states "*The functions and duties of the Fertilizer Committee are issuing necessary directives to prevent environmental pollution and hazard to human beings and animals in respect of fertilizer business*" and also Article 40 of the Fisheries Law states "*No one shall cause harassment of fish and other aquatic organisms or pollution of the water in a freshwater fisheries waters.*" Article 35 of The Protection of Wildlife and Conservation of Natural Areas Law (The State Law and Order Restoration Council Law No. 6/94) states "*Whoever commits any of the following acts shall, on conviction be punished with imprisonment for a term which may extend to 3 years or with fine which may extend to kyats 10,000 or with both :... (d) causing water and air pollution, causing damage to a water-course or putting poison in the water in a natural area; ...*". However, local people are using chemical fertilizers and cleansers without being aware of their harmful effects on the health of the lake as well as humans. On the top of it, discharging the chemicals to the lake will have a far-reaching effect on the ecosystem. It seems the problem of interpretation of the provisions of above national laws will arise soon in near future.

2. Environmental law education

In our interaction with FFI field officers and rangers about legislation, it was found that they are concerned only with Wildlife Law, not Environment Conservation Law which is the latest environmental law. They know Environment Conservation Law coming into effect but they never conform the provisions, because it is too abstract to follow in the natural environment of Indawgyi Lake. Needless to say, there is no problem that the people are following the Wildlife Law, though it does not mean they can take no account of the duties under the Environment

Conservation Law. It is very important to follow new legislation. For example, the Environment Conservation Law has the provision of Environment Impact Assessment, which is not mentioned in the Wildlife Law.

As stated above, it seems very important to let local people know some information about important provisions of environmental law, which are related to their works or activities. This would promote effective implementation of wetland conservation, which is stated in the Ramsar Convention.

The keystone species of the area are Eastern Hoolock Gibbon, hog deer and migratory birds. The highest density of Hoolock Gibbon was recorded here in the 2010 survey. The site is an Asian Heritage Park and is already in the tentative list of the World Heritage Site, which is a pre-qualification for the World Heritage Site.

4.4 Socio-Economic Status

Latt (2010) conducted a geographical study in 11 village tracts in 2010 and has enumerated a number of socio-economic variables. Than (2011) conducted a socio-economic survey of the five villages (Shweletpan, Mamon Kaing, Hepa, Nyaung Bin and Lon Ton) focusing on three variables; social, economic and environmental. Some of the socio-economic and cultural findings are presented below.

1. Land ownership

The land is privately owned in Myanmar. The agricultural lands of the Indawgyi area can be divided into four categories, which are given in Table 1.

2. Agriculture

Farming is the number one occupation in the Indawgyi region. About 80% of the population are farmers. The farming is intensive in nature. Rice is the main crop and according to local farmers, both high yielding and local varieties of rice are grown only under the rain-fed condition. Rice production is sufficient in the area and sometime it is exported to Hopin, and Mohnyin towns. To the surprise of the team there is no irrigation in the area.

Table 1: Categories of Lands in the Indawgyi Area

Land Category	Location	Area (Acre)
1. Le Land	Plain area	28416
2. Ya Land	Along the stream	1475
3. Garden Land	Around the settlements	1181
4. Taung Land	Mountain range	78
	Total	31,150

Source: Latt (2010)

In addition to farming, livestock is secondary but important activity in the region. Livestock are kept only at the subsistence level. Cattle, buffalo, pigs and chicken are the common livestock. Cattle and buffalos are for drought, milk and meat purposes.

According to the group meeting with farmers at Hepu, rice cultivation is followed by either beans or peanuts. Rice is transplanted in June and harvested in October. In January beans and peanut are grown and harvested in March. The sticky (glutinous) rice (local name is *Kauk Nyang*) is native to this place.

The farmers also practice integrated rice-fish farming. In the village there were many farmers-cum-fishers but due to decrease in the population of fishes, they have stopped fishing. The reasons for the decrease of fish population are pollution, high population of fishermen and use of small gears. Also, there are many migratory fishes which come here for breeding purpose.

The choice for the local community is either fishing or farming. They prefer farming to fishing because farming is the best occupation. It is a traditional, stable source of livelihood and hereditary as well. That is the reason why local people opt only for part-time fishing.

The major problems faced by local farmers are summarized below

1. High cost of labor and its shortage: This is caused by people going to work in jade and gold mines, where they get high wage.
2. Dependence on rains: Neither there is any irrigation canal, nor tube-well. Farming totally depends on rainfall. Because of this they can't plant on time. Rice is transplanted only when the under-ground water rises to the ground level.
3. Timely availability of good seeds: Seeds are not available on time. This is also a problem.

3. Fishing

Because of Indawgyi Lake and many inflowing streams, fishing is the second important economic activity and the source of cash in the region. The lake is rich in microflora and is good for aquatic fishes for spawning, nursery and feeding. It is reported that some 64 species of fishes

have recorded in the lake and surrounding streams. Fishermen set nets always in the afternoon from 3-5 pm and collected them at midnight. The fishermen never fish in day time and use only non-motorized boat for fishing.

It was reported that the license is issued by the Department of Fishery and it costs Kyats 5000 per piece.

The team had a meeting with the young fishermen of the area. They told us that they are not allowed to fish in the core zone. They observe the rule that fishing should not be done in the lake for three months from May to July. Every year the fish harvest is going down and down. They believe that harvest is low because God is not happy and has changed the color of the water in the lake. In order to increase the harvest of fish, fingerlings should be reintroduced and native species of fishes should be encouraged.

1. Chemical soaps are used in the lake, which circulates and pollutes water. As pollution increases, fish production goes down. It is a big problem. Unless and otherwise, the use of chemical soaps are stopped, the problem of pollution will not stop.
2. Invasion of the lake by invasive species such as Tilapia fish.
3. Fishermen are poor and they are facing the problem of educating their children. Their immediate problem is purchasing stationery and paying their monthly fees.
4. They are totally unemployed during the period of breeding season from May to July. However, some are engaged in farming as well as in other off-farm activities.
5. Fishermen are always in debt and suffering from high interest rate. It is a big problem for them. Bad weather destroys their nets, which needs to be immediately replaced for which they need net. In order to support them, an emergency fund should be established for fishermen.

4. Forest products

Teaks are abundantly available in the region. The most common forest products are hardwood, fuelwood, charcoal, bamboo, resin and honey. Because of this MOECAAF has implemented the Greening Project in the area.

5. People talk to plants

According to the study of Myitkyina University (2003), the Shan peoples consider plants as living things. They respect them. They talk to plants, especially medicinal plants. They always ask for their permission to harvest and process these products for human welfare. After the harvest, plants are dried under the sun or by hanging, airing and storing them in tins, jars and boxes. The harvesting time for these products is given below.

- | | |
|--------------------|--------------------------------|
| August –November | = Bark collection |
| November – March | = Herbal plants collection |
| October –February | = Roots and rhizome collection |
| December – January | = Tuber collection |

6. Cultural heritage

The Indawgyi lake has two important pagodas; Shwe Myint Zu Pagoda and Shwe Traung Pagoda. All these pagodas add to the serenity and cultural diversity of the lake.

(1) Shwe Myint Zu Pagoda: The Pagoda was built by Reverend “U Thaw Bitha”. At four cardinal points; North, South, East and West are four Buddhas who attained enlightenment before Lord Buddha. All four Buddhas are facing outward. Although, the Pagoda looks immersed in the lake, it is connected by a natural causeway.

The Pagoda is famous in Myanmar and attracts over 100,000 of visitors for the festival, which falls on the month of April when the moon is full. The festival is a religious, cultural, social as well transaction event. People come here to pay their respects, sell, eat, drink foods, and have fun. During this time, boat races and boat festivals are organized, which also attracts a large number of visitors. In April, water level recedes and people can walk along the causeway.

Fishing is not allowed inside the radius of one mile from the Pagoda, nor the hunting of birds. But visitors can feed birds and fishes. While we were boating in the lake, we were also feeding the flying brown-headed geese.

(2) Shwe Taung Pagoda: On the top of the hillock, in the northern part of the Indawgyi is a golden pagoda under construction. At its shoulder remains a monastery with a few monks.

In addition to these two pagodas, in the western side about 3miles north of Shwe Myint Zu Pagoda, two more pagodas are worth-visiting. They are Ngwe Myint Zu and Moat Soe Ma Zaydees. Both of these Pagodas were built in 1949.

7. Other social characteristics: Other social-cultural conditions as indicated by some selected variable are briefly put forward below.

- (1) *House type:* Houses are mostly of the stucco type, which helps protect from the flood and dampness. Most of the houses are built of wooden planks and bamboo splits. Both wooden planks and bamboo splits are used for walls and floors. The roofs are mostly of thatch grasses and some have the corrugated iron sheet.
- (2) *Power supply:* There is no regular supply of power. Power is generated by people using the generator. In some places, power is generated by local community and monastery. In the past people used oil-lamp but now it is replaced by candles. We were informed that the generator is shut off at 9 pm at the guest house. And it was done so while we were there in the guest house.
- (3) *Drinking water:* About 82% of the people use lake water for drinking as well as for domestic use. One study showed that the lake water is drinkable and has no nitrite, nitrate, phosphate and mercury. Only 18% use underground water by digging tube well as deep as 60-70 feet (**Than, 2011**)
- (4) A two-lane dirt road surrounds the lake. It is about 65 miles. In wet season, due to bad condition, public transportation can't be seen on the road. At all time, boats, motor-boats and cycles are common means of transportation.

8. Tourism

The lake has a lot of potentials for establishing tourism in the area although Indawgyi Lake is a remote, inaccessible and difficult-to-reach the area. This situation has been further aggravated by the long on-going conflict between the Government and the Kachin Independence Army (KIA).

