

ROMBLON STATE UNIVERSITY
College of Engineering and Technology
Main Campus, Odiongan, Province of Romblon

HANDOUT #4

CE5122 Water Resource Engineering & Irrigation Structures
Engr. Reynaldo P Ramos, PhD

Tues/Friday – 1:30-3:30/3:30-5:00PM

SITE ASSESSMENT AND SURVEY FORMS FOR A RIVER SYSTEM

SITE ASSESSMENT FORM

Name of River/Stream:			
Sampling Station ID No:			
Distance from Previous Station: _____ kilometer _____ meters			
Description of Flow:		Turbulent	
		Silent	
Stages of Flow:		Upstream	
		Downstream	
Average Width of River/Stream at Station (in meters):			
Depth of River at Station (in meters):			
Section 1:	Section 2:	Section 3:	Average:
Surface Velocity (in meters/second):			
Section 1:	Section 2:	Section 3:	Average:
Stream Flow rate:			
Nature of River Bottom: (bedrock, sand, clay, silt, gravel, with solid waste, etc.)			
Bank and Riparian Vegetation: (check all that applies)			
		Weeds	Reeds (tambo, etc)
		vines	
River Classification:	AA		C
	A		D
	B		
If unclassified, described current usage:			
		source of water supply	
		recreational (bathing, swimming, etc.)	
		agriculture, irrigation, livestock watering, etc.	
		fishing (propagation & growth of aquatic resources)	
Proximity to Common Sources of Contamination (attach photos)			
a. common sources		b. distance from the source	
	settlement area (residential, etc.)		within 500 meter radius
	Industry (power plant, paper mills.etc)		within 1 kilometer radius
	agricultural area		> 1 kilometer radius
eroded stream banks/landslides/algal growth			
Specify the types of industry closest to the site:			
	Quarrying		
	Smelting		
	manufacturing & processing		
Accessibility to the Site:			
	paved road	dirt road	private property
	bridge	no access	

Recommendation:

Proposed as a sampling station Not Proposed

Assessed by: _____

Position: _____

KEY INFORMANT SURVEY QUESTIONNAIRE/ PARTICIPATORY MAPPING GUIDE

Characterization of Biophysical Environment

With the use of a topographic map and provincial/municipal/barangay boundary maps, identify a reference point (e.g., the barangay hall or the place where you are holding the meeting) and from there, mark the landmarks that will be identified from the survey. To facilitate the survey, it is advisable to use local dialect as the medium of communication. Request the key informants to identify the following:

- a. The names of barangays and municipalities within the survey area
- b. The names of the rivers within the survey area. Which is the principal river, which are the secondary rivers? Where are the river boundaries?
- c. Where do the rivers originate? Where do the rivers drain?
- d. Approximately how long are the rivers, how wide and how deep? Describe the general physical character of the river and riverine area (e.g, meandering, shallow and wide, deep and wide, rocky bottom, soft bottom)
- e. What are the existing uses of the rivers? Identify the points where the uses change.
- f. Are there endemic aquatic species? Do the river serve as habitat for wild animals? .
- g. Are there protected areas in the locality? Where are the boundaries of such areas? Are there other important /historical landmarks?
- h. Are there intake facilities for public drinking water supply? Which areas do these facilities serve?
- i. Are there intake facilities for irrigation? What areas do these facilities serve?
- j. Are there man-made dams? What are these for?
- k. Are there lakes, reservoir, and similar water bodies? What are current uses of such bodies of water?
- l. When is the rainy season? Dry season?
- m. What are the existing uses of the watershed/river basin area? Where are the boundaries of these uses?
- n. Identify and locate on the map: mine sites, quarry sites, landslide prone areas, piggeries/cattlefarms/poultry, kaingin areas, plantations, landfill site or dumpsite
- o. Identify and locate the housing clusters, industrial areas, other major land development areas

VISUAL STREAM SURVEY

Helpful Hint: To facilitate the survey, it would be very helpful to bring along copy of a topographic map and a GPS to confirm exact survey boundaries. Observations such as conditions of watershed may be noted on the maps as necessary.

