Government of the People's Republic of Bangladesh
MINISTRY OF HOUSING AND PUBLIC WORKS
Urban Development Directorate (UDD)
82, Segunbagicha, Dhaka-1000

Inception Report

For

"Preparation of Development Plan for Mirsharai Upazila, Chittagong District: Risk Sensitive Land use Plan (MUDP)" an area of approximately 482.88 sq km. for
Package-6: Baseline Survey of Existing Flora and Fauna

Inception Report

INCEPTION REPORT
Baseline Survey of Existing Flora and Fauna-Package-06of"Preparation of Development
Plan for Mirsharai Upazila, Chittagong District: Risk Sensitive Landuse Plan" Project under
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QUESTIONNAIRE

Ref: ECAL/UDDP-Mirsharai/1575

Date: December 14, 2017

To,

Ahmed Akhtaruzzaman
Project Director
Preparation of development Plan for Mirsharai Upazila,
Chittagong District: Risk Sensitive Landuse Plan (MUDP)
Urban Development Directorate (UDD)
82, Segunbagicha, Dhaka-1000.

Subject   : **Submission of Inception Report.**

Ref.   : as per Contract Agreement signed on 15th November, 2017.

Dear Sir,

We ECAL being the appointed consultant for "**Preparation of Development Plan for Mirsharai Upazila Chittagong District: Risk Sensitive Land use Plan (MUDP)" an area of approximately 482.88 sq km. (Package-6: Baseline Survey of Existing Flora and Fauna)**, are pleased to submit Mobilization Report as per contract and we are hoping that you and your organization will take appreciable efforts to pass commenced bill of Inception Report as early as possible.

I hope you will find our submission in order.

Thanking you

Yours Sincerely,

_____
Mohammed Jamal Uddin
Executive Director

**Enclo:** Inception Report-40 copies (5 copies color & 35 copies black)

Section-1
Background Introduction

1.1.   Project Background

The total area of MirsharaiUpazila (Chittagong district) is 482.88 sqkm(BBS)/509.80sqkm(GIS Data), located in between 22°39' and 22°59' north latitudes and in between 9I°27' and 91°39' east longitudes. It is, bounded by Trippura state of India, ChhagalnaiyaandFeniSadarupazilas on the north, Sitakundaupazila and Bay of Bengal on the south, Fatikchhariupazila on the east, SonagaziandCompaniganjupazilas on the west. Mirsharai Thana was formed in 190] and it was turned into an upazila in 1983. MirsharaiUpazila consists of 2 Municipality, 16 Union and 113 Mouza.
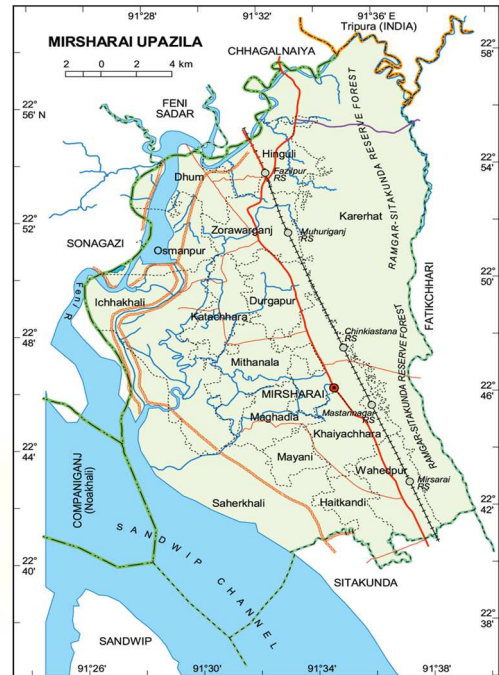
Mirsharai, the combination of lake and hilly area contains attractive scenic beauty on the southernmost part of Bangladesh. The most important attraction of the upazila is that one can travel MohamayaChara Lake by speed boat and explore hilly area and can enjoy Khoiyachora, Baghbiani, Napitachora, Sonaichora, Mithachora and Boyalia waterfalls. This area is located 192.2 km far from Dhaka and 4.5 hour bus journey. Anyone can travel by rail and it is 197 km of rail journey and it takes 4.5 hour from Dhaka to MirsharaiUpazila. 56 km from the Chittagong Divisional headquarters and takes 1.5 hours travel by bus. The Bangladesh Road Transport Corporation introduced a direct bus service from Dhaka to *Mirsharai*via Comilla (Banglapedia,2012)

The Feni is the main river of Mirsharai Upazila; Sandwip Channel is also notable. There are 30 canals present in this area some of those are FeniNadi, Isakhali, Mahamaya, Domkhali, Hinguli, Moliaish, KoilaGovania and MayaniKhal. The hills range on the northern and eastern side of this upazila along the bank of the Feni River extended up to Chittagong and the Chittagong hill tracts

1.2   Historical Events: Sultan Fakhruddin Mobarak Shah conquered Chittagong in 1340 AD and established the Muslim rule in this region. During the reign of Gaur Sultans Hussain Shah and Nusrat Shah, Paragal Khan and Chhuti Khan were the rulers of this area. Subsequently Nizam Shah, brother of emperor Sher Shah, was the ruler of this area. NizampurPargana is named after Nizam Shah and the whole area of Mirsharai came under the control of

Nizampurpargana. From the beginning of the 16th century this region was very rich in Bangia literature. Most of the time between 1580 and 1666 this region was under the control of the Arakanese. The place at which (of the present Mirsharaithana) BujurgUmed Khan, son of Subadar Sayesta Khan, landed after crossing the Feni River was named as BujurgUmedpur. With the conquest of Chittagong by Bujurg Umed Khan in 1666, this region came permanently under the Mughal rule. Towards the *end* of British rule in India, Durgapur and Karerhat areas of Mirsharaiupazila were the centers of revolutionary activities of Chittagong. A fierce battle was fought between the freedom fighters (under Capt. Wali Ahmed) and the Pak army at a place adjacent to the Fenafuni Bridge on the south of Mirsharaisadar in which about 100 Pak soldiers were killed. Besides, direct encounters were held between the freedom fighters and the Pak army at many' places including Shuvapur Bridge, Hinguli Bridge, Aochi Mia Bridge and Mostan Nagar.

