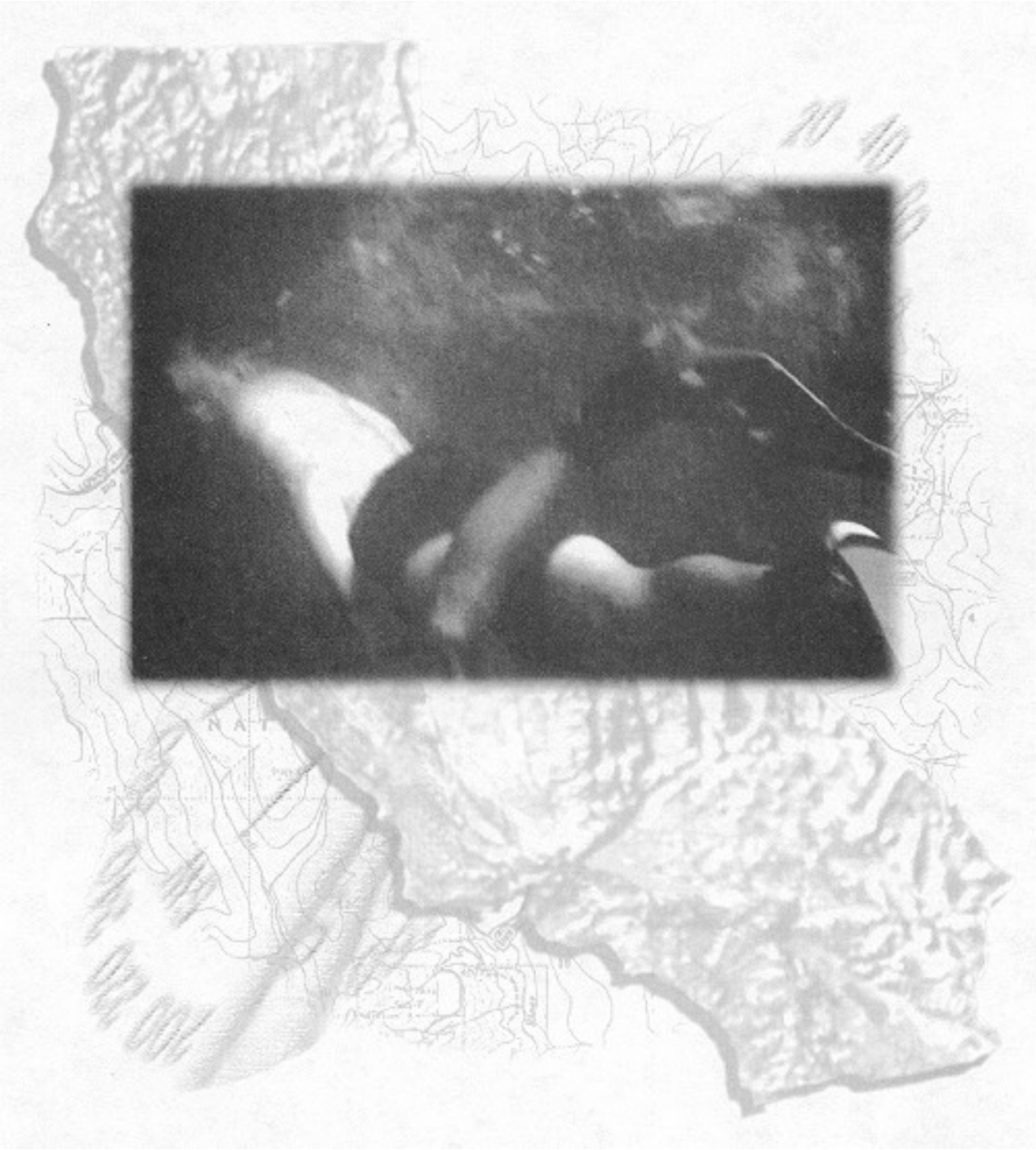
CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

PART VIII

PROJECT EVALUATION AND MONITORING



PART VIII PROJECT EVALUATION AND MONITORING

Habitat projects are designed and implemented with specific goals and objectives for restoring, improving, enhancing or maintaining stream habitat conditions. Through the process of evaluating and monitoring habitat projects, it can be determined if intended goals have been achieved.