I. BASIC INFORMATION

Sampling Station No. _____ Name of River: _____
Location: _____
(Barangay, Municipality/Province/Region)
Upstream boundary: _____ Coordinates: _____
(Barangay, Municipality/Province/Region)
Downstream boundary: _____ Coordinates: _____
(Barangay, Municipality/Province/Region)
Total River Length: _____ km Length of stream surveyed: _____
(m)
Date: _____ Time _____ hrs Weather: _____
Survey undertaken by: _____ Position: _____
Survey supervised by: _____

II. BANK AND IN-STREAM CHARACTERISTICS

- Use of Flood plain:** industrial _____% commercial _____% residential _____%
pasture/grassland _____%, woodland _____% others (agriculture) _____%
_____ % roadway/pavement (Note: Items must sum up to 100%)
- Riparian cover:** trees _____% grasses or weeds _____% bare
area _____% paved area _____%, buildings _____% others (bamboo stands)
_____ % (Note: Items must sum up to 100%)
- River bank conditions:** trees _____% grasses or weeds _____% bare area
_____ % paved area _____%, buildings _____% others _____%
(Note: Items must sum up to 100%)
- Water flow:** Present conditions: Check as appropriate;
_____ in channel _____ flooding over banks _____ dry/no flow/pooling
- Flow Rate:** _____ m (determined by flow measurements, see Attachment 4)
- Tidal Influence:** Is waterway influenced by tides? _____ Yes _____ No; If yes, when?
_____ If influenced by tide: Tide was: _____ rising _____ falling
Tide was: _____ high _____ mid-range _____ low
- Bed composition:** silt or mud _____%, sand _____% gravel _____%
Cobble (2-10") _____ % boulders >10" _____% bedrock _____ %

8. **Percent embeddedness of cobble substrate** = $\frac{\text{Some what/not embedded (0-25\%)} + \text{halfway embedded (50\%)} + \text{Mostly embedded (75\%)} + \text{completely embedded (100\%)}}{5}$ = _____%

(Note: Applicable only to riffle areas, not to pools or runs. Fill out only if applicable to stream being surveyed.)

9. **Presence of naturally occurring organic material in stream (good habitat for aquatic organisms)**

Logs or wooden debris: none occasional plentiful

Leaves, twigs, rootmass, etc. none occasional plentiful

10. **Algae:** Percentage of stream bottom covered by visible algae? _____%

close growing (cluster): _____% Filamentous (strands over 2" long) _____

= 100%

11. **Water clarity:** Check all that apply (determine by viewing sample water in a clear container)

turbid: suspended matter in water : sediment blue/green algae
 (leaves)

tannic: clear water that is naturally stained orange/brown due to organic acids

no staining/no suspended matter

others (i.e., chemical discharge, dyes)

12. **Color of water** (describe) _____

13. **Odor of water** (describe) _____

14. **Bank erosion:**

a. How vegetated is the left bank, looking downstream, for the length of the river reach being surveyed (circle a percentage)

Vegetated bank

Bare/eroded bank

100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

What are the visual indicators used to assess the percentage above? (check all that apply)

exposed soil obvious soil loss soil covered with vegetation

steep slopes (U-shaped banks) gentle slopes

exposed roots no exposed roots

b. How vegetated is the right bank, looking downstream, for the length of the river reach being surveyed (circle a percentage)

Vegetated bank _____ Bare/eroded bank _____
100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

What are the visual indicators used to assess the percentage above? (check all that apply)

What are the visual indicators used to assess the percentage above? (check all that apply)

exposed soil obvious soil loss soil covered with vegetation

steep slopes (U-shaped banks) gentle slopes

exposed roots no exposed roots

Indications of human use:

16. Additional Comments:

III. AQUATIC BIOTA CHECKLIST (Optional)

1. Wildlife in or around the stream: Check opposite column if present.

Mammals		Reptiles	
Amphibians		Mussels/shells/clams/oysters	
Waterfowls		Crustaceans	

