1.2   NATURAL CHANNEL ASSESSMENT METHODOLOGY

This section outlines the procedure for assessing either natural channels or naturalized man-made channels. Natural channel assessment can be a challenge, particularly in an urban environment. The system presented in this Manual has been developed to help a User quantify the condition of streams through a process that is easy to understand, requires little training, and produces repeatable results.

The basis of this assessment is the review of five categories of stream characteristics (referred to as reach conditions); **Channel Condition**, **Riparian Buffer**, **In-Stream Habitat**, **Benthic**, **Condition**, and **Channel Alterations** (Table 1-1).   Each of these categories are subdivided into various levels of *Condition Parameters*, as depicted below:

Table 1-1: Field Guide - Condition Parameters

Channel Condition	Riparian Buffer	In-Stream Habitat	Benthic Condition	Channel Alteration
Severe	Poor	Poor	Poor	Severe
Poor	Marginal			Marginal
Marginal		Marginal	Fair	
Suboptimal	Suboptimal			Minor
Optimal	Optimal	Optimal	Good	Negligible / None

Definitions and examples for each of the *Condition Parameters* are provided in Section 1.2.1 - 1.2.5 for each of the reach condition categories. To evaluate an assessment reach, simply refer to the appropriate section for the reach condition category under consideration and pick the *Condition Parameter* that corresponds to the actual stream conditions observed in the field. Record the selected *Condition Parameter* in the corresponding section on Form 1-1.

NATURAL CHANNEL ASSESSMENT METHODOLOGY (cont.)

RCI Flowchart Procedure

After each of the reach conditions have been evaluated and appropriate *Condition Parameters* have been selected and recorded on Form 1-1, refer to the appropriate **RCI Flowchart** (Section 1.3, pages 48-67) to determine the resulting RCI for the reach. The RCI flow charts represent a hierarchical system in which the basic organizational component is the **Channel Condition** category followed by **Riparian Buffer**, **In-Stream Habitat**, **Benthic Condition** and **Channel Alteration**. For example, a stream that was determined to have "optimal" **Channel Condition**, refer to pages 64-67 for the CHANNEL CONDITION: OPTIMAL" RCI Flowcharts. Next, select the appropriate page based on the *Condition Parameter* for **Riparian Buffer**. Once on the correct page, proceed through the RCI flow chart by selecting the corresponding **In-Stream Habitat** *Condition Parameter,* followed by the appropriate **Benthic** *Condition Parameter,* followed by the proper **Channel Alteration** *Condition Parameter,* finally arriving at the RCI for the subject reach. Record the value of that RCI at the bottom of the field form.

This completes the assessment procedure for natural and naturalized man-made channels. A stepwise procedure is presented on the following page. Also, please refer to Section 1.4 (page 70-81) for examples of streams categorized by their RCI score.

NATURAL CHANNEL ASSESSMENT METHODOLOGY (cont.)

STREAM ASSESSMENT - STEPWISE PROCEDURE

STEP 1 → COPY FIELD FORMS – make one copy of Form 1- for each assessment to be performed (and From B-1 from appendix B if conducting a benthic condition assessment).

STEP 2 → DETERMINE LIMITS OF ASSESSMENT REACH – determine the limits of the assessment reach and locate them on your project map and flag if required for future survey location.

STEP 3 → MAN-MADE VS. NATURAL – determine whether the channel is man-made or natural.

STEP 4 → IF MAN-MADE – refer to Section 1.1 of this manual to determine the RCI. Skip to STEP 7.

STEP 5 → IF NATURAL CHANNEL – refer to Section 1.2.1 - 1.2.5 (pages 14-44) of this manual to evaluate the conditions of the stream categories. Record the results on Form 1-1. Note that Form 1-2 is used for scoring the benthic condition.

STEP 6 → DETERMINE RCI – refer to the flowcharts in Section 1.3 (pages 48-67) of this manual to determine the RCI. Record the RCI on the Form 1-1.

STEP 7 → ADDITIONAL DATA – determine the length (may require survey) and contributing drainage area, utilizing best available topographic mapping, of the assessment reach and record them on the Form 1-1.

NATURAL CHANNEL ASSESSMENT METHODOLOGY (cont.)

FORM 1-1: INSTRUCTIONS

Form 1-1, Stream Assessment Field Form, is to be used to record assessment information for each individual assessment reach (1 form per assessment reach).