Map of the project area
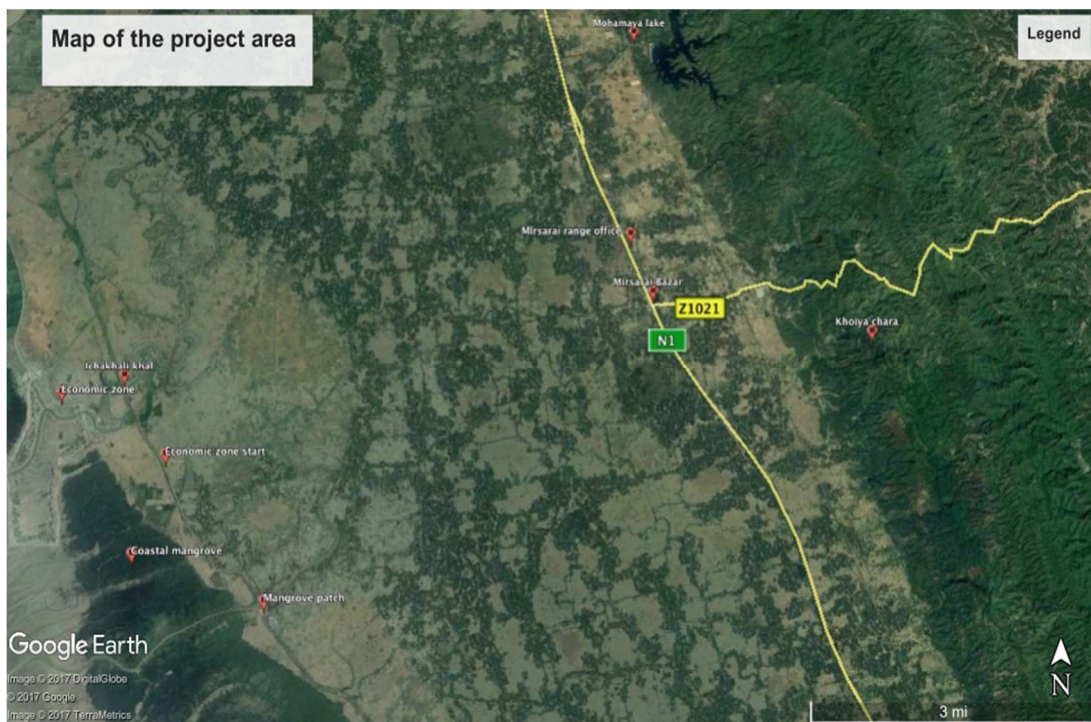
1.3   Main occupations: Agriculture is the main occupation(38.93%) here with the others like non-agricultural labourer 3.61%, industry 0.57%, commerce 13.26%,transport and communication 2.93%, service 18%, construction 1.19%, religious service 0.34%, rent and remittance 8.84% and others 12.33%.   Total cultivable land 22,896.40 hectares, fallow land 147733 hectares; single crop 38.91%, double crop 42.46% and treble crop land 18.63%. At present Cultivable   land   under   irrigation   is   6,917.85 hectare. Ownership of agricultural land Landowner 51.30%, 'landless 48.70%; agricultural landowner: urban 38.82% and rural 52.09%

1.4   Value of Land: The market value of the first grade arable land is Tk 30000 per 0.01 hectare. Main crops Paddy, potato, aborigine, bean, tomato, pumpkin and radish. Extinct or nearly extinct crops Sugarcane, jute, arahar, sesare, linseed, ground nut. Main fruits Mango, blackberry, jackfruit, banana, papaya, litchi, pineapple,

1.5   Communication facilities Roads: Pucca road 230 km, semi-pucca road 119 km, mud road 1435 km; railway 16 km; waterway 11 nautical miles, Rail junction 4. Extinct or nearly extinct traditional transport Palanquin, bullock cart. Noted manufactories Carpet industry, pipe mill, ice factory, rice mill, bakery, brick-field, steel furniture, fish- poultry' feed' factory, bidi factory. There are also Cottage industries, Goldsmith, blacksmith, potteries, weaving, tailoring, bamboo and wood work. Hats, bazars and fairs Hats and bazars are 52, fairs 5, most noted of which are Abu Torab Bazar, Kamar Ali Bazar, Bara Daroga Hat, Mahajan Hat, Rarer Hat, Baraia Hat, Shantir Hat, ZorwarganjBaishakhiMela, BaruniSnanMela and ShadhinataMela. Main exports product is Bamboo, fish, paddy, potato, banana, vegetables.

1.6   NGO Activities: Operationally important NGOs are BRAC, Proshika. ASA, Sheba, CARE, and Hunger Project.Upazila health complex 1, family planning centre 16, satellite clinic 11.