2. Fish in the stream: (Check all that apply)

Sizes	None	Abundant	Rare
Small (1-2")			
Medium (3-6")			
Large (7" and above)			

3. Aquatic plants in the stream (check all that apply)

Plant type	Frequency of Occurrence	Where found		
		Stream Edge	Pools	Near Riffle
Attached plants:	None			
	Occasional			
	Plentiful			
Free-floating plants:	None			
	Occasional			
	Plentiful			

4. Extent of algae in the stream: Are there submerged stones, twigs, or other material in the stream coated with a layer of algae? (Check all that apply)

Color	Frequency of Occurrence	Type of Coating	
		Light	Heavy
Brownish	None		
	Occasional		
	Plentiful		
Greenish	None		
	Occasional		
	Plentiful		
Others			

5. Are there filamentous (string-like) algae?

Color	None	Occasional	Plentiful
Brownish			
Greenish			
Other			

6. Are there detached "clumps" or "mats" of algae floating on the water's surface?

Color	None	Occasional	Plentiful
Brownish			
Greenish			
Other			

7. Stream shade cover: How well is the water surface shaded by vegetation: (Looking downstream). 100% means total shading, 0% means no shading. Encircle based on best estimate.

100	90	80	70	60	50	40	30	20	0
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Write down additional comments/observations: _____

IV. LAND USES

1. Identify land uses and activities in the basin area that have the potential to affect water bodies.

(Check all the boxes that apply, describe the location of the activity(ies) and indicate the location on your map. If the activities are frequently occurring, indicate on the note.

Please indicate if you: _____ Surveyed only the area adjacent to the waterbody
 _____ Surveyed the entire drainage area

Land Disturbing Activities & Other Sources of Sediment	Adjacent to Water	In Watershed	Notes on location & frequency of activity
Extensive areas disturbed by land development or construction of utilities, roads & bridges	<input type="checkbox"/>	<input type="checkbox"/>	_____
Large or extensive gullies	<input type="checkbox"/>	<input type="checkbox"/>	_____
Unpaved roads near or crossing streams	<input type="checkbox"/>	<input type="checkbox"/>	_____
Croplands	<input type="checkbox"/>	<input type="checkbox"/>	_____
Pastures with cattle access to water bodies	<input type="checkbox"/>	<input type="checkbox"/>	_____
Commercial forestry activities including harvesting and site-preparation	<input type="checkbox"/>	<input type="checkbox"/>	_____
Extensive areas of streambank failure or channel enlargement	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other Agricultural Activities			
Confined animal (cattle or swine) feeding operations and concentrations of animals	<input type="checkbox"/>	<input type="checkbox"/>	_____

Animal waste stabilization ponds

Poultry houses

Highways and Parking Areas

Shopping centers & commercial areas

Interstate and controlled access highways and interchanges

Major highways and arterial streets

Other extensive vehicle parking areas

Mining

Quarries with sediment basins in live flowing streams

Transportation and Motor Vehicle Services

Truck cleaning services

Public and private automobile repair facilities

Car washes and large auto dealers

Rail or container transfer yards

Airports with fuel handling / aircraft repair

Business & Industry, General

Activities with exterior storage or exchange of materials

Activities with poor housekeeping practices indicated by stains leading to streams or storm drains or on-site disposal of waste materials

Heavy industries such as textiles & carpet, pulp & paper, metal, and vehicle production or fabrication

Dry cleaners / outside chemical storage

Food & Kindred Products

Fertilizer production plants

Meat and poultry slaughtering or processing plants

Construction Materials

Wood treatment plants

Concrete and asphalt batch plants

Waste Recycling, Movement & Disposal

Junk and auto salvage yards

Solid waste transfer stations

Landfills and dumps (old & active)

Recycling centers

Drum cleaning sites

Illicit Waste Discharge*

Sanitary sewer leaks or failure

Overflowing sanitary sewer manholes due to clogging or hydraulic overloading

By passes at treatment plants or relief valves in hydraulically overloaded sanitary sewer lines

Domestic or industrial discharges

Extensive areas with aged/malfunctioning septic tanks

Dry-weather flows from pipes (with detectable indications of pollution)

Streamside areas of illegal dumping

- If found (most likely during stream surveys), these activities should be immediately reported to the local government or EMB regional office.