Nevertheless, the following adventure activities are carried out in the lake. They are; kayaking, cycling, trekking, recreational fishing, boat tour, bird watching and pagoda festival

(1) Accommodation: Accommodation is a bit problem in Indawgyi. Tourists must stay only in the designated guest houses. The Government has designated two guest houses; (1) Indaw MaHar Guest House, and (2) Indaw Two Guest House. The former can accommodate 11 guests at a time and the later has only two rooms. We were told that the second one is run by the army and can accommodate guests only when the first one is fully occupied. Tourists are not allowed to stay in the private house or in the community. They must stay at the guest houses. In case, the guest houses are fully booked, then tourists must stay in the monastery. However, native tourists are allowed to stay in their relative's houses.

(2) Inn Chit Thu Tourism Group: The *Inn Chit Thu* is a local phrase, called the Lovers of the Lake. Inn Chit Thu Tourism Group is a non-governmental organization (NGO), established with the support of FFI Myanmar.

In 2013 FFI organized a workshop in collaboration with MOECAAF. The intention of the workshop was to include the concept of community-based tourism in the area. Basically, the community-based tourism is a locally grown idea and stemmed from the felt-needs of the community. This is a proactive idea. In order to promote this idea, FFI helped youth of Lon Ton to form a group called, *Inn Chit Thu* Tourism Group. The sole idea is to support the efforts of local community for conservation of resources and the improvement of livelihoods.

At present the Group has some 40 members. And Lon Ton is the site for the application of this idea. FFI provided material support on the condition that the Group would manage the enterprise. Now the Group has provided an opportunity for local employment, cash generation and stewardship.

According to the Secretary of the Inn Chitu Thu Tourism Group, FFI facilitated and supported the establishment of the group by providing a kayak and some bi-cycles. Now a Committee has been formed to manage the enterprise. The President and the Secretary are changed every month on rotation except the boat-keeper and treasurer. It has been over a year they have been running the kayak. As a result, now they are about to add three more kayaks.

Currently, the Group has been providing the following services.

1. Renting out a kayak at Kyts 15,000 and a cycle at Kyts 7,000 per day
2. Providing guide service to trekking as well as bird watching. The rate is Kyts 10,000/guide along with the additional cost of transportation.
3. Providing logistics for recreational fishing.
4. Providing boat-tour in the lake @ Kyts 5,000/hour

To a query about the use of their earning, the Secretary told us that they had plans to use the one-third of their earning to support the elderly people, promoting anti-plastic campaign, and supporting school education and health services. More information can be found in **Box A**.

Box B: Case of Community-based Tourism

Indawgyi is a remote and isolated area with difficult to access. Still, tourist can't go there because of limited accommodation facilities. Community-based tourism is a pilot project initiated by FFI in Indawgyi. FFI added this component to their conservation program in 2013. It was done in collaboration with the MOECAAF. Its central objective is to support local livelihood with conservation efforts. This idea is based on the felt-needs and direct interest of local community. It is locally brewed concept and was implemented only in Lon Ton, where a group of 30 young people was formed. The group is called Inn Chit Thu Tourism Group.

In the beginning, FFI provided material support of a kayak and a few bicycles. The management of the enterprise was solely the responsibility of the Group. Now this Group has provided employment to local youths and has been the stewardship of resources in the area.

Our guide, U Myint Shwe told us that tourists are not allowed to go beyond the army post of Lon Ton. Only after having permission from the local army post they can cross the village of Lon Ton. We also received some conflicting information that visitors can go as far as Shwe Myit Zu Pagoda. However it needs to be confirmed.

In Lon Ton, only two restaurants cater to the needs of tourists. They are Hepu Restaurant and Khaing Restaurant. There are other *Let Phet Yi Sai* (tea shops), which are good only for noodle, tea, coffee, light snacks and soft drinks.

As far as the cost of the living condition is concerned, food and accommodation are quite cheap in the Indawgyi area.

9. Plant communities

Reed bed is the plant communities of emergent and submerged hydrophytic flora such as water oak, wild rice, Indian rice, water hyacinth and other aquatic floral species. But reeds are the dominating species especially in the north-eastern bank of the lake. They were in good conditions but now have changed into rangeland ecosystem. Even then, reed beds and rangelands are good habitat for fish and birds and for water purification functions. They also prevent lakeshore erosion.

The reed bed ecosystem is ideal for feeding, resting and nesting sites because of many aquatic plants and the mud-dwelling invertebrates. Reed beds are an ideal condition for fish-eating birds and their molting and breeding. It provides aesthetic values to the landscape. Thus reed beds are good for protecting fish and birds in the area.

Secondly, *Barrabtonia* (Local name is *Kyimi*) grows luxuriantly along the bank. Its clump along with algae and fern covers ground, which prevents the shoreline erosion and protects the lake environment. The tree of *Khyimi* is used by migratory bird as wintering, nesting and roosting sites. Aquatic diversity includes some 26 species of plants and 85 species of fishes including oceanic fish family (Myitkyina University, 2003:47-60).

10. Agro-ecosystem

Rice is the major crop of the area. As reported in the focus group discussion, still farmers practice traditional cropping systems such as mono-cropping, intercropping, relay cropping and mixed cropping systems. On the basis of water availability, the farming system of the area can be divided into two categories: wet farming and dry farming. Dry farming includes home garden and Swidden cultivation, whereas wet farming includes mainly rain-fed rice. Farmers transplant rice after the water table rises up in the ground. The three farming systems have been reported from the area.

- (1) **Slash & Burn cultivation:** This is also called shifting cultivation or Swidden cultivation. The indigenous peoples clear the trees and bush, burn them and hoe the land for one to two successive years. Then land is left fallow and farmers move to another areas. Generally they follow the rotation system of 4-6 years. Indigenous rice varieties, *Oryza indica* and *Oryza japonica* are the most common varieties of rice grown in the area. The site selection depends on soil fertility and distance from the village. The Swidders recognize the soil fertility by judging the growth of forests. Mature forests are considered as having good soil for crop cultivation. The greater the amount of biomass, the richer the soil in nutrients and thus good crops. More than half of the farmers do *Taung-Ya* cultivation. Generally, one household requires about 3 acres of *Taung-ya* for Swidden cultivation. While driving, we observed many patches of forests with secondary forests, which is the evidence of abandoned land by Swidders.
- (2) **Wet cultivation:** As mentioned earlier, rice is the main crop in the area. Myitkyina University (2003:68) reported some 30 varieties of rice including sticky rice (glutinous rice). Wheat, maize and sorghum are also major crops grown in the area. The secondary crops are grown along with major crops and includes cassava, sweet potato, taro (*Colocasia*), yam and arrow root.
- (3) **Home garden:** Home garden, also called kitchen garden, is a common practice in the region. Both the Shan and Kachin farmers set a piece of land for their gardens. Crops such as vegetables (chili, brinjal, legumes, potato, pumpkin, beans and peas), tobacco, tea, papaya and sugarcane are grown in the home garden. Perennial crops that can be seen at the edge of the garden are coconut, areca nut, jackfruit, banana and many ornamental plants. It is reported that the most common home garden crops are tea, tobacco and chilies. Myitkyina University, (2003: 69) reports that two species of crops *Caryota urens* and *Caryota mantis* are cultivated as substitute crops for rice cultivation. The University further reports 65 medicinal plants that grow in a Swidden area.

In some places, the crops are protected by either bamboo fencing or long ditch or both along the border. The ditch has dual functions of floodwater storage and fence. It was reported in our direct observation that ditch is another kind of fencing, which is about 1 feet deep and 1 feet in diameter. In some places, there are ditches after ditches (or pits) so as to protect crops from animals.

Likewise, organic mulching is also used to protect moisture in the soil. The materials used in the mulching are rice husk, mustard seed residues and weeds. This is a traditional customs practiced by the Shan people. Nowadays, plastics are also seen being used as mulching the high value crops and fruits.

11. People

The surrounding of the Indawgyi Lake is inhabited by the Shan, Bamar, Kachin and Katu ethnic tribes, Indian and Chinese peoples. The archeological study of the bronze ware and pottery suggests the history of the Shan people in the area as old as 2000 years (**Myitkuina University, 2003:80 and 86**). The Indawgyi area is the home to the Shan sub-ethnic tribes, namely *Tai-lain*, *Tai-lae* and *Tai-kanti* and the *Kachin* and the lesser known primitive sub-tribe, *Phon-shan*. The total population of the Phon-shan was about 30 with 10 households in 2003. The Tai-lain people are commonly known as *Shan-ni* (**Myitkyina University, 2003:68-69**). This statement was confirmed during our interview as well. The University report further mentions the migration of another Shan sub-tribe, *Jinghpaw* to this area in ancient time.

The local people have faiths mostly in Buddhism and Christianity. Their customs are blended with each other and in many cases they have borrowed each other's customs. The ancestors of the Shan people practiced polytheism. In the belief of the Shan people, Gods is everything and all in all. That means everything is controlled by Gods. This belief can be found in the concept of holy hill forests, which are protected by guardian spirit, known as **Nat-Kun**. According to this belief, hill forests are the abode of God. The guardian God protects all plants and animals. Therefore, hunting, gathering fire woods and other forest products are all strictly prohibited. Any violence and disturbance against these plants and animals is punished by God. Traditionally, every village has a holy forest reserve. These forests are the storehouse of biological resources. Now this belief is diminishing in the Indawgyi area.

Likewise, in the temple, pagoda, monastery and holy shrine, plants are protected; hunting of animals and fishing are strictly prohibited. Because of this very practice, genetic resources are naturally protected; traditional culture and values are preserved; the beauty of natural environment is enhanced.