1.7   Opportunity: Bangladesh can earn money in local and also in foreign exchange by opening a tourist resort at *Mirsharai.* The spot, if properly developed will become an excellent holiday resort and tourist centre. Rowing facility can be arranged easily; fishing and hunting facilities are already there. The success of developing *Mimharai* as a tourist centre and Special Economic Zone depends much on good communication facilities and availability of modern amenities. Moreover, the proposed *Special Economic Zone* would generate many industry-related new activities including huge vehicular traffic such as air, rail, road and water. This phenomenon would have both positive and negative impact on the socio-economic condition and existing land use pattern of the region. The proposed planning package would guide such probable changes in the socio-economic condition and land use pattern of the region, and would also address the adverse impact of such changes.

The proposed project would be prepared on a regional development perspective considering the region as a part of whole of Mirsharai Upazila and its 16 unions. In this development-planning package since its location is strategically important from the regional context because *this* upazila is situated on the way to Dhaka Chittagong highway as the highway runs through this upazila.

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1.8   Description of the Project Area: A detailed description of the Project Area is
given below:

Table: Area, Population and Density of the Project Area:

Municipality	Union	Mouza	Village	Population		Density (persq km)	Literacy Rate (%)
				Urban and Other Urban	Rural		
2	16	103	208	31206	367510	826	55.1

Source: BBS, 2011

Mirsharai sea beach, hilly area, Mohamaya Chara Lake, Khaiya Chara region
has the greater potential for tourism development as there are abundant
resources to attract tourists. Mirsharai is developing in an unplanned and
haphazard manner very rapidly due to the ample opportunity for tourism
development, which is acting as pull factor for private sector developers.
Hence, this project has been under taken to protect the region from depletion
of its natural resources and character and tourism development as well.

Moreover, honorable MoHPW Minister expressed his heartiest interest to
develop char of this Upazila as an exclusive economic zone; as well as to
establish a tourist zone and economic zone covering Mirsharai Upazila.

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Section-2
Objectives of the Project

2.1 Objectives of the Project

The objective of the project is to-optimize coastal resources and activities for sustenance of marg. The coastal activities and resources are very important to the economy and life of the people of whose living conditions are inextricably linked to the productivity and sustainability of coastal zone. This long term Holistic Development Plan for the coastal zone. Coastal zone needs to be integrated with the mainstream of development process of the country. So, an interdisciplinary development planning approach is urgent to optimize livelihood of coastal zone. The major objectives of the projects are as follows.

(i) To integrate coastal zone with the mainstream of development process of the country.
(ii) To frame policies for the best use of land and its control for the Mirsharai Upazila.
(iii) To optimize coastal environment for sustenance of marginal people.
(iv) Formulation of Policies and plans for mitigation of different types of hazards, minimizing the adverse impacts of climate change and recommend possible adaptation strategies for the region.
(v) Formulation of Policies and plans for gradual nucleation of settlements with policies and plans for development of growth centers of the area.

Formulation of a planning package for development of tourism in Mirsharai Upazila, and also to accommodate future changes in existing land use pattern, socio-economic condition of the area and quality of life of the people due to establishment of the third sea port in the region in an integrated and comprehensive manner.

2.2 Objectives the baseline survey of existing flora and fauna:

However, some of the specific objectives of the baseline survey of existing flora and fauna are as follows.
- To prepare an inventory on existing flora and fauna of Mirsarai Upazila.
- To identify threatened species of wild plants and animals.
- To identify critical ecosystem and wildlife habitats in this area.
- To prepare habitat map of existing flora and fauna.
- To determine the potentiality of natural resources for ecotourism development.
- To determine potential threats to the wild plants, animals and their critical habitats and also on the critical ecosystems due to the developmental activities.
- To prepare a strategic and management plan to mitigate the potential impacts on the ecosystem or species.

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Section-3
Methodology for the Assignment

3.1   An Inventory of the Flora and Fauna

Habitat types will be categorized after the reconnaissance field survey and the survey sites will be selected based on different habitats. Survey points will be selected randomly but ensuring to cover all types of habitats and also covering most of the area of the Upazila. Survey sites will be plotted on the map using GPS coordinates.

3.1.1   Survey areas are broadly divided into 8 Sub-categories.

3.1.1.1   Forest areas: Mirsarai Upazila covers a large area of Korer Hat Forest Range and a part of Baraiyadhala National Park. Regular survey will be conducted there.
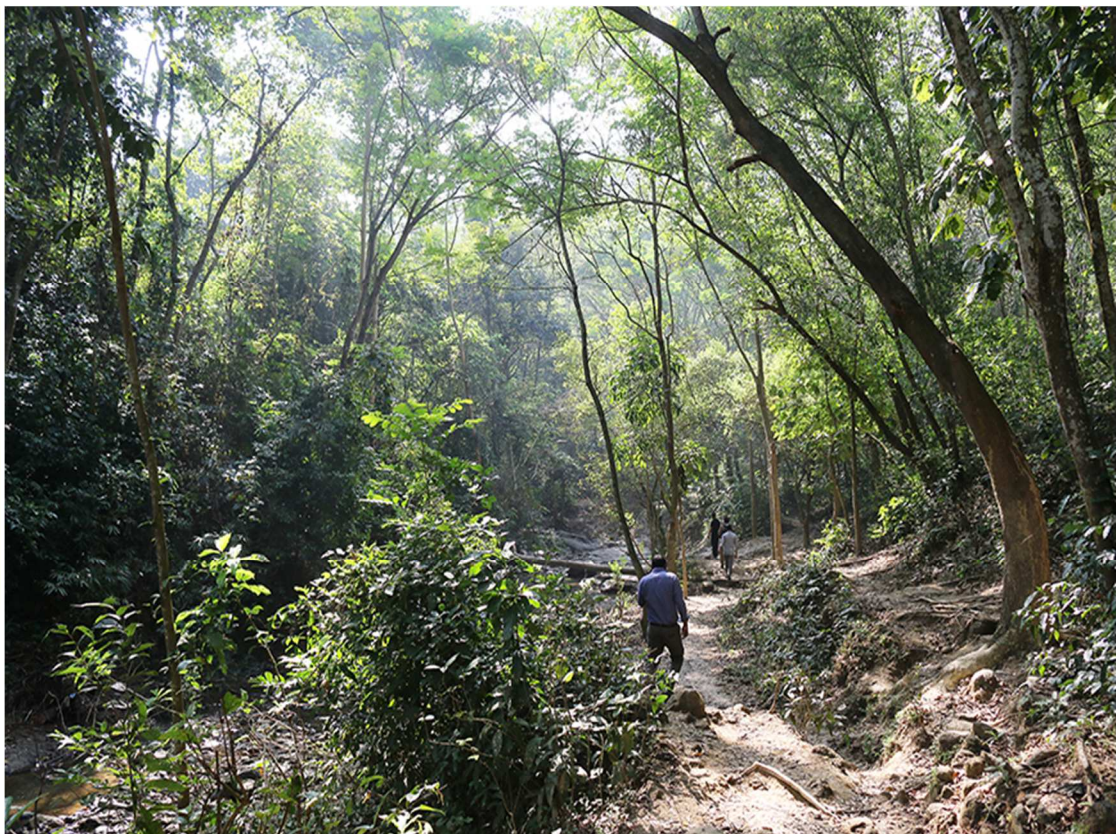
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3.1.1.2 Hill streams: Many of the hill streams are active throughout the year. This habitat is suitable for many cryptic species of amphibians and reptiles.

