

## **Appendix 11—Score Sheet for Rating Ecological Integrity and Description of the Rating Variables**

This appendix provides the data form (A.11.1) and information needed to determine the ecological integrity of the focal watershed. Identifying information recorded on the data form includes the date, observer, mountain range, watershed name, and the watershed code in the Great Basin watershed database.

The general watershed characteristics determined in the office (form A.4.1) and the data in the score sheet for assessing watershed sensitivity and resilience (form A.10.1) are used to complete the assessment of general geomorphic characteristics. The reach summaries from the riparian vegetation data collected in the field (form A.7.1) are used to complete the assessment of general vegetation characteristics. The scores for the disturbance assessment are derived from the reach-scale disturbance data collected within the watershed (form A.8.1).

Ecological integrity can be evaluated for the individual sampled reaches and the entire watershed. High scores for a particular category (geomorphic, vegetation, disturbances) indicate reduced ecological resilience and low ecological integrity.

|                                                                                                                                                                                                                      |                                                  |                 |   |  |                                                                                                    |   |   |   |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------|---|--|----------------------------------------------------------------------------------------------------|---|---|---|---|
| <b>A.11.1–WATERSHED ECOLOGICAL INTEGRITY</b>                                                                                                                                                                         |                                                  | Date:           |   |  |                                                                                                    |   |   |   |   |
| Observer:                                                                                                                                                                                                            |                                                  | Database Code:  |   |  |                                                                                                    |   |   |   |   |
| Mountain Range:                                                                                                                                                                                                      |                                                  | Watershed Name: |   |  |                                                                                                    |   |   |   |   |
|                                                                                                                                                                                                                      |                                                  |                 |   |  |                                                                                                    |   |   |   |   |
| <b>Watershed Type:</b><br>(A <sub>1</sub> , A <sub>2</sub> , B, C)                                                                                                                                                   |                                                  |                 |   |  |                                                                                                    |   |   |   |   |
| <b>Watershed Sensitivity and Resilience Type</b> (from A.10.1 and A.10.2): _____<br>(Flood dominated, Armored, Fan-dominated, Deeply-incised, Pseudo-stable)                                                         |                                                  |                 |   |  |                                                                                                    |   |   |   |   |
| <b>Ratings:</b> High scores for a category (geomorphic, vegetation, disturbances) indicate reduced ecological resilience and low ecological integrity. These can be evaluated at both the reach and watershed scale. |                                                  |                 |   |  |                                                                                                    |   |   |   |   |
| Reach 1 = high, 2 = mid, 3 = low, 4 = additional                                                                                                                                                                     |                                                  |                 |   |  | <b>REACH</b><br><table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table> | 1 | 2 | 3 | 4 |
| 1                                                                                                                                                                                                                    | 2                                                | 3               | 4 |  |                                                                                                    |   |   |   |   |
| <b>Parameter</b>                                                                                                                                                                                                     | <b>Scores</b>                                    | <b>Score</b>    |   |  |                                                                                                    |   |   |   |   |
| <b>General Geomorphic Characteristics – Forms A.4.1 and A.10.1</b>                                                                                                                                                   |                                                  |                 |   |  |                                                                                                    |   |   |   |   |
| Debris Flow Activity                                                                                                                                                                                                 | 0 = none, 2= slight, 3 = moderate, 4 = large     |                 |   |  |                                                                                                    |   |   |   |   |
| Active or Recent Channel Incision                                                                                                                                                                                    | 0 = none, 2= local, 3 = moderate, 4 = widespread |                 |   |  |                                                                                                    |   |   |   |   |
| Recent Avulsions Preventing Stabilization                                                                                                                                                                            | 0 = none, 2= local, 3 = moderate, 4 = widespread |                 |   |  |                                                                                                    |   |   |   |   |
| <b>Sum of Geomorphic Characteristics =</b>                                                                                                                                                                           |                                                  |                 |   |  |                                                                                                    |   |   |   |   |
| <b>General Vegetation Characteristics – Form A.7.1</b>                                                                                                                                                               |                                                  |                 |   |  |                                                                                                    |   |   |   |   |
| Decrease in Riparian Area Extent                                                                                                                                                                                     | 0 = none, 2 = low, 3 = moderate, 4 = high        |                 |   |  |                                                                                                    |   |   |   |   |
| Vegetation Vigor                                                                                                                                                                                                     | 1 = high, 2 = moderate, 3 = low                  |                 |   |  |                                                                                                    |   |   |   |   |
| Vegetation Mortality                                                                                                                                                                                                 | 1 = high, 2 = moderate, 3 = low                  |                 |   |  |                                                                                                    |   |   |   |   |
| Wetland Indicator Status                                                                                                                                                                                             | 1 = high, 2 = moderate, 3 = low                  |                 |   |  |                                                                                                    |   |   |   |   |
| Successional Class                                                                                                                                                                                                   | 1 = high, 2 = moderate, 3 = low                  |                 |   |  |                                                                                                    |   |   |   |   |
| Bank Stability Class                                                                                                                                                                                                 | 1 = high, 2 = moderate, 3 = low                  |                 |   |  |                                                                                                    |   |   |   |   |
| Nonnative Invasive Species                                                                                                                                                                                           | 1 = none to few, 2 = common, 3= widespread       |                 |   |  |                                                                                                    |   |   |   |   |
| <b>Sum of Vegetation Characteristics =</b>                                                                                                                                                                           |                                                  |                 |   |  |                                                                                                    |   |   |   |   |
| <b>Response to Anthropogenic and Other Disturbances – Form A.8.1</b>                                                                                                                                                 |                                                  |                 |   |  |                                                                                                    |   |   |   |   |
| Roads and Road Crossings                                                                                                                                                                                             | 0 = none, 2= low, 3 = moderate, 4 = high         |                 |   |  |                                                                                                    |   |   |   |   |
| Recreational Activities                                                                                                                                                                                              | 0 = none, 2= low, 3 = moderate, 4 = high         |                 |   |  |                                                                                                    |   |   |   |   |
| Development (housing)                                                                                                                                                                                                | 0 = none, 2= low, 3 = moderate, 4 = high         |                 |   |  |                                                                                                    |   |   |   |   |
| Development (mining)                                                                                                                                                                                                 | 0 = none, 2= low, 3 = moderate, 4 = high         |                 |   |  |                                                                                                    |   |   |   |   |
| Surface Water Manipulation                                                                                                                                                                                           | 0 = none, 2= low, 3 = moderate, 4 = high         |                 |   |  |                                                                                                    |   |   |   |   |
| Groundwater Extraction                                                                                                                                                                                               | 0 = none, 2= low, 3 = moderate, 4 = high         |                 |   |  |                                                                                                    |   |   |   |   |
| Water Diversion (dams/canals)                                                                                                                                                                                        | 0 = none, 2= low, 3 = moderate, 4 = high         |                 |   |  |                                                                                                    |   |   |   |   |
| Beaver Dams (incision, etc.)                                                                                                                                                                                         | 0 = none, 2= low, 3 = moderate, 4 = high         |                 |   |  |                                                                                                    |   |   |   |   |
| Fire Effects                                                                                                                                                                                                         | 0 = none, 2= low, 3 = moderate, 4 = high         |                 |   |  |                                                                                                    |   |   |   |   |
| Livestock Grazing                                                                                                                                                                                                    | 0 = none, 2= low, 3 = moderate, 4 = high         |                 |   |  |                                                                                                    |   |   |   |   |
| Wildhorse Effects                                                                                                                                                                                                    | 0 = none, 2= low, 3 = moderate, 4 = high         |                 |   |  |                                                                                                    |   |   |   |   |
| Other:                                                                                                                                                                                                               | 0 = none, 2= low, 3 = moderate, 4 = high         |                 |   |  |                                                                                                    |   |   |   |   |
| Other:                                                                                                                                                                                                               | 0 = none, 2= low, 3 = moderate, 4 = high         |                 |   |  |                                                                                                    |   |   |   |   |
| <b>Sum of Disturbance Response =</b>                                                                                                                                                                                 |                                                  |                 |   |  |                                                                                                    |   |   |   |   |