Myitkyina University (2003:87) further reports that the Shan people have been protecting the big fish, *Rita rita* as holy fish for over hundred years.

Part 5

Partners Mapping

Our rapid trip was able to identify 5 organizations that are actively engaged in the conservation of lake and lake resources. These organizations include government agency, NGOs and community groups. The team believes that there are other organizations as well, which needs to be further explored. Then only the partner mapping would be complete. The organizations that were in contact with us are given below.

1. Indawgyi Wildlife Sanctuary

Indawgyi Wildlife Sanctuary has a main office at Mohnyin Township, headed by a warden. Its Front Office is at Lon Ton. The warden administers the Sanctuary through its 3 guard posts. One is at Hepu village, which has 12 staff members. Currently, U Htay Win is the warden of the Sanctuary.

The lake has two major ecosystems; forests and wetlands. The settlements and cultivated area do not fall in the Sanctuary.

The Sanctuary was established in 1999. In 2004, the Sanctuary was included in the ASEAN Heritage Park. The added value it gives to the Sanctuary are training of the staff, providing educational materials including laptops, managing an education center and providing its staff in the ASEAN workshop. The education center at Nan Mun is supported by the ASEAN Center for Biodiversity (ACB). Recently, the Sanctuary has been included in the Tentative List of the World Heritage Site.

The Sanctuary has the total area of 314 sq. miles. It has two major ecosystems; terrestrial and wetland area. The terrestrial area includes the former 5 reserve forests; (1) Mukso Reserve Forest, (2) Nan Mun Reserve Forest, (3) Indawgyi Reserve Forest, (4) Main Naung Reserve Forest, and (5) Nanyinkha Reserve Forest. On the other hands, the wetland area includes the entire area of Indawgyi Lake.

The Sanctuary has designated 8 core areas called “No Fishing Zone”. In the core zones, fishing is not allowed at all. In the Eastern side these zones are in (1) Nam Mawkkkan, (2) Lon Sant, (3) Shwe Taung Pagoda. In the Wstern sides they are in (1) Mamon Kaing, (2) Lon Ton, (3) Shwe Myint Zu Pagoda, (4) Namni Laung, and (5) Nyaung Bin.

These zones are enclosed by nets and are managed by the Sanctuary in partnership with the FOW and local fishermen. None is allowed to go inside the core area.

Indawgyi Lake harbors four species of endemic fishes; *Puntius orphoides*, *Hypsibarbus myitkyinae* (Rainboth, 1994), *Indostomus paradoxus* (All these reported in 1929), *Gudusia vaiergata* (in the 2003 Inventory Survey).

We asked the range officer about the role of pagodas on the conservation and sustainable use of resources in the Indawgyi. His responses are summarized as follows.

The pagodas have declared the area of its one mile radius as the no-fishing zone. Neither fishing, nor bird- hunting is allowed. Rather, the waterbirds like the brown-headed geese are fed by people. Because of faith, the people abide by this rule and its regulations. The pagodas regularly give talk program on the importance of non-violence.

Conversion of Swidden area into plantation: The villagers were using the hilly areas for shifting cultivation. But these areas have now been converted into rubber plantation. This is the reason why the Sanctuary and FFI have been working together in community forestry. There are about six community forestry groups. The Sanctuary also provides opportunities for inter-group meetings and information sharing activities.

Trespassing in the “Core Zone”: Trespassers and intruders are active in core areas. Although none is allowed to enter the core zones, illegal activities are common in the core zones. They do fishing. Sometime they cut the nets of the area and free the fishes from the enclosure. The first-time trespasser is given counseling and then freed. The second time, he is given a warning and asked to sign an affidavit not to repeat the same crime. Then, the third time, all the catches and gears are seized. The record has that people have trespassed the area up to two times.

Major problems of the Sanctuary comprise trespassing into the core zone, license given by other agencies, armed conflict, conversion of the Swidden farms and so forth. In this report, issues and problems of the lake are presented in **Part 6**.

2. Community Forestry Group

Outside the Sanctuary area, there are 6 community forestry groups. This program is supported by FFI and was started about 3 years ago. Each group is managed by its own executive committee. The Committee consists of 5 members with a one year term. Their term can be extended for another year by election. The Executive Committee carries out the following duties.

1. Sell fuel wood to local residents.
2. Harvest timber only after the permission received from the FD. Its price depends on the size of timber. The price for local resident is 20% below the market price.

The Committee uses its income in the following areas.

1. Protect the boundary of the forest,
2. Safeguard forest resources from fire, cattle, illegal activities, disease and other encroachments,
3. Regularly coppice, weed out, prune and train the trees
4. Support the community health activities
5. Provide support to education of the children (stationery, fees, extra-curricular activities)
6. Support welfare activities in the community.

According to the President of Lon Sant Community Forestry Group, U Kyaw Win, in the beginning the group managed 50 acres of forest and now has added another 50 acres to it.

Lon Sant Community Forestry Group has a long-term strategy for the management of their forests. For example,

1. Plant precious saplings such as teak, hardwood (matures in 3 years) and iron wood (matures in 15 years)
2. Plant samplings for fuelwood
3. Conduct agro-forestry activities.

Lon Sant Group has taken forests on lease for 30 years from the Sanctuary. The group is determined to extend and expand its community activities.

In response to our question on undesirable activities in their community forests, the President says that anybody found guilty is freed after undergoing counseling. If he repeats crime the second time, then, he/she is sent to the local administration for action.

3. FFI

FFI, an International non-governmental organization has been working in the area for the past 15 years, first with BANCA and now with FD. Its current activities include:

1. Working with community forestry groups through the village conservation group.
2. Support wetland conservation in the lake through patrolling, ecotourism and annual waterbird census.
3. Support conservation education and awareness program through school education
4. Conduct research and development program such as conducting fish and turtle survey. In 2012, FFI has camera-trapped the occurrence of the endangered Hog Deer in the Indawgyi area.

4. Inn Chit Thu Tourism Group

Detailed information about this group is presented in **Part 4, Sub-Part 4.4 Socio-economic Status, under Tourism** in page 29.

5. Friends of Wildlife

The Friends of Wildlife (FOW) under the guidance of the Indo-Myanmar Conservation, a charity organization based in the UK. It has supported the Sanctuary to establish "No Fishing Zone" and its management. In Indawgyi Lake, it is engaged in fisheries only. It works with the Sanctuary, villages and community. It also releases fingerlings in July every month and provides training to students.

Part 6

Major Issues and Problems

Even though the lake is far away and difficult-to-reach, it is not free from issues and problems. The lake is suffering from both natural as well as anthropogenic problems, which are the causes of **decrease in fish population**.

Major issue related to the management of lake resources is the issue of **jurisdiction**. For examples, the lake is under the management of the Sanctuary, whereas fish resources are under the control of the Department of Fishery, which issue license to fishing. Therefore, the Sanctuary does not have any control over the matter. Subsequently, inappropriate practice (such as blasting), fishing in the core area, use of small nets and introduction of exotic fish species are occurring in the lake.

Another issue is the **migration of fishermen** to the area. It was reported that the population of fishermen is increasing in the area and they make temporary settlement in the boat house. However, we saw only one floating house near the shoreline of Lon Sant village.

Based on our field visit, talks with local people and secondary information, we have put forward the following problems issues.

1. **Sedimentation:** Sedimentation into the lake is caused by runoff from the surrounding agricultural lands, logging in the catchment area and gold extraction, mining and panning upstream. This has caused the filling up of the lake as well as pollution of the lake.
2. **Pollution:** Washing cloth, bathing, mud, mercury and acid coming from gold mine and agricultural runoff are the source of pollution in the lake.
3. **Encroachment in the lake:** Because of the unclear boundary line along the shoreline of the lake, local people are illegally cultivating the shoreline area when water level recedes back.
4. **Security threats:** The northernmost and western parts of the lake are controlled by the Kachin Independence Army (KIA). The Sanctuary staff is not in a situation to patrol those areas.
5. **Lack of resources:** The Sanctuary does not have enough resources (such as boat, flash lights and other gears) for patrolling.

Part 7

Some Suggestions

On the basis of our interaction with the staff members, field visit and secondary information the team has come up with the following suggestions to improve the management of the lake and its surroundings.

1. Organize a symposium on Indawgyi Lake involving all relevant stakeholders.
2. Initiate actions in collaboration with relevant stakeholders and partners to nominate the lake as another Ramsar site.
3. Prepare additional educational materials (booklets, information sheet and others) aiming at different stakeholders including tourists, general public and native tourists.
4. Establish an emergency fund to support the fishermen, when there is water hazard.
5. Support participatory action research on areas such as indigenous knowledge, wetland dependent peoples, biological and cultural resources.
6. Develop a strategic plan for the conservation based on the concept of Participatory Watershed Management.
7. Promote the on-going conservation education being conducted by different stakeholders.
8. Develop more accommodation facilities for the tourists.
9. Support the sanctuary for its effective patrolling.
10. Initiate additional capacity building activities for various stakeholders.