3.1.1.3 Coastal mangroves: Coastal mangroves are good habitat for shore birds and introduced spotted deer.

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3.1.1.4 Agricultural land: Agricultural lands provide support to many insectivore and grain eater birds and also to rodents.

3.1.1.5 River banks: Habitat for many wader birds, freshwater fish and turtles.

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3.1.1.6 Homestead vegetation: Habitat for birds as well as hiding places for many nocturnal mammals and birds.

3.1.1.7 Development areas: Developing areas will also be surveyed to know the impact of developing activities on existing wild animals.

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3.1.1.8 Tourist spots: Tourist sports will be surveyed to see the impact of tourists on wildlife habitats and ecosystem.

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3.1.2 Survey methods for flora

Plant community will be studied by following different methods. Parameters like frequency, density, abundance, presence, absence and dominance, diversity index will be quantified.

3.1.2.1 Transect survey

Transect survey will be used to explore the existing floristic composition of Mirsharaiupazila. Sample of the plant species will be collected to prepare herbarium in order to identify the plant species wherever necessary. The floristic composition includes the occurred species of under trees, shrubs, herbs, climbers, epiphytes, parasites and ferns.

3.1.2.2 Quadrate survey

The quadrate survey will be used for assessing plant community structure, tree species diversity and their regeneration status. The estimate of species contents of a habitat shall be determined by observing the plant species at different sample areas.

In the quadrates, trees of ≥5cm diameter will be counted. Moreover, total height and diameter of the trees individuals of different species will also be recorded. The parameters that are commonly used to characterize the structure of the plant communities are:

Density, Frequency, Abundance, Vegetation Coverage, Basal area, Dominance, Species richness index, Similarity index, Shannon-Wiener diversity index, Index of similarity etc.

3.1.2.3 Point Quarter Method

The point quarter sampling method is a method that is quick and very useful to wildlife biologist.

The method relies on using a series of randomly determined points that may be distributed along a transect line or throughout a habitat to be described. Each point represents the centre from which four compass directions north, south, east and west) divided the sampling point into four quarters.

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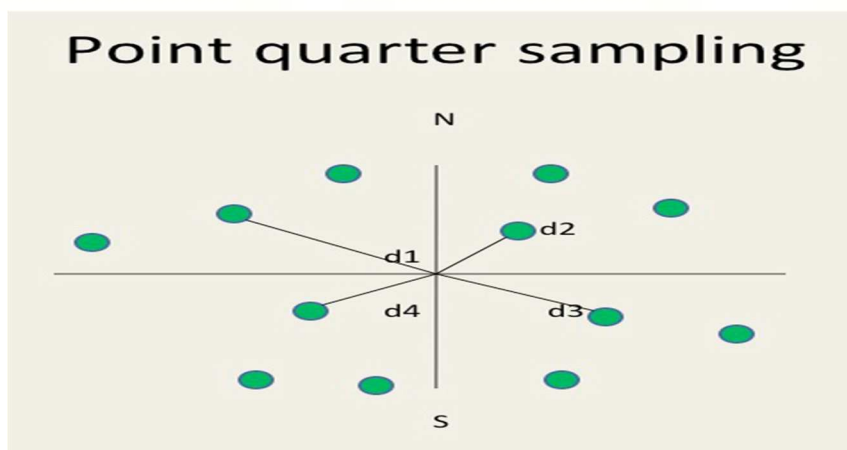
In each quarter the distance (d1 to d4) from the point to the centre of the nearest plant with a predefined size (>10 cm dbh) is measured. So the calculation is-

Mean distance from the point d=mean (d1 to d4)
So, density of plants per unit area =A/d^2,
Where A= total area.

3.1.3 Survey methods for fauna

A combination of different methods will be applied for the project work. Some of the methods are as follows.

3.1.3.1 Line Transect Sampling

Both temporary and permanent transect line will be set randomly covering all types of habitat. Visual encounter survey will be conducted on foot both in day and night. All the wild animals will be recorded from the both side of transect. GPS coordination will be used to calculate the total transect area covered for survey.
During river habitat survey, the river will be considered as a transect line.