Selecting an Assessment Reach

Prior to beginning the assessment, determine the limits of the assessment reach. In order to ensure the selected reach is representative of stream character, assessment reaches should extend approximately 200 linear feet or more, and be centered around the proposed impact area when it is narrow such as for a small road or utility crossing. Assessment reaches should be continuous and have similar *Condition Parameters* - it would not be appropriate to lump 200 linear feet of a **severe** channel condition with 300 linear feet of a **suboptimal** channel condition. Conversely, a small isolated area whose *Condition Parameters* vary should be incorporated into the assessment of the surrounding reach. Assessment reaches are meant to analyze the condition of the impact area, therefore: (1) if an impact reach has homogeneous *Condition Parameters,* then only one assessment reach - which extends approximately 200 linear feet around the impact area- needs to be done; (2) if there are multiple (2 or more) distinct reaches within an impact area (where differing *Condition Parameters* result in differing RCI scores), multiple assessments will need to be completed (note, the sum total of the assessment reaches must be greater than 200 linear feet). Once selected, the upstream and downstream limits of the reach should be marked on a map, so that a length and drainage area may be determined, and flagged in the field, so the reach may be surveyed if more precision is needed in the future.

NATURAL CHANNEL ASSESSMENT METHODOLOGY (cont.)

Form 1-1 Sections

Section A is used for man-made channels. The RCI listed adjacent to the type of lining is selected and recorded in Section C - this ends the assessment process for man-made channels. Naturalized man-made channels (i.e. not restricted by armoring techniques) should be assessed utilizing the Natural Channel Assessment Methodology outlined in Section 1.2 and Section B of Form 1-1.

Section B is filled out for assessment reaches determined to be natural or naturalized man-made channels. The *Condition Parameter* within each of the 5 categories is determined, following the procedures presented in Sections 1.2.1 - 1.2.5 in the Manual (pages 14 –44), and recorded under Section B on the form.

Section C of the form provides a space to record the RCI, determined from Section A for man-made channels or from the flowcharts contained in Section 1.3 of the Manual for natural channels.

Section D sets aside an area to record the length and contributing drainage area of the assessment reach.

FORM 1-1: STREAM ASSESSMENT FIELD FORM

Project # : _____   Date: _____

Reach Name: _____   Team: _____

A   Man-Made Channels. (Use the assigned RCI)

1. Piped Channel   0
2. Open Channel - concrete   0.25
3. Open Channel - gabions, riprap   0.50
4. Open Channel - naturalized   *apply Natural Channel Methodology*

B   Natural Channel Methodology
Evaluate the following parameters using the definitions provided in Sections 1.2.1 - 1.2.4.

1. Channel Condition
  ◯ Severe
  ◯ Poor
  ◯ Marginal
  ◯ Suboptimal
  ◯ Optimal

2. Riparian Buffer
  ◯ Poor
  ◯ Marginal
  ◯ Suboptimal
  ◯ Optimal

3. In-Stream Habitat
  ◯ Poor
  ◯ Marginal
  ◯ Optimal

4. Benthic Condition
  ◯ Poor
  ◯ Fair
  ◯ Good
  Benthic Condition Source
  ◯ Default
  ◯ Site Observation (refer to benthic condition worksheet)

5. Channel Alteration
  ◯ Severe
  ◯ Moderate
  ◯ Minor
  ◯ Negligible/ None

C   Reach Condition Index (RCI)
After evaluating the parameters, use the Reach Flow Charts (pages 48-67) to determine the RCI.

Reach Condition Index (RCI) (0 - 6) =_____

D   Other Required Information

Reach Length: _____   (feet)

Drainage Area : _____   (acres)

Summarize the RCI information for each assessment reach in FORM 1-2.

NATURAL CHANNEL ASSESSMENT METHODOLOGY (cont.)

FORM 1-2 - INSTRUCTIONS

Form 1-2, <u>Summary of Stream Assessments</u>, is to be used for compiling the results of multiple stream assessments. For every copy of Form 1-1 completed for an assessment, one corresponding entry shall be recorded in Form 1-2.

FORM 1-2: SUMMARY OF STREAM ASSESSMENTS

Project # : _____   Date: _____

Team: _____

Stream Name	Reach Name	Drainage Area DA	Length L	RCI
		(acres)	*(feet)*	