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Photo Essay

1.Culture



Figure 1: Kachin Women in Traditional Dress



Figure 2: Kachin Girls



Figure 3: Manau Dance at Myitkyina



Figure 4: Manau Dance at Myitkyina



Figure 5: Manau Dance at Myitkyina



Figure 6: Team with Kachin Girls



Figure 7: Shwe Myint Zu Pagoda



Figure 8: Shwe Myint Zu Pagoda (Close View)



Figure 9: Shwe Taung Pagoda



Figure 10: Kachin Foods

2. The Team with Peoples



Figure 1: Team at FFI Office



Figure 2: Team At Myitkyina Airport



Figure 3: Nam Mun Viewpoint



Figure 4: Team with Fishermen



Figure 5: Meeting with Farmers



Figure 6: Team with Farmers



Figure 7: Team at Shwe Taung Pagoda



Figure 8: Members of Inn Chit Thu Tourism Group in Lon Ton



Figure 9: Team at FFI Local office



Figure 10: Team at YCDC

3. Biodiversity



Figure1: Indaw Mahar Guest House



Figure 2: Road under Repair



Figure 3: Shwe Traung from the Boat



Figure 4: North Side of Shwe Taung



Figure 5: Outlet of lake from Shwe Taung



Figure 6: Nyaung Bin from Shwe Taung



Figure 7: Black-headed Gull Picking Foods



Figure 8: View from Shwe Traung



Figure 9: Feeding Black-headed Gull from the Boat

4. Lifestyle



Figure 1: Rural Women at Work



Figure 2: Fuelwood Piles



Figure 3: A Floating House



Figure 4: Cow Grazing



Figure 5: Coconut Harvest



Figure 2: Areca Nut



Figure 7: Village Road



Figure 8: Boy with His Oxen Cart



Figure 9: Vigorous Zingiber plant



Figure 10: Rural Women



Figure 11: Washing & Bathing in Lake



Figure 12: House near the Lake



Figure 13: Bamboo & Tin House



Figure 14: A Thatched House



Figure 15: Thatched House & Road



Figure 16: Rural Road

Table 2: Bird Species Observed During the Trip

No.	Order	Family	English Name	Species	Scientific Name	IUCN St.
1	Anseriformes	Anatidae	Tufted Duck		<i>Aythya fuligula</i>	
2			Greylag Goose		<i>Anser anser</i>	
3			Red crested Pochard		<i>Netta rufina</i>	
4			Lesser wisting Duck		<i>Dendrocygna javanica</i>	
5			Ferruginous Duck sp.		<i>Aythya nyroca sp.</i>	NT
6			Gadwall sp.		<i>Anas strepera sp.</i>	
7			Cotton Pigmy Goose		<i>Nettapus coromandelianus</i>	
9			Ferruginous Pochard		<i>Aythya nyroca</i>	NT
10			Common Pochard		<i>Aythya ferina</i>	
11			Gadwall		<i>Anas strepera</i>	
12			Podicipediformes	Podicipedidae	Little Grebe	
13	Great Crested Grebe				<i>Podiceps cristatus</i>	
14	Ciconiiformes	Ciconiidae	Asian openbill Stork		<i>Anastomus oscitans</i>	NT
15	Pelecaniformes	Threskiornithidae	Glossy Ibis		<i>Plegadis falcinellus</i>	
16		Ardeidae	Little Egret		<i>Egretta garzetta</i>	
17			Great Egret		<i>Ardea alba</i>	
18			Purple Heron		<i>Ardea purpurea</i>	
19			Indian pond Heron		<i>Ardeola grayii</i>	
20		Phalacrocoracidae	Little Cormorant sp.		<i>Microcarbo niger sp.</i>	
21			Great Cormorant		<i>Phalacrocorax carbo</i>	
22			Spot billed Pellican		<i>Pelecanus philippensis</i>	VU
23		Suliformes	Falconidae	Brahminy Kite		<i>Haliastur indus</i>
24	Gruiformes	Rallidae	Common Coot		<i>Fulica atra</i>	
25			Purple Swamphen		<i>Porphyrio poliocephalus</i>	
26		Gruidae	Eurasian Crane (Common Crane)		<i>Grus grus</i>	
27			Sarus Crane		<i>Grus antigone</i>	VU
28	Charadriiformes	Jacanidae	Pheasant tail Jacana		<i>Hydrophasianus chirurgus</i>	
29			Common Snipe sp.		<i>Gallinago gallinago sp.</i>	
30		Laridae	Black-headed Gull		<i>Chroicocephalus ridibundus</i>	
31	Columbiformes	Columbidae	Black-capped Kingfisher		<i>Halcyon smyrnensis</i>	
32	Caprimulgiformes	Caprimulgidae	Large-tailed Nightjar		<i>Caprimulgus macrurus</i>	
33	Passeriformes	Campephagidae	Small Minivet		<i>Pericrocotus cinnamomeus</i>	
34		Dicruridae	Black Drongo		<i>Dicrurus macrocercus</i>	
35		Estrildidae	White-rumped Munia		<i>Lonchura striata</i>	
36		Motacillidae	White Wagtail		<i>Motacilla alba</i>	
37		Muscicapidae	Oriental Magpie Robin		<i>Cospychus saularis</i>	
38		Passeridae	Plain-backed Sparrow		<i>Passer flaveolus</i>	
39		Sturnidae	Common Myna		<i>Acridotheres tristis</i>	
40		Hirundinidae	Barn Swallow		<i>Hirundo rustica</i>	
41	Red-rumped Swallow			<i>Cecropis daurica</i>		

Source: Reconnaissance Trip, 2015

Table 3. Mammal Species Observed During the Trip

No.	Order	Family	Species	
			English Name	Scientific Name
1	Primates	Hylobatidae	Eastern Hoolock gibbon	<i>Hoolock hoolock</i>
2	Camivora	Canidae	Golden Jackal sp.	<i>Canis aureus</i>
3	Artiodactyla	Cervidae	Hog Deer	<i>Hyelaphus porcinus</i>
4	Proboscidea	Elephantidae	Asian Elephant	<i>Elephas maximus</i>

Source: Reconnaissance Trip, 2015

Table 4. Amphibian Species Observed During the Trip

No.	Order	Family	Species		IUCN St.
			English Name	Scientific Name	
1	Anura	Ranidae spp.	Similarly Brown frogs call	<i>Ranidae spp.</i>	
2			Similarly Wrinkled frogs call	<i>Ranidae spp.</i>	

Source: Reconnaissance Trip, 2015

Table 5. Bird species Found in the Indawgyi Area

No.	Order	Family	English Name	Species	Scientific Name	IUCN St.	Ref No.*	
1	Galliformes	Phasianidae	White-cheeked Partridge		<i>Arborophila atrogularis</i>		3	
2			Rufous-throated Partridge		<i>Arborophila rufogularis</i>		1, 3	
3			Barred Botton Quail		<i>Turnix suscitator</i>		1	
4			Chinese Francolin		<i>Francolinus pintadeanus</i>		1	
5			Red Jungle Fowl		<i>Gallus gallus</i>		1, 3	
6			Kalij Phaeasant		<i>Lophura leucomelanos</i>		3	
7			Silver Pheasant		<i>Lophura nycttemera</i>		1	
8			Imperial Pheasant		<i>Lopbura imperialis</i>		1	
9			Grey Peacock Pheasant		<i>Polyplectron bicalcaratum</i>		3	
10			Green Peafowl		<i>Pavo muticus</i>		1	
11	Anseriformes	Anatidae	Lesser wisting Duck		<i>Dendrocygna javanica</i>		1, 3	
12			Greylag Goose		<i>Anser Anser</i>		1, 3	
13			Bar headed Goose		<i>Anser indicus</i>		1, 2	
14			Cotton Pygmy Goose		<i>Nettapus coromandelianus</i>		1, 3	
15			Northern Pintail		<i>Anas acuta</i>		1, 3	
16			Northen Shoveler		<i>Anas clypeata</i>		1, 3	
17			Mallard		<i>Anas platyrhynchos</i>		2, 3	
18			Indian Spot billed Duck		<i>Anas poecilorhyncha</i>		1, 3	
19			Gadwall		<i>Anas strepera</i>		1, 2, 3	
20			Falcated Duck		<i>Anas falcata</i>	NT	2	
21			Garganey		<i>Anas querquedula</i>		1, 2	
22			Eurasian Wigeon		<i>Anas penelope</i>		1	
23			Common Teal		<i>Anas crecca</i>		1	
24			Red-crested Pochard		<i>Netta rufina</i>		1, 2	
25			Bear's Pochard		<i>Aythya baeri</i>	CR	1	
26			Common Pochard		<i>Aythya ferina</i>		1, 3	
27			Tufted Duck		<i>Aythya fuligula</i>		2, 3	
28			Ferrugionus Pochard		<i>Aythya nyroca</i>	NT	1, 3	
29			Ruddy Shelduck		<i>Tadorna ferruginea</i>		1	
30	Podicipediformes	Podicipedidae	Little Grebe		<i>Tachybaptus ruficollis</i>		1, 2, 3	
31			Great Crested Grebe		<i>Podiceps cristatus</i>		1, 2, 3	
32	Ciconiiformes	Ciconiidae	Asian openbill Stork		<i>Anastomus oscitans</i>	NT	1, 2, 3	
33			Wolly necked Stork		<i>Ciconia episcopus</i>	VU	1, 2, 3	
34			Black-necked Stork		<i>Ephippiorhynchus asiaticus</i>		3	
35			Lesser adjutant Stork		<i>Leptoptilos javanicus</i>		2, 3	
36	Pelecaniformes	Threskiornithidae	Glossy Ibis		<i>Plegadis falcinellus</i>		3	
37		Ardeidae	Chnese little Bittern		<i>Ixobrychus sinensis</i>		1, 3	
38			Indian Pond Heron		<i>Ardeola grayii</i>		1, 3	
39			Eastern Cattele Egret		<i>Bubulcus Ibis</i>		1, 3	
40			Great Egret		<i>Ardea alba</i>		1, 3	
41			Grey Heron		<i>Ardea cinerea</i>		2, 3	
42			Purple Heron		<i>Ardea purpurea</i>		1, 3	
43			Intermediate Egret		<i>Mesophoyx intermedia</i>		1, 3	
44			Little Eegret		<i>Egretta garzetta</i>		1, 3	
45			Little Heron		<i>Butorides striatus</i>		2	
46			Javan pond Heron		<i>Ardeola speciosa</i>		1	
47			Phalacrocoracidae	Indian Shag		<i>Phalacrocorax fuscicollis</i>		1
48				Great Cormrant		<i>Phalacrocorax carbo</i>		1, 3
49				Little Cormorant		<i>Microcarbo niger</i>		1, 3
50				Spot billed pellican		<i>Pelecanus philippensis</i>	VU	1
51			Suliformes	Anhingidae	Oriental Darter		<i>Anhinga melanogaster</i>	NT
52	Falconidae	Collared Falconet			<i>Microhierax caerulescens</i>		2, 3	
53		Oriental Hobby			<i>Falco severus</i>		3	
54		Brahminy Kite			<i>Haliastur indus</i>		2	
55	Suliformes	Accipitridae	White-rumped Vulture		<i>Gyps bengalensis</i>	CR	2, 3	
56			Himalayan Griffon		<i>Gyps himalayensis</i>		3	
57			Slender-billed Vulture		<i>Gyps tenuirostris</i>	CR	3	
58			Crested serpent Eagle		<i>Spilornis cheela</i>		2, 3	
59			Western marsh Harrier		<i>Circus aeruginosus</i>		2, 3	
60			Hen Harrier		<i>Circus cyaneus</i>		3	