3.1.3.2 Quadrate Sampling

Randomly selected quadrates with fixed (10m × 10m) or variable size will be taken in different habitats. Small sized wild animals like amphibians and reptiles will be quantified using quadrat sampling.

3.1.3.3 Use of different types of traps

Pit fall trap, tube trap and box trap will be used to capture cryptic species. All these traps are designed to capture live animals. Appropriate baits will be used wherever necessary.

3.1.3.4 Counting at colonies and bat roosts

Bats and some of the birds are colonial and some also build nests in colonies. Bird colony and bat roosts will be surveyed.

3.1.3.5 Night survey

Night survey will be conducted with the aid of high power flashlight. Nocturnal wild animals will be encountered during night survey.

3.1.3.6 Camera trap
Automatic digital camera traps will be used to survey nocturnal and crepuscular animals. These camera traps are operated by motion sensor. The

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camera will be automatically activated and captured photos if anything moves in front of it.

3.1.3.7 Pellet count

Pellet count method will specifically be used for deer survey. Counting pellet groups (deer defecations) is used to determine population size and distribution. This method is based on the assumption that periodic accumulations of animal defections are related to population density. Quadrat of specific size will be set in deer habitat, counting of pellet will be carried out in the morning and afternoon.

3.1.3.8 Questionnaire survey

A pre-designed questionnaire will be used to know the status of wild animals and plants in this Upazila based on the experience of the local people.

3.1.3.9 FGD

Focal Group Discussion (FGD) will be conducted among the local inhabitants to assess historical status of animals and plants in this area.

3.2 The Comparative Assessment of the Plant and Animal Communities of the Study Area

Different types of habitats will be categorized like hilly area, plain lands, wetlands, homestead vegetation, riverbanks, agricultural fields etc. Same survey methods will be repeated in all types of habitats so a comparison would be made. Comparison of plant and animal diversity would be justified using different diversity indices from the data. Critical ecosystem or habitats would be identified by considering the number of species presents there, number of threatened species and the ecosystem services of the ecosystem.

3.3 Indicator species monitoring

Species, which indicate the health of the environment by their presence, absence or any abnormalities of change in their population, health or behavior. Indicator species will be selected from all the groups based on the habitat or target of monitoring. Indicator species from plants, amphibians, reptiles, birds and mammals will be selected. Each of the indicator species will be finally selected after the initial field visit. Population status of all the indicator species will be monitored.

From the reconnaissance survey and literature we have selected 13 species from 4 major groups as indicator species for long term monitoring of the project area.

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Sl. No.	Name of the species	Role / indication in the ecosystem
Amphibians		
3.3.1	Painted Ballon frog	Its presence indicates deposition of good leaf litter on forest floor
3.3.2	Cope's Frog	Presence in rainy season indicates capacity of rain water conservation in forest
3.3.3	Cascade frog	Indicates the health of hill stream
Reptiles		
3.3.4	Tokay Gecko	Its presence on tree indicates the maturation of habitat

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Sl. No.	Name of the species	Role / indication in the ecosystem
3.3.5	Emma Gray's Forest Lizard	It is only found in good quality forest.
3.3.6	Ring Lizard	Indicates the quality of marshy areas in a forest
3.3.7	Spot-tailed Pit viper	Presence of it indicates the availability of small prey on lower canopy of forest.
Birds		
3.3.8	Red Jungle Fowl	Indicator of forest floor health
3.3.9	Red-headed Trogon	Only found in good quality dense forest

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Sl. No.	Name of the species	Role / indication in the ecosystem
3.3.10	Red-breasted Parakeet	Indicates the presence of tall trees and breeding habitat of tree-hole nesting birds.
3.3.11	Racket-tailed Drongo	Indicator of good quality woodland with huge insect production.
Mammals		
3.3.12	Barking deer	Indicates the presence of dense undergrowth of the forest and also indicates the suitable habitat for other ground dwelling mammals
3.3.13	Fishing cat	Indicates the health of water bodies

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3.4 Identification of critical ecosystem and wildlife habitats

Habitats with high species diversity, population density of rare or threatened species will be determined from the field survey. Ecosystem services will also be determined from field observation and also by questionnaire survey and FGD. Critical ecosystem or habitats will be plotted on the maps using GPS coordinates.

3.5 Characterizing Impacts and Mitigation

To illustrate how significant impacts (adverse or beneficial) that might occur due to tourism development and establishment of Mirsharai Economic zone, BISIC industry and salinity of water as well, in the absence of mitigation and compensation measures, shall be quantified and characterized in the following way:

- determine the value of existing flora and fauna affected, through survey and study;
- assess impacts affecting those flora and fauna, which meet or exceed a defined threshold value, with reference to ecological processes and functions as appropriate;
- quantify the extent, magnitude, duration, timing and frequency of the impacts;
- assess impact reversibility;
- explain the level of confidence in these predictions; and
- Identify likely significant impacts in the absence of any mitigation.

3.6 Evolution of Project Design and Mitigation

- Identify measures to avoid or reduce negative impacts;
- Identify opportunities for enhancement;
- Demonstrate likely success of mitigation measures; and
- Provide sufficient information for mitigation measures to be implemented effectively, *e.g.* through an Environmental Action Plan (EAP).

3.7 Identify Significant Residual Impacts and Their Legal, Policy and Development Control Consequences

- Produce a clear summary of the significant residual impacts of the project incorporating mitigation and enhancement measures;
- Where significant impacts cannot be avoided/reduced, identify compensation measures to be implemented;
- Consider the consequences of significant residual impacts in the light of planning policies and legislation; and
- Include mitigation, compensatory actions and enhancements in the EAP or similar.