V. GENERAL WATERBODY AND WATERSHED CHARACTERISTICS

This information may be obtained during the KII.

1. Note the number of hydrologic modifications on your waterbody: *structures that alter water flow*

- | | | | |
|---------|-------|---------------|-------|
| None | _____ | Dredge spoils | _____ |
| Dams | _____ | Pipes | _____ |
| Bridges | _____ | Waterfalls | _____ |
| Others | _____ | | |

2. Note the approximate length of the stream that is affected by the following: *if assessing a wetland, lake or pond, some of the following may also affect your waterbody*

- | | |
|--------------------------------|--|
| Stream culvert | _____ meter or _____ km or _____% of stream length |
| Stream straightening | _____ meter or _____ km or _____% |
| Concrete streambank/bottom | _____ meter or _____ km or _____% |
| Dredging/channelization | _____ meter or _____ km or _____% |
| Riprap/gabion | _____ meter or _____ km or _____% |
| Cattle crossing | _____ # |
| Stream crossing (for vehicles) | _____ # |

3. Note extent of vegetative buffer along the banks: *at a minimum of 5 sites*, at regular intervals (every 250 m in a 1-kilometer section) note the following*

#	Width in meter	Location (Left bank, Right bank or N, S, E, W side of wetland or lake)	Characteristics and comments
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

4. Check the categories that best describe the general appearance of the waterbody:

Litter:

- No litter visible
- Small litter occasionally (i.e., cans, paper)
- Small litter common
- Large litter occasionally (i.e., tires, pallets, shopping carts)
- Large litter common

Special Problems:

- Spills of chemicals, oil, etc.
- Fish kills
- Wildlife, waterfowl kills

Erosion:

- No bank erosion or areas of erosion very rare; no artificial stabilization
- Occasional areas of bank erosion
- Areas of bank erosion common
- Artificial bank stabilization (i.e., riprap) present

5. **Comments on general waterbody and watershed characteristics:** (e.g. date and size of fish kill, increased rate of erosion evident, litter most evident after storms)
 * Fish kills should be immediately reported to DENR Wildlife Resources Division or to the BFAR.
6. **Summarize notable changes that have taken place since last year (if this is not your first year conducting the Watershed Survey).**

I. PIPE AND DRAINAGE DITCH INVENTORY

In this section, provide information on pipes and drainage ditches found on the banks or in the waterbody. These pipes/ditches can be abandoned or active. Note the information for each pipe or drainage ditch you observe. *Make additional copies as necessary.*

Pipe #	Location	Type	Size	Flow	Waterbody condition	Comments

1. **Number each pipe/ditch** for mapping/locating purposes
2. **Location of pipe/ditch:** note whether in water, bank, near waterbody or other. Describe location.
3. **Identify type of pipe (list all that apply):** PVC, iron, concrete, galvanized; industrial outfall, sewage treatment plant outfall, storm drain, combined sewer overflow; agricultural field drainage, paddock or feedlot drainage, settlement basin/pond drainage, parking lot drainage unknown, other.
4. **Size: measure approximate diameter of pipe:** inches or centimeters
5. **Describe the discharge flow:** Rate of flow: none, intermittent, trickle, steady, heavy
 Appearance: clear, foamy, turbid, oil sheen, color, other
 Odor: none, rotten eggs/sewage, chemical, chlorine, other
6. **Waterbody condition:** describe the bank/waterbody below pipe or drainage ditch: no problem evident, eroded, sewage litter (e.g. toilet paper), litter (e.g. bottles, cans), lots of algae, other
7. **Comments of pipes and drainage ditches:** Use this space to explain or expand on information provided on pipes and discharges you have identified above. For example, you may want to identify particular facilities, or discuss in more detail the condition of the waterbody below the discharge. Use separate page if necessary.