No.	Order	Family	Species		IUCN St.	Ref No.*	
			English Name	Scientific Name			
61	Suliformes	Accipitridae	Pied Harrier	<i>Circus melanoleucos</i>		2	
62			Eastern Marsh Harrier	<i>Circus aeruginosus</i>		3	
63			Chinese Sparrow Hawk	<i>Accipiter soloensis</i>		3	
64			Besra	<i>Accipiter virgatus</i>		3	
65			Greater spotted Eagle	<i>Clanga clanga</i>		VU	2
66			Steppe eagle	<i>Aquila nipalensis</i>			2
67			Grey-headed Fish Eagle	<i>Ichthyophaga ichthyaetus</i>		NT	2
68			Black Kite	<i>Milvus migrans</i>			2
69			Shikra	<i>Accipiter badius</i>			2
70				Oriental Honey Buzzard	<i>Pernis ptilorhynchus</i>		2
71	Gruiformes	Rallidae	Water Coak	<i>Gallicrex cinerea</i>		1, 3	
72			Purple Swamphen	<i>Porphyrio poliocephalus</i>		1, 3	
73			Common Moorhen	<i>Gallinula chloropus</i>		1, 3	
74			Common Coot	<i>Fulica atra</i>		1, 3	
75			White-breasted Waterhen	<i>Amaurornis phoenicurus</i>		2	
76		Gruidae	Sarus Crane	<i>Grus antigone</i>		VU	2
77			Eurasian Crane (Common Crane)	<i>Grus grus</i>		2	
78			Recurvirostridae	Black-winged Stilt	<i>Himantopus himantopus</i>		1
79	Charadriiformes	Charadriidae	Grey-headed Lapwing	<i>Vanellus cinereus</i>		2, 3	
80			Red-Wattled Lapwing	<i>Vanellus indicus</i>		1	
81			Little ringed Plover	<i>Charadrius dubius</i>		2, 3	
82		Jacanidae	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>		1, 3	
83			Bronze-winged Jacana	<i>Metopidius indicus</i>		2, 3	
84			Jack Snipe	<i>Lymnocyptes minimus</i>		3	
85			Solitary Snipe	<i>Gallinago solitaria</i>		3	
86				Common Snipe	<i>Gallinago gallinago</i>		1, 3
87				Wood Sandpiper	<i>Tringa glareola</i>		2
88		Scolopacidae		Common Sandpiper	<i>Actitis hypoleucos</i>		2, 3
89			Bar-tailed Godwit	<i>Limosa lapponica</i>		2	
90		Laridae	Brown-headed Gull	<i>Chroicocephalus brunnicephalus</i>		1, 3	
91			Black-headed Gull	<i>Chroicocephalus ridibundus</i>		1, 3	
92		Sternidae	Black-bellied Tern	<i>Sterna acuticauda</i>		2	
93	Columbiformes	Columbidae	Spotted Dove	<i>Streptopelia chinensis</i>		1	
94			Red-turtle Dove	<i>Streptopelia tranquebarica</i>		1	
95			Eurasian Collared Dove	<i>Streptopelia decaocto</i>		3	
96			Oriental Turtle Dove	<i>Streptopelia orientalis</i>		3	
97			Emerald Dove	<i>Chalcophaps indica</i>		3	
98			Pin-tailed Green Pigeon	<i>Treron apicauda</i>		3	
99			Thick-billed Green Pigeon	<i>Treron curvirostra</i>		3	
100			Grey-fronted Green pigeon	<i>Treron affinis</i>		3	
101			Green Imperial Pigeon	<i>Ducula aenea</i>		3	
102			Mountain Imperial Pigeon	<i>Ducula badia</i>		1	
103	Psittaciformes	Psittaculidae	Long tail Parakeet	<i>Psittacula longicauda</i>		1	
104			Alexandrin Parakeet	<i>Psittacula eupatria</i>		1	
105			Grey headed Parakeet	<i>Psittacula finschil</i>		1	
106			Blosson-headed Parakeet	<i>Psittacula roseata</i>		1	
107			Red-breasted Parakeet	<i>Psittacula alecardri</i>		1, 3	
108	Cuculiformes	Cuculidae	Dark Hawk Cuckoo	<i>Hierococcyx bocki</i>		3	
109			Indian Cuckoo	<i>Cuculus micropterus</i>		3	
110			Plaintive Cuckoo	<i>Cacomantis merulinus</i>		3	
111			Green-billed Malkoha	<i>Phaenicophaeus tristis</i>		3	
112			Lesser Coucal	<i>Centropus bengalensis</i>		3	
113	Strigiformes	Tytonidae	Barn Owl	<i>Tyto alba</i>		1, 3	
114			Oriental Scops Owl	<i>Otus sunia</i>		1	
115			Mountain Scops Owl	<i>Otus spilocephalus</i>		3	
116			Collared Owlet	<i>Glaucidium brodiei</i>		3	
117	Caprimulgiformes	Caprimulgidae	Great-eared Nightjar	<i>Lyncornis macrotis</i>		3	
118			Large-tailed Nightjar	<i>Caprimulgus macrurus</i>		3	

No.	Order	Family	Species		IUCN St.	Ref No.*
			English Name	Scientific Name		
119	Trogoniformes	Trogonidae	Red-headed Trogon	<i>Harpactes erythrocephalus</i>		3
120	Coraciiformes	Coraciidae	Indian Roller	<i>Coracias benghalensis</i>		2, 3
121		Alcedinidae	Common kingfisher	<i>Alcedo atthis</i>		1, 3
122			Blue-eared Kingfisher	<i>Alcedo meninting</i>		3
123			Rubby Kingfisher	<i>Halcyon coromanda</i>		3
124			White-throated Kingfisher	<i>Halcyon smyrnensis</i>		1, 3
125			Stork-billed Kingfisher	<i>Pelargopsis capensis</i>		2
126			Pied Kingfisher	<i>Ceryle rudis</i>		2, 3
127		Meropidae	Green Bee-eater	<i>Merops orientalis</i>		3
128			Blue-tailed Bee-eater	<i>Merops philippinus</i>		3
129	Bucerotiformes	Upupidae	Hoo poe	<i>Upupa epops</i>		1
130		Bucerotidae	Oriental pied Hornbill	<i>Anthracoceros albirostris</i>		2, 3
131			Black Hornbill	<i>Anthracoceros malayanus</i>		1
132			Blyth's Hornbill	<i>Rhyticeros plicatus</i>		1
133			Great Hornbill	<i>Buceros bicornis</i>		1, 3
134			Austen's Brown Hornbill	<i>Ptilolaemus Austeni</i>		1, 3
135			Rufous-necked Hornbill	<i>Aceros nipalensis</i>		3
136			Wreathed Hornbill	<i>Rhyticeros undulatus</i>		3
137	Piciformes	Megalaimidae	Blue-throated Barbet	<i>Megalaima asiatica</i>		2
138			Coppersmith Barbet	<i>Megalaima haemacephala</i>		2
139			Lineated Barbet	<i>Megalaima lineata</i>		3
140			Red-throated Barbet	<i>Megalaima mystacophanos</i>		3
141		Picidae	White-browed Piculet	<i>Sasia ochracea</i>		3
142			Grey-capped Pygmy Woodpecker	<i>Dendrocopos canicapillus</i>		3
143			Lesser Yellownape Woodpecker	<i>Picus chlorolophus</i>		3
144			Greater Yellownape Woodpecker	<i>Chrysophlegma flavinucha</i>		3
145			Himalayan Flameback Woodpecker	<i>Dinopium shorii</i>		3
146			Greater Flameback Woodpecker	<i>Chrysocolaptes guttacristatus</i>		3
147			Bay Woodpecker	<i>Blythipicus pyrrhotis</i>		3
148			Great Slaty Woodpecker	<i>Mulleripicus pulverulentu</i>		3
149			Greater golden backed Woodpecker	<i>Chrysocolaptes guttacristatus</i>		1
150			Common goldenback Woodpecker	<i>Dinopium javanense</i>		1
151			Streak-throated Woodpecker	<i>Picus xanthopygaeus</i>		1
152			Stripe breasted Woodpecker	<i>Dendrocopos atratus</i>		1
153			Streak-breasted Woodpecker	<i>Picus viridanus</i>		1
154	Passeriformes	Eurylaimidae	Long-tailed Broadbill	<i>Psarisomus dalhousiae</i>		3
155		Sturnidae	Pied Starling	<i>Spreo bicolor</i>		1
156		Pittidae	Blue-naped Pitta	<i>Hydromis nipalensis</i>		3
157		Vireonidae	White-bellied Erpornis	<i>Erpornis zantholeuca</i>		3
158		Campephagidae	Black-winged Cuckooshrike	<i>Coracina melaschistos</i>		3
159			Indochinese Cuckooshrike	<i>Coracina polioptera</i>		3
160			Short-billed Minivet	<i>Pericrocotus brevirostris</i>		3
161			Long-tailed Minivet	<i>Pericrocotus ethologus</i>		3
162			Scarlet Minivet	<i>Pericrocotus speciosus</i>		3
163			Grey-chinned Minivet	<i>Pericrocotus solaris</i>		3
164			Scarlet Minivet	<i>Pericrocotus speciosus</i>		1
165			Small Minivet	<i>Pericrocotus cinnamomeus</i>		1
166			Bar-winged Flycatcher Shrike	<i>Hemipus picatus</i>		3
167		Oriolidae	Black naped oriole	<i>Oriolus chinensis</i>		1, 3
168			Slender-billed Oriole	<i>Oriolus tenuirostris</i>		3
169			Maroon Oriole	<i>Oriolus traillii</i>		3
170			Black-hooded Oriole	<i>Oriolus xanthornus</i>		3
171		Artamidae	Ashy Woodswallow	<i>Artamus fuscus</i>		3
172		Aegithinidae	Common Iora	<i>Aegithina tiphia</i>		1, 3
173		Stenostiridae	Yellow-bellied Fantail	<i>Chelidorhynch hypoxantha</i>		3
174			White-throated Fantail	<i>Rhipidura albicollis</i>		3
175			Bronzed Drongo	<i>Dicrurus aeneus</i>		1, 3
176		Dicruridae	Hair-crested Drongo	<i>Dicrurus hottentottus</i>		3
177			Ashy Drongo	<i>Dicrurus leucophaeus</i>		3
178			Black Derongo	<i>Dicrurus macrocercus</i>		1, 3
179			Greater racket-tailed Drongo	<i>Dicrurus paradiseus</i>		1, 3