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3.8   Mapping of the Site

The site of the flora and fauna will be mapped in ARC GIS and present at a
scale in consultation with PD.

3.9   Development of an Interactive Digital Model

Finally develop an interactive digital model of existing habitat, decline of
habitat and possible areas of conservation.

3.10   Submission of Final Report

The Final report will set out clearly about information on existing flora and
fauna necessary for decision making. Key aspects include:

Description of baseline and trends of existing flora and fauna,
explanation of the criteria used to evaluate existing flora and fauna; and
assess the significance of impacts of the project; Statement of methodology
used; Presentation of analytical techniques used and the analysis itself; and
interpretation from the analyses identification of likely impacts on existing flora
and fauna; and an explanation of their significance and the level of certainty
with which this can be stated; and description of legal and policy
consequences.

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Section-4

WORK PLAN & MANNING SCHEDULE

Tasks and Responsibilities:

Report	Activities/Tasks	Duration (in day)	Start Date	End Date
Signing of Contract & Notification of Order	Task 1: Contract Sign after Notification of Order	1	15.11.2017	15.11.2017
Mobilization Report	Task-2: Literature review, finalization of survey protocol, reconnaissance survey	15	16.11.2017	01.12.2017
Inception Report	Task-3: Inception report for Field Survey	15	02.12.2017	17.12.2017
Interim Report	Task-4: Field Survey Task-5: Field survey - 1st interim report Task-6: Field survey - 2nd interim report	120	18.12.2017	17.04.2018
Draft Report	Task-7: Data Analysis & Draft report preparation	20	18.04.2017	07.05.2018
Final Report	Task-8: Final report preparation	7	08.05.2018	15.05.2018

Shown in GanttChart:

Task and Activities	Timeline																					
	Nov '17	Dec '17	Jan'18				Feb'18				Mar'18				Apl'18				May'18			
	W2-W4	W1-W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Signing of Contract & Notification of Order																						
Reconnaissance survey, Mobilization report and Inception report																						
Secondary data collection																						
Primary data collection & field survey																						
Data compilation																						
Interim Report																						
Analyzing field																						

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Task and Activities	Timeline																					
	Nov '17	Dec '17	Jan'18				Feb'18				Mar'18				Apl'18				May'18			
	W2-W4	W1-W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
data																		■	■			
Writing draft reports																	■	■	■	■		
Sharing and revising draft reports																			■	■		
Submission of final report																					■	

FIGURE 5.2:

Gantt Chart of Project Activity for Survey of Esisting Flora and Fauna of Mirsharai Upazila

ID		Task Name	Start	Finish	Prede
1		Task-5: Preparation and Compilation of Base Map and Demarcation of Project Boundary/ Area/ Locaiotn	Wed 11/15/17	Tue 5/15/18	
2		Task 1: Contract Sign after Notification of Order	Wed 11/15/17	Wed 11/15/17	
3		Task-2: Literature review, finalization of survey protocol, reconnaissance survey	Thu 11/16/17	Fri 12/1/17	2SS
4		Task-3: Inception Report for Survey	Sun 12/3/17	Sun 12/17/17	3SS
5		Task-4: Field Survey :	Mon 12/18/17	Tue 4/17/18	4SS
6		Task-4.1: Field survey - 1st interim report	Mon 12/18/17	Wed 2/7/18	4SS
7		Task-4.2: Field survey - 2nd interim report	Thu 2/8/18	Tue 4/17/18	6
8		Task-5: Data Analysis & Draft Report preparation	Wed 4/18/18	Mon 5/7/18	7
9		Task-6: Final report preparation	Tue 5/8/18	Tue 5/15/18	8

Project: EM
Date: Thu 11/16/17

Task	Inactive Summary	External Tasks
Split	Manual Task	External Milestone
Milestone	Duration-only	Deadline
Summary	Manual Summary Rollup	Progress
Project Summary	Manual Summary	Manual Progress
Inactive Task	Start-only	
Inactive Milestone	Finish-only	