**Table A.11.2-** Descriptions of the data needed to complete the data form for the watershed ecological integrity assessment (A.11.1).

### **General Geomorphic Characteristics**

- **Debris Flow Activity:** The watershed score for past debris flow activity (# of flows) in form A.4.1 is used to assign the scores for debris flow activity. The watershed score is entered for each reach as: 0 = none (0-10), 2 = slight (10-20), 3 = moderate (20-40), 4 = large (>40).
- **Active or Recent Channel Incision:** The subtotals for incision evidence for the sampled reaches and incision sensitivity index in form A.10.1 are used to assign the scores for active or recent channel incision. The scores are: 0 (none) = no evidence of recent channel incision affecting channel processes and riparian ecosystems, 2 (local) = channel incision is localized and is affecting only a few areas within the watershed, 3 (moderate) = channel incision is fairly widespread within the watershed, 4 (widespread) = channel incision is progressive and affects the ecological integrity of most of the watershed.
- **Recent Avulsions Preventing Stabilization:** The subtotals for the avulsion evidence for the sampled reaches and avulsion sensitivity index in form A.10.1 are used to assign the scores for active or recent channel incision. The scores are: 0 (none) = no evidence of recent channel avulsion affecting channel processes and riparian ecosystems, 2 (local) = avulsion is localized and is affecting the ecological integrity of only a few areas within the watershed, 3 (moderate) = avulsion is fairly widespread within the watershed and is affecting ecological integrity, 4 (widespread) = channel avulsion occurs throughout the watershed and is significantly affecting ecological integrity.

### **General Vegetation Characteristics**

- **Riparian Area Extent, Vegetation Vigor and Mortality, Wetland Indicator Status, Successional Status, and Bank Stability Status:** These data are collected during the riparian vegetation assessment and are described in table A.7.2. Data on riparian area extent are from the first section of form A.7.1; data on wetland indicator status, successional status, bank stability status, vegetation vigor and vegetation mortality are from the reach summaries in form A.7.1.
- **Nonnative Invasive Species:** Nonnative invasive species are typically an indicator of anthropogenic disturbance at some point in time. The information entered into this form are derived from the reach summaries for the riparian vegetation data in form A.7.1. Assignment of scores is as follows: 1 = none to few nonnative invasive species occur and cover of these species is very low; 2 = several nonnative invasive species occur and cover of these species is low to moderate; 3 = a large number of nonnative invasive species are present and cover of these species is moderate to high.

### **Response to Anthropogenic and Other Disturbances**

The primary natural and anthropogenic disturbances affecting stream systems and riparian and meadow vegetation are described in the text. The scores are based on the watershed-scale (A.4.1) and reach-scale disturbance data collected within the watershed (A.8.1). Assignment of scores for all disturbances is as follows: 0 = no negative effect; 2 = low if the disturbance is having a minor negative effect on the stream channel, stream banks, or vegetation; 3 = moderate if it is having a clear negative effect on geomorphic processes or riparian vegetation; and 4 = high if the disturbance has significantly altered geomorphic processes or the riparian vegetation in a negative way.