No.	Order	Family	Species		IUCN St.	Ref No.*	
			English Name	Scientific Name			
180	Passeriformes	Dicruridae	Lesser atcket tail Drongo	<i>Dicrurus remifer</i>		1, 3	
181			Spangled Drongo	<i>Dicrurus bracteatus</i>		1	
182		Monarchidae	Black-naped Monarch	<i>Hypothymis azurea</i>		3	
183		Corvidae	House Crow	<i>Corvus splendens</i>		3	
184			Eastern Jungle Crow	<i>Corvus macrorhynchos levaillantii</i>		3	
185			Common Green Magpie	<i>Cissa chinensis</i>		3	
186			Grey Treepie	<i>Dendrocitta formosae</i>		3	
187			Rufous Treepie	<i>Dendrocitta vagabunda</i>		3	
188		Laniidae	Grey-backed Shrike	<i>Lanius tephronotus</i>		3	
189			Burmese Shrike(Long-tailed Shrike	<i>Lanius Schach</i>		1, 3	
190			Brown Shrike	<i>Lanius cristatus</i>		2	
191		Nectariniidae	Purple Sunbird	<i>Cinnyris asiaticus</i>		3	
192			Olive-backed Sunbird	<i>Cinnyris jugularis</i>		3	
193			Black-throated Sunbird	<i>Aethopyga saturata</i>		3	
			Sunbird spp.	<i>Nectariniidae spp.</i>		1	
194		Nectariniidae	Little Spiderhunter	<i>Arachnothera longirostra</i>		3	
195			Streaked Spiderhunter	<i>Arachnothera magna</i>		3	
				Spiderhunter spp.	<i>Arachnothera spp.</i>		1
196		Dicaeidae	Plain Flowerpecker	<i>Dicaeum minullum</i>		3	
				Flowerpecker spp.	<i>Dicaeidae spp.</i>		1
197		Chloropseidae	Golden fronted Leafbird	<i>Chloropsis aurifrons</i>		1, 3	
198			Blue winged Leafbird	<i>Chloropsis cochinchinensis</i>		1, 3	
199			Orange-bellied Leafbird	<i>Chloropsis hardwickii</i>		1, 3	
200		Irenidae	Asian Fairy Bluebird	<i>Irena puella</i>		3	
201		Estrildidae	Chestnut Munia	<i>Lonchura atricapilla</i>		3	
202			Scaly-breasted Munia	<i>Lonchura punctulata</i>		1, 3	
203			White-rumped Munia	<i>Lonchura striata</i>		1	
204		Passeridae	Eurasian tree Sparrow	<i>Passer montanus</i>		1, 3	
205				Plain-backed Sparrow	<i>Passer flaveolus</i>		1
206		Ploceus	Asian golden Weaver	<i>Ploceus hypoxanthus</i>		1	
207				Streaked Weaver	<i>Ploceus manyar</i>		1
208		Motacillidae	White Wagtail	<i>Motacilla alba</i>		1	
209			Grey Wagtail	<i>Motacilla cinerea</i>		3	
210			Citrine Wagtail	<i>Motacilla citreola</i>		3	
211			Forest Wagtail	<i>Dendronanthus indicus</i>		1	
212			Yellow Wagtail	<i>Motacilla flaba</i>		1	
213			Olive-backed Pipit	<i>Anthus hodgsoni</i>		3	
214			Scarlet Finch	<i>Carpodacus sipahi</i>		1	
215			Fringillidae	Spot-winged Grosbeak	<i>Mycerobas melanozanthos</i>		3
216		Sittidae	Chestnut bellied Nuthatch	<i>Sitta castanea</i>		1, 3	
217				Velvet-front Nuthatch	<i>Sitta frontalis</i>		1, 3
218				White-tailed Nuthatch	<i>Sitta himalayensis</i>		3
219		Sturnidae	Asian Pied Starling	<i>Gracupica contra</i>		3	
220			Cilared Myana	<i>Acridotheres albocinctus</i>		3	
221			Crested Myna	<i>Acridotheres cristatellus</i>		3	
222			Jungle Myna	<i>Acridotheres fuscus</i>		3	
223			Common myna	<i>Acridotheres tristis</i>		1	
224			Common Hill myna	<i>Gracula religiosa</i>		1	
225				Vinous breasted Starling	<i>Strunus burmanicus</i>		1
226		Turdidae	Black-throated Thrush	<i>Turdus atrogularis</i>		3	
227				Chinese Blackbird	<i>Turdus merula</i>		3
228		Muscicapidae	White-tailed Robin	<i>Cinclidium leucurum</i>		3	
229			Plumbeous Water Redstart	<i>Rhyacornis fuliginosa</i>		3	
230			Blue Rock Thrush	<i>Monticola solitarius</i>		3	
231			Pied Bushchat	<i>Saxicola caprata</i>		3	
232			Grey Bushchat	<i>Saxicola ferreus</i>		3	
233			Jerdon's Bushchat	<i>Saxicola jerdoni</i>		3	
234			Eastern Stonechat	<i>Saxicola maurus</i>		3	
235			Himalayan Bluetail	<i>Tarsiger rufilatus</i>		3	
236			Black-backed Forktail	<i>Enicurus immaculatus</i>		3	
237			Blue Whistling Thrush	<i>Myophonus caeruleus</i>		3	
238			Hill Blue Flycatcher	<i>Cyornis banyumas</i>		3	
239				White-tailed Flycatcher	<i>Cyornis concretus</i>		3