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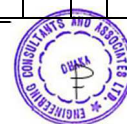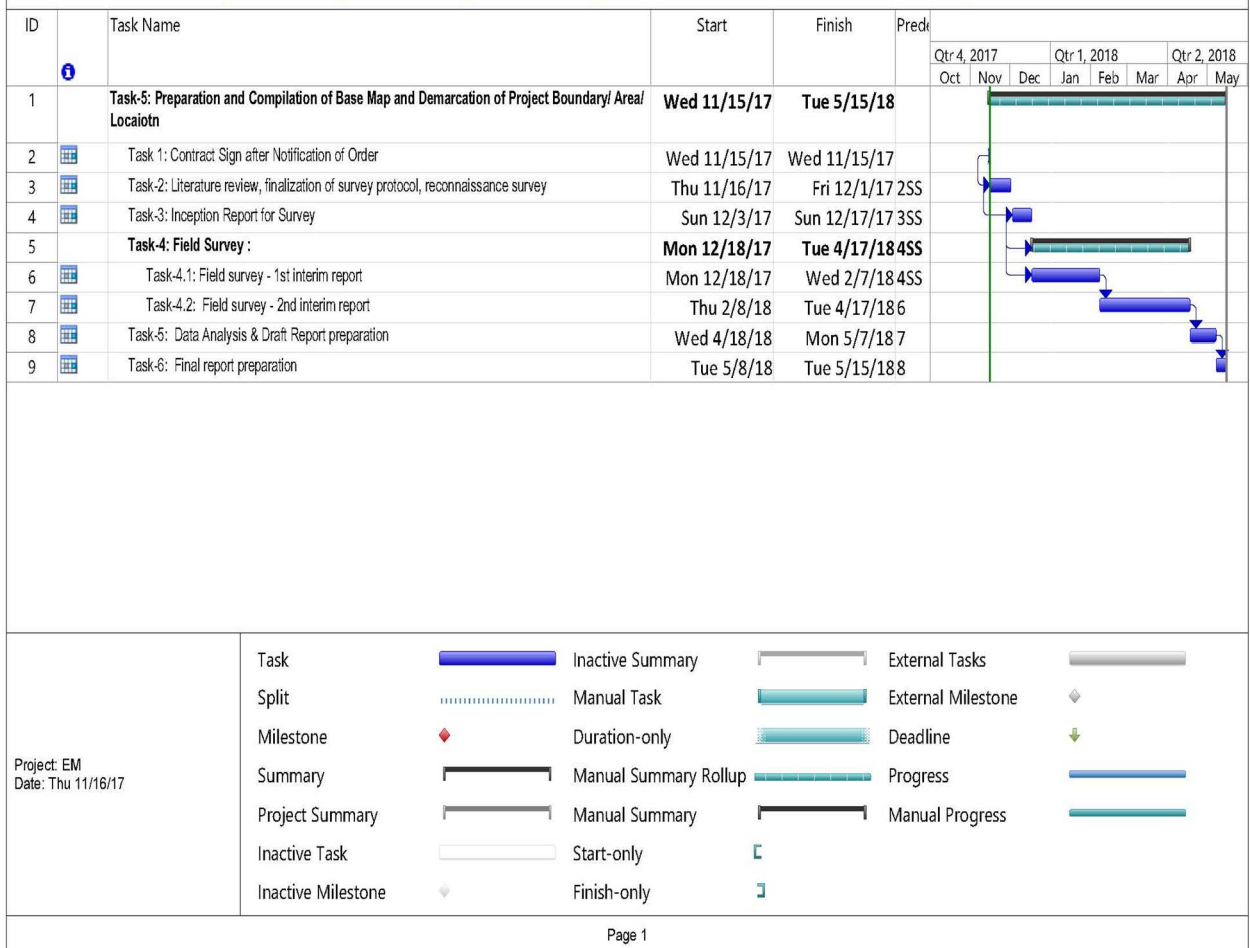## Experts and Responsibilities involvement in this Project:

Sl. No.	Name of Staff	Qualification with year of Passing	Experience (in years)	Proposed Position
	Professional Experts:			
1	Prof. Dr. Md. KamrulHasan	PhD Professor of Zoology at Jahangirnagar University	16	Team Leader/ Baseline Survey of Existing Flora and Fauna Expert
2	Mohammed. Jamal Uddin	MS Associate Professor of Environmental Science at Jahangirnagar University	25	Environmental Impact Assessment Expert
3	AnikSaha	MSc in Zoology with specialization on wildlife biology	5	Associate Baseline Survey of Existing Flora and Fauna Expert
4	Md. TouhidurRahman	MSc student in Zoology focusing on wildlife biology	2	Research Assistant Baseline Survey of Existing Flora and Fauna
	Supporting Staffs:			
4	Md. Takib Bin Rouf	M.Sc (Environmental Sciences) from Jahangirnagar University, Appear. B.Sc (Environmental Sciences), from Jahangirnagar University, 2015.	2	Associate Field Researcher
5	Masfiq Bashir	M.Sc (Environmental Sciences) from Jahangirnagar University, Appear. B.Sc (Environmental Sciences), from Jahangirnagar University, 2014.	2	Associate Field Researcher
6	Santosh Kumar Roy	Diploma in Computer Science. M. A. (Philosophy), under National University, 1996 B. A. under Dhaka University, 1990.	25	Office Manager
7	NazmulHossain	H. Sc. Pass	5	Peon

A. Baseline Survey of Existing Flora and Fauna Expert- 1 Person (1x3 = 3 mm.)

Responsibility: (i) To make an inventory of all types existing flora and fauna in the project area including endangered species, (ii) to identify the potentiality of the natural resources (flora and fauna) for tourism development in the region.(iii) To identify environmental hazards that might de imparted on the flora and fauna due to tourism development and establishment of Mirsharai Economic zone, BISIC industry and salinity of water; (iv) To prepare a map of habitat for existing flora and fauna of the project area indicating communities of various species of plants including the areas that would be disturbed by tourism development and establishment of Mirsharai Economic zone, BISIC industry and salinity of water as well; (v) To earmark the areas, which would not be disturbed by any kind of development; (vi) To make recommendations to protect the fore's', resources from environmental hazards and also to preserve the endangered species from depletion to attain sustainable development; (vii) To develop an interactive digital model for the whole ecological system with special reference to flora and fauna in the project area.(viii) To prepare report on assigned task under the scope of work of the ToR; (ix) Any other related task as assigned by PD.

B. Environmental Impact Assessment Expert- 1 Persons (1x2 = 2 mm.)

Responsibility: (i) Prepare guidelines for environment impact assessment (EIA) for tourism development and establishment of Mirsharai Economic zone, BISIC industry and salinity of water in the region with special reference to existing flora and fauna; (ii) Conduct EIA for various proposed projects under the planning; (iii) To identify the establishments to be established in environmentally critical areas in the region and provide with required remedial measures, and also develop control and regulatory mechanisms for sustainability of the flora and fauna in the region; (iv) To identify the location of habitats that shall be preserved to keep the biodiversity of the region sustainable; (v) To identify the endangered species of the region and earmark the site for their conservation and selecting site for safari park and sanctuary; (v) determination of criteria for selecting site for tourism development; {vi} To examine the environmental condition of the proposed tourism sites and recommend remedial measures with special reference to existing flora and fauna of the region; (vii) To develop an Environmental Action Plan (EAP) for mitigation measures to be implemented effectively. (viii) To work closely with the GIS/RS specialist to integrate the environmental considerations into spatial database; (ix) Any other related jobs assigned by PD.