No.	Order	Family	Species		IUCN St.	Ref No.
			English Name	Scientific Name		
240	Passeriformes	Muscicapidae	Chinese Blue Flycatcher	<i>Cyornis glaucicomans</i>	3	
241			Large Blue Flycatcher	<i>Cyornis magnirostris</i>	3	
242			Tickell's Blue Flycatcher	<i>Cyornis tickelliae</i>	3	
243			Verditer Flycatcher	<i>Eumyias thalassinus</i>	3	
244			Large Niltiva	<i>Niltava grandis</i>	1, 3	
245			Little Pied Flycatcher	<i>Ficedula westermanni</i>	1, 3	
246			Oriental magpie Robin	<i>Cospsychus saularis</i>	3	
247			White-rumped Shama	<i>Copsychus malabaricus</i>	3	
248			Paridae	Sultan Tit	<i>Melanochlora sultanea</i>	1
249				Grey-headed Canary-Flycatcher	<i>Culicicapa ceylonensis</i>	1
250		Muscicapidae	Red-throated flycatcher	<i>Ficedula prava</i>	1	
251		Emberizidae	Yellow breasted Bunting	<i>Emberiza aureola</i>	1, 3	
252			Chestnut Bunting	<i>Emberiza rutila</i>	3	
253		Pycnonotidae	Red vented Bulbul	<i>Pycnonotus cafer</i>	3	
254			Yellow-vented Bulbul	<i>Pycnonotus goiavier</i>	3	
255			Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	1	
256			Black-crested Bulbul	<i>Pycnonotus flaviventris</i>	1	
257			Sereak eared Bulbul	<i>Pycnonotus blanfordi</i>	3	
258			Sooty headed Bulbul	<i>Pycnonotus aurigaster</i>	3	
259			Olive Bulbul	<i>Iole virescens</i>	3	
260			White-throated Bulbul	<i>Alophoixus flaveolus</i>	3	
261	Ashy Bulbul		<i>Hemixos flavala</i>	3		
262	Himalayan Black Bulbul		<i>Hypsipetes leucocephalus</i>	3		
263	Hirundinidae	Barn Swallow	<i>Hirundo rustica</i>	3		
264		Red-rumped Swallow	<i>Cecropis daurica</i>	3		
265	Phylloscopidae	Grey-cheeked Warbler	<i>Seicercus poliogenys</i>	3		
266		Dusky Warbler	<i>Phylloscopus fuscatus</i>	1		
267		Two-barred Warbler	<i>Phylloscopus plumbeitarsus</i>	3		
		Warbler spp.	<i>Phylloscopidae spp.</i>	3		
268	Sylviidae	Yellow-eyed Babbler	<i>Chrysomma sinense</i>	3		
269	Pellorneidae	Nepal Fulvetta	<i>Alcippe nipalensis</i>	3		
270		Brown-cheeked Fulvetta	<i>Alcippe poioicephala</i>	3		
271		Schaeffer's Fulvetta	<i>Alcippe schaefferi</i>	3		
272		Rufous-throated Fulvetta	<i>Schoeniparus rufogularis (Alcippe rufogula)</i>	3		
273		Puff-throated Babbler	<i>Pellorneum ruficeps</i>	3		
274	Zosteropidae	Oriental White-eye	<i>Zosterops palpebrosus</i>	3		
275	Timaliidae	Grey-throated Babbler	<i>Stachyris nigriceps</i>	3		
276		Orange-billed Scimitar Babbler	<i>Pomatorhinus ochraceiceps</i>	1		
277		Pin-striped Tit-Babbler	<i>Macronous gularis</i>	1, 3		
	Babbler spp.	<i>Turdoides spp.</i>	3			
278	Leiothrichidae	White-crested Laughingthrush	<i>Garrulax leucolophus</i>	3		
279		Lesser Necklaced Laughingthrush	<i>Garrulax monileger</i>	3		
280		Blue-winged Minla	<i>Minla cyanouroptera</i>	3		
281		Grey Sibia	<i>Heterophasia gracilis</i>	3		
282	Locustellidae	Striated Grassbird	<i>Megalurus palustris</i>	3		
283	Cisticolidae	Zitting Cisticola	<i>Cisticola juncidis</i>	1		
284		Dark-necked Tailorbird	<i>Orthotomus atrogularis</i>	3		
285		Common Tailor Bird	<i>Orthotomus sutorius</i>	3		

*Sources: 1: Mytkyina University (2003), 2: Davies *et. al* (2004), 3: Geissmann *et. al* (2010) & IUCN (2014)

Table 6. Mammal species Found in the Indawgyi Area

No.	Order	Family	English Name	Species Scientific Name	IUCN St.	Ref No.*
1	Pholidota	Manidae	Chinese Pangolin	<i>Manis pentadactyla</i>	CR	2
2	Primates	Lorisidae	Northern Slow Loris	<i>Nycticebus bengalensis</i>	VU	2
3		Cercopithecidae	Phayre's Leaf Monkey	<i>Trachypithecus phayrei</i>	EN	2
4			Shortridge's Leaf Monkey	<i>Trachypithecus shortidgei</i>	NT	2
5			Assamese Macaque	<i>Macaca assamensis</i>		2
6			Rhesus Macaque	<i>Macaca mulatta</i>		2
7			Stump-tailed Macaque	<i>Macaca arctoides</i>	VU	2
8			Northern Pig-tailed Macaque	<i>Macaca leonina</i>	VU	2
9		Hylobatidae	Eastern Hoolock gibbon	<i>Hoolock hoolock</i>	EN	2
10		Carnivora	Canidae	Golden Jackal	<i>Canis aureus</i>	
11	Dhole			<i>Cuon alpinus</i>	EN	2
12	Ursidae		Asian Black Bear	<i>Ursus thibetanus</i>	VU	2
13		Sun Bear	<i>Helarctos malayanus</i>	VU	2	
		Bear spp.	<i>Ursus spp.</i>		1	
14	Mustelidae	Yellow-throated Marten	<i>Martes flavigula</i>		2	
15		Large-toothed (Burmese) Ferretbadger	<i>Melogale personata</i>		2	
16		Hog Badger	<i>Arctonyx collaris</i>	NT	2	
17		Oriental Small-clawed Otter	<i>Aonyx cinerea</i>	VU	2	
18		Viverridae	Small Indian Civet	<i>Viverricula indica</i>		2
19			Large-spotted Civet	<i>Viverra megaspila</i>	VU	2
20			Large Indian Civet	<i>Viverra zibetha</i>	NT	2
21	Mask Palm Civet		<i>Paguma larvata</i>		2	
22	Common Palm Civet		<i>Paradoxurus hermaphroditus</i>		2	
23	Binturong	<i>Arctictis binturong</i>	VU	2		
24	Herpestidae	Small Indian Mongoose*	<i>Herpestes auropunctatus</i>		2	
25	Felidae	Clouded Leopard	<i>Neofelis nebulosa</i>	VU	2	
26		Leopard	<i>Panthera pardus</i>	NT	1, 2	
27		Tiger	<i>Panthera tigris</i>	EN	1, 2	
28		Marbled Cat	<i>Pardofelis marmorata</i>	VU	2	
29		Leopard Cat	<i>Prionailurus bengalensis</i>		2	
30		Fishing Cat	<i>Prionailurus viverrinus</i>	EN	2	
31		Jungle Cat	<i>Felis chaus</i>		2	
32		Proboscidea	Elephantidae	Asian Elephant	<i>Elephas maximus</i>	EN
33	Artiodactylia	Suidae	Eurasian Wild pig	<i>Sus scrofa</i>		2
34	Cervidae	Fea's Muntjac	<i>Muntiacus feae</i>		2	
35		Red Muntjac	<i>Muntiacus muntjak</i>		2	
36		Sambar Deer	<i>Cervus unicolor</i>	VU	1, 2	
37	Bovidae	Gaur	<i>Bos gaurus</i>	VU	1, 2	
38		Chines Serow	<i>Capricornis milneedwardsi</i>		1, 2	
39		Red Serow	<i>Capricornis rubidus</i>	NT	2	
		Serow spp.	<i>Capricornis spp.</i>		1	
40	Rodentia	Sciuridae	Black Giant Squirrel	<i>Ratufa bicolor</i>	NT	2
41			Pallas's Squirrel sp.	<i>Callosciurus erythraeus sp.</i>		2
42			Irrawaddy Squirrel sp.	<i>Callosciurus pygerythrus sp.</i>		2
43			Red Giant Flying Squirrel	<i>Petaurista petaurista</i>		2
44		Spalacidae	Chinese Bamboo Rat	<i>Rhizomys sinensis</i>		2
45		Hoary Bamboo Rat	<i>Rhizomys pruinosus</i>		2	
46	Hystriidae	Malayan Porcupine	<i>Hystrix brachyura</i>		2	
47		Brush-tailed Porcupine	<i>Atherurus africanus</i>		2	

*Sources: 1: Davies *et. al* (2004), 2: Geissmann *et. al* (2010) & IUCN (2014)

Table 7. Reptile species Found in the Indawgyi Area

No.	Order	Family	Species		IUCN St.	Ref No.*
			English Name	Scientific Name		
1	Testudines	Testudinidae	Yellow Tortoise	<i>Indotestudo elongata</i>	EN	1
2		Testudinidae	Sian Brown Tortoise	<i>Manouria emys</i>	EN	1
3		Bataguridae	Asian Leaf Turtle	<i>Cyclémy s dentata</i>	NT	1
4		Bataguridae	Myanmar Box Turtle	<i>Cuora amboinensis lineata</i>	VU	1
5		Trinychidae	Asiatic soft shell Turtle	<i>Amyda cartilaginea</i>	VU	1
6		Trinychidae	Myanmar Peacock soft shell Turtle	<i>Nilssonia formosa</i>	EN	1

*Sources: 1: Shwe Myint *et. al* (2010) & IUCN (2014)

Table 8: Fish Species Found in the Indawgyi Lake

No.	Order	Family	Species		IUCN St.	Ref No.*
			English Name	Scientific Name		
1	Clupeiformes	Clupeidae	Burmese river shad	<i>Gudusia variagata</i>		1,2
2	Osteoglossiformes	Notopteridae	bronze featherback	<i>Notopterus notopterus</i>		1,2
3				<i>Rohtee fese</i>		1
4				<i>Rohtee belengeri</i>		1
5				<i>Rohtee cortiocunma</i>		1
6				<i>Chela laubuca</i>		1
7				<i>Chela sladoni</i>		1
8				<i>Danio kyathit</i>		1
9			Glowlight danio	<i>Danio choprae</i>		1
10				<i>Barilius barila</i>		1
11				<i>Barilius guttatus</i>		1
12			Giant donio	<i>Danio aequipinnatus</i>		1
13			Zebrafish	<i>Danio rerio</i>		1
14			Burmese carplet	<i>Amblypharyngodon atkisonic</i>		1
15			Elegant Rasbora	<i>Rasbora elegans</i>		1
16				<i>Rasbora cinthovenii</i>		1
17				<i>Rasbora rasbora</i>		1
18				<i>Rasbora daniconius</i>		2
19		Cyprinidae		<i>Esomus altus</i>		1,2
20				<i>Cyclocheilichthys apogon</i>		1
21	Cypriformes			<i>Oreichthys casuatis</i>		1
22				<i>Chagunius chagunio</i>		1
23			Ticto barb	<i>Puntius ticto</i>		1
24			Rosy barb	<i>Puntius conchoni</i>		1
25			Olive barb	<i>Puntius sarana</i>		1
26			Olive barb	<i>Puntius sarana sewalli</i>		1
27				<i>Puntius orphoides</i>	-	2
28				<i>Hypsibarbus myitkyina</i>	-	2
29				<i>Acrossocheilus hexagono lepis</i>	-	1
30				<i>Osteochilus neilli</i>	-	1
31			Nandi labeo	<i>Labeo nandina</i>	NT	1
32			Kuria labeo	<i>Labeo gonius</i>		1
33			Rohu	<i>Labeo rohita</i>		1
34				<i>Labeo Calabusa</i>	-	1
35				<i>Salmostoma sladoni</i>		2
36		Cobitidae	Peppered Loach	<i>Lepidocephalus guntea</i>		1
37				<i>Acanthopsis chororhynchus</i>	-	1
38		Balitoridae		<i>Homaloptera rupicola</i>		1

No.	Order	Family	Species		IUCN St.	Ref No.*	
			English Name	Scientific Name			
39				<i>Silurus cochinchinensis</i>		1	
40		Siluridae		<i>Ompok bimacalatus</i>	NT	1	
41				<i>Ompok Pabo</i>	NT	1	
42				<i>Wallago attu</i>	NT	1,2	
43				<i>Mystus corsula</i>		1	
44		Bagridae		<i>Mystus gulio</i>		1	
45				<i>Mystus Leucophasis</i>		1	
46			Long-whiskered Catfish	<i>Mystus aor</i>		1	
47				<i>Glyptothorax birmanicus</i>	-	1	
48	Siluriformes	Erethistidae		<i>Glyptothorax tuberculatus</i>	DD	1	
49				<i>Glyptothorax birmamicus</i>	-	1	
50		Akysidae		<i>Prethistes conta</i>	-	1	
51		Sisoridae		<i>Gagata cenia</i>		1	
52		Akysidae		<i>Akysis prashadi</i>		1,2	
53		Heteropneustidae	Stinging catfish		<i>Heteropneustes fossilis</i>		1
54		Clariidae			<i>Clarias Scopoli</i>	-	1
55					<i>Clarias batrachus</i>		1
56				<i>Mystus seenghala</i>		1	
57	Bagridae			<i>Mystus corsula</i>		1	
58				<i>Mystus leucophaesus</i>	-	1	
59	Beloniformes	Belonidae		<i>Belone cancila</i>		1,2	
60	Gasterosteiformes	Indostomidae		<i>Indostomus paradoxus</i>		1,2	
61			Rice swampeel	<i>Monopterus albus</i>		1	
62	Synbranchiformes	Synbranchidae		<i>Monopterus javanensis</i>	-	1	
63				<i>Monopterus allus</i>	-	1	
64	Syngnathiformes	Syngnathidae		<i>Doryichthys dunckeri</i>		1	
65		Ambassidae		<i>Ambassis ranga</i>		1	
66			Himalayan Glassy Perchlet	<i>Ambassis baculis</i>		1	
67		Badidae		<i>Badis badis</i>		1	
68	Perciformes			<i>Badis dario</i>	DD	1	
69		Osphronemidae		<i>Parasphaerichthys ocellatus</i>		1	
70		Anabantidae	Climbing perch		<i>Anabas testudineus</i>	DD	1
71		Osphronemidae			<i>Trichogaster fasciatus</i>		1
72		Channidae	Snakehead Murrel	<i>Ophicephalus striatus</i>		1,2	
73			Blotched snakehead	<i>Ophicephalus marulius</i>		1,2	
74	-	Ophicephalidae		<i>Ophicephalus gachaa</i>	-	1	
75				<i>Macrognathus aculeatus</i>	-	1	
76	Synbranchiformes	Mastacembelidae		<i>Macrognathus lecepeda</i>	-	1	
77				<i>Macrognathus armatus</i>	-	1	
78	Tetraodontiformes	Tetraodontidae		<i>Tetraodon cutcatia</i>		1,2	
79				<i>Labeo dyochilus</i>		1	
80			Angra Labeo	<i>Labeo angra</i>		1	
81			Nandi labeo	<i>Labeo nandina</i>	NT	1	
82				<i>Labeo gomius</i>	-	1	
83	Cypriniformes	Cyprinidae		<i>Labeo calbusa</i>	-	1	
84				<i>Labeo gobu</i>	-	1	
85				Rohu	<i>Labeo rohita</i>		1,2
86				Burmese Latia	<i>Crossocheilus burmanicus</i>		1
87				Khasi garra	<i>Garra nasuta</i>		1
88			Balitoridae	Striped Loach	<i>Nemacheilus botia</i>		1
89		Cobitidae	Tiger Botia	<i>Botia hymenophysa</i>	NT	1	

*Sources: 1: Mytkyina University (2003), 2: Davies et. al (2004) & IUCN (2014)

Annex I Itinerary

Place: Indawgyi Lake, Kachin State, Myanmar **Date:** 3-13 January 2015

Organizer: FFI Myanmar

Participants: Bishnu Bhandari, Hide Nakamura & Shiina Suzuki

Day & Date	Time	Activities
Day One: Sunday 4 Jan 2015		Depart for Yangon & meet Hide-san & Shiina-san at Yoma Hote, Yangon
Day Two: Monday 5 Jan 2015		1. Briefing at FFI Office 2. Fly to Myitkyina by K7- 622 at 13:30-16:40 3. Visit Shree Ram Janaki Temple 4. Visit the Kachin Festival 3. Night stay at Two Dragon Hotel, Myitkyina
Day Three: Tuesday 6 Jan 2015	7:30 2 pm 3 pm 4 pm 6 pm	Drive to Indawgyi, Lunch & Tea on the way Reach Lon Ton and Check in Indaw MaHar Guest House Meeting with fishermen Meeting with the Sanctuary staff Meeting with the Friends of Wilflife
Day Four: Wednesday 7 Jan 2015	8 am 8:30 9:30 12:00 1 pm 3 pm 4 pm 5 pm 5:45	Depart for Hepu by boat Meeting with farmers Travel to Lon Sant and walking through of the village Travel to Shewe Taung Pagoda Visit of the Ayerawati River mount and Hike to the Shwe Taung Lunch at Nyang Bin Visit of Shwe Mint Zu Pagoda Meeting with local tourism group, Inn Chit Thu Drive back to Hopin village for night halt
Day Five: Thursday 8 Jan 2015	6:45 7:45 10:45 11 am 2 pm 5 pm 7 pm	Breakfast at Bin Bang Restaurant Drive back to Myitkyina Arrive at Myitkyina Visit the Kachina Festival and lunch Fly back to Yangon by YJ-202 at 14:05-16:55 Arrive at Yangon with a short stop over at Mandalay Stay at Yoma Hotel, Downtown, Yangon
Day Six: Friday 9 Jan 2015	9 am 11 am 1:30 3 pm 4:30 7:30	Visit Yangon University Library and Central Linrary Meet U Htun Paw Oo at Gyagone Forest Compound, Bayintnaung Road, Insen, Yangon Meet U Ngwe Lwinn at FFI Office Meeting with the YCDC Staff about Inya and Kandawgyi lakes Meeting with U Saw Daw Wah, UNDP Shiina-san leaves for Japan
Day Seven: Saturday 10 Jan 2015	10:30	Vist Yangon Zoological Garden
Day Eight: Sunday 11 Jan 2015	1 pm	Meet U Tun Tun, Former DG (Place to be decided)
Day Nine: Monday 12 Jan 2015	8 am 2 pm 4:30 5 pm	Visit tothe library of Dagon University, Dagon Township Meeting with the FFI official Deliver AWS publication to library Travel to the Yangon International Airport
Day Ten: Tuesday 13 Jan 2015		Arrive at the respective countries

Annex II

Important Institutions & Persons

1. Community Forestry Group
 - a. U Kyaw Win – President, Lon Sant Community Forestry Group, Lon Sant.
2. FFI Myanmar Programme
 - a. U Zau Lunn, Marine Coordinator, FFI Myanmar Programme, Yangon
 - b. U Ngwe Lwinn, Terrestrial Coordinator, FFI Myanmar Programme, Yangon
 - c. Mr. Mark E. Grindle, Program Manager, FFI Myanmar Programme, Yangon
 - d. U Myint Shwe, Field Coordinator, FFI Myanmar Programme, Yangon
3. Free Lancer
 - a. Tin Tun- Former Director-General, Dept of Planning and Statistics, Yangon
4. Friends of Wildlife
 - a. U Ko Ko Naing – Project Officer, Friends of Wildlife. Lon Ton, Mohnyin Township, Kachin State, Myanmar.
5. Indawgyi Wildlife Sanctuary
 - a. U Kyi Oo – Range Officer, Indawgyi Wildlife Sanctuary, Lon Ton, Mohnyin Township, Kachin State, Myanmar.
 - b. U Soe Myint – Ranger, Indawgyi Wildlife Sanctuary, , Lon Ton, Mohnyin Township, Kachin State, Myanmar.
6. Inn Chit Thu Tourism Group
 - a. Daw Eima Soe – Secretary, Inn Chit Thu Tourism Group, Lon Ton, Mohnyin Township, Kachin State, Myanmar.
7. Local people
 - a. Fishermen of the Lon Ton village, Mohnyin Township, Kachin State, Myanmar.
 - b. Farmers of the Hepu village, Mohnyin Township, Kachin State, Myanmar.
8. Myanmar Forest Association : U Htun Paw Oo- Executive Member, Myanmar Forest Association, Gyagone Forest Compound, Bayintnaung Road, Insein, Yangon.
9. UNDP : U Saw Doh Wah, Program Analyst, United Nations Development Programme, Yangon, Myanmar.
10. YCDC
 - a. U Thein Min, Deputy Chief Engineer, Engineering Department (Water & Sanitation, Yangon City Development Committee (YCDC)
 - b. Daw Khin Aye Myint, Engineering Department (Water & Sanitation, Yangon City Development Committee (YCDC)

>>>>> The End <<<<<