C. Associate Baseline Survey of Existing Flora and Fauna Expert— 1 Persons (1x3= 3 mm.)

Responsibility: To assist the Baseline Survey of Existing Flora and Fauna Expert

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(i) To make an inventory of all types marine resources in the project area including endanger species, (ii) to identify the potentiality of the marine resources (flora and fauna) for tourism development in the region.(iii) To identify environmental hazards that might de imparted on the marine resources due to tourism development and establishment of Mirsharai Economic zone, BISIC industry and salinity of water in the region; (iv) To prepare a map for marine resources of the project area indicating communities of various species of plants includingthe areas that would be disturbed by tourism development and establishment of Mirsharai Economic zone, BISIC industry and salinity of water in the region as well; (v) To earmark the areas, which would not be disturbed by any kind of development; (vi) To make recommendations to protect the marine resources from environmental hazards and also to preserve the endangered species from depletion to attain sustainable development; (vii) To develop an interactive digital model for the whole ecological system with special reference to marine resources in the project area; (ix) Any other related task as assigned by PD.

D. Research Assistant Baseline Survey of Existing Flora and Fauna Expert – 1 person (1 x 3-3 mm).

Responsibility: To assist the Baseline Survey of Existing Flora and Fauna Expert

(i) To make an inventory of all types marine resources in the project area including endanger species, (ii) to identify the potentiality of the marine resources (flora and fauna) for tourism development in the region.(iii) To identify environmental hazards that might de imparted on the marine resources due to tourism development and establishment of Mirsharai Economic zone, BISIC industry and salinity of water in the region; (iv) To prepare a map for marine resources of the project area indicating communities of various species of plants includingthe areas that would be disturbed by tourism development and establishment of Mirsharai Economic zone, BISIC industry and salinity of water in the region as well; (v) To earmark the areas, which would not be disturbed by any kind of development; (vi) To make recommendations to protect the marine resources from environmental hazards and also to preserve the endangered species from depletion to attain sustainable development; (vii) To develop an interactive digital model for the whole ecological system with special reference to marine resources in the project area; (ix) Any other related task as assigned by PD..

Section-5

Work Progress & Field Activities
(November 2017 to December 2017)

In the last two months of the project (Nov'17 to Dec'17) following activities and tasks have been completed.

1. Contract signing and notification of order has been completed.

2. A detailed work-plan has been constructed. □

3. Data sheet has been prepared for questionnaire survey (Annex 1). □

4. Resource mobilization for the project has been completed. □

5. Requirements of the experts and project staffs have been completed.

6. The expert team made reconnaissance field visit to the survey area.

7. The expert team conducted meeting with the Forest Rangers of Mirsarai Coastal Forest Range and Mirsarai Hill Forest Range and collected basic information from range office.

8. Mobilization report of the project has been submitted.

9. Inception report has also been submitted.

10. Secondary data has been collected through literature review and with the contact of Forest Department. □

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Field Activities:

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Section-6

Conclusion of Inception Report:

Detailed survey plan has been described in the inception report. Baseline survey for the flora and fauna will be conducted in all types of habitats including hill forests, coastal mangroves, human inhabited areas and development areas. The survey will be conducted for covering at least three seasons; *viz.* winter, pre-monsoon and monsoon. As the habitats of Mirsarai Upazila are so diverse, two teams of 3 members each will be mobilized at the same time during the survey. All the arrangements for the field survey have been completed in the last two months of the project. The survey team is ready to go to the field in the first week of January 2018.

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Annex 1

Questionnaire:

Baseline Survey of Existing Flora and Fauna-Package-06 of "Preparation of Development Plan for Mirsharai Upazila, Chittagong District: Risk Sensitive Land use Plan" Project under Urban Development Directorate (UDD).

Location:	Date & Time:
Respondent Name:	Address:
Age: Sex: Religion/Cast:	Education:

Livelihood status

1. How long have you been staying in this village / area?

2. Do you collect any resource (like fish, shell etc.) from the project area?

3. If yes then how frequent?

4. Do you or your family member go for hunting?   Y   /   N

5. If yes, what are the species that you usually hunt for?

6. How frequent do you go for hunting?   Daily / weekly / monthly / seasonally / yearly / ……………..

7. Does any one in your village destroy bird nest / disturb / catch animals? If yes what kind of animals?

8. What do you do when you/ family members got sick? Use traditional medicine / go to K*abiraj or Boidda /* Buy medicine from shop / go to doctor.

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9. Do you see following animals in your village / surrounding areas (show the color plate). If yes, how often you see or when did you see last time?

   Jungle   cat………………………….   Fishing   Cat   ……………………………..   Civets ………………………..

   Jackal   ……………………   …………   Hog   Badger……………..…………..   Porcupine ……………………..

   Monkey   ………………………….   ….   Deer   …………….…………..   Others ………………….……………

10. Do you think biodiversity (forest, plants, animals) in your area decreasing? Y / N. if yes why?

11. Do you think proposed economic zone may harm biodiversity in your area? If yes how?

12. What should do to conserve biodiversity in your area?

13. Do you know about Wildlife Act / other law?   Y / N.

14. Miscellaneous Information (if any):

Name and signature of the Interviewer:

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