Evaluation is generally a comparison between conditions before and after a project that quantitatively or qualitatively measures the change. Factors to be considered during an evaluation should include both physical and biological conditions. An evaluation provides information regarding the level of success or failure of prescriptions and techniques and guidance for future designs and construction techniques. It provides the fishery manager and habitat specialist with specific data regarding habitat improvement prescriptions that have proven to result in positive responses. It also provides contract administrators and landowners with cost-benefit information and a basis for future project funding consideration.

Monitoring, although similar in many respects to evaluation, generally involves documenting specific conditions that may or may not specifically have been objectives of the project. For example, permits or environmental review processes may require monitoring for overall or specific "environmental impacts." This monitoring will be for a specific and usually extended time period and may involve sensitive plant and animal species or communities. On site or off site monitoring can be part of an investigation process to measure the effectiveness of required mitigation efforts as a result of a project=s impacts.

The evaluation process begins well before project construction or implementation. The early stages of project planning should include an investigation of the status of the target species and associated habitat. In most cases, general status of communities, species, or habitat provides the impetus for restoration or enhancement plans. The foundation for evaluation should include specific biological and physical details that describe the historic and pre-project features of the proposed project site and watershed.

Knowledge of fish species abundance and habitat conditions that existed during the early period of European arrival can provide historic information necessary to define optimum goals and objectives. However, caution should be exercised to ensure project goals are realistic within the parameters of the project. In many cases, restoration of historic conditions or fish populations are no longer possible due to severe environmental modifications like dams, water diversions, soil and vegetation disturbance, or changes in species composition of the biotic community. If project goals established during the planning process are not realistic, it=s unlikely the goals will be reached and the evaluation will reveal failure.

Pre-Project Assessment and Data Collection

Historic Information

Historic watershed, stream channel, riparian, fish and wildlife, and land use information describes potential capabilities and establishes targets for planning purposes. Historic information also aids in the evaluation process by providing a greater understanding of what to expect from habitat restoration or enhancement efforts. Historic data should provide descriptions in the following areas:

- Aquatic species, abundance indices, distribution;
- Riparian community species and densities;
- General watershed condition and uses;
- Channel and habitat types;
- Instream sediment storage and transport;
- Stream flow and water temperature regimes.

Pre-Project Information

Existing or pre-project descriptions of habitat and channel types, fish species, riparian communities, and water quality are vital for the evaluation process. Pre-project data provides the benchmark for comparing project effects. Without pre-project data the post-project field investigations become merely an inventory or exercise in collecting baseline data with no basis for comparison. Pre-project data categories should include:

- Existing aquatic species, abundance indices, age structure, and distribution;
- Existing channel and habitat types throughout the proposed project reach;
- Existing spawning substrate availability and fine sediment composition;
- Existing water quality and flow and temperature regimes;
- Existing riparian species and densities;
- Existing watershed conditions and uses;
- Photographs of specific proposed project sites.

Documentation Immediately Following Project Completion

Completed projects should include an overall description of actual work accomplished and should include the following information:

- Specific location of the stream reach receiving structure(s) or prescription as defined by a permanently marked surveyed and geo-referenced location (i.e., reference point), and a distance measurement and direction from the referenced point (e.g., bridge, building or stream mouth) to the beginning of the treatment reach, and the stream length of the project reach. The number of structures built should also be given;

- "As-built" descriptions, design drawings, and photographs should be provided whenever possible;

- Description of the habitat associated with each structure or prescription including habitat unit number, habitat type, pool depth, pre-scour depth, spawning gravel abundance and quality, shelter rating, and fish presence. This information can be recorded on the Habitat Inventory Data Form in Part III;

- Objectives of the structure(s) or prescription;

- Riparian enhancement projects should append written descriptions, photo documentation, and plant species surveys of the site immediately before and after planting;

- Cost of each prescription or total project cost within a contiguous reach (especially important if a contract includes multiple projects or streams).

Completed project descriptions should include information to enable a person to: 1) locate a specific project reach where structures were built or prescription applied years after project completion; 2) discern how the original project was constructed and configured; and 3) determine what the objectives of the project were and ascertain the result. For example, if a pool-forming or scour structures were constructed, water depth within the anticipated scour area of each habitat unit or type needs to be documented at time of completion if a measure of how much the structure contributed to pool depth is to be obtained during subsequent evaluations.

To ensure that appropriate background, location, and type of structure information is recorded, a “Project Site Completion Form” should be completed for each newly completed structure or project reach. Subsequent evaluations should use the “General Project Information Form,” to provide an overview of the project evaluation, and the “Individual Structure or Site Form” to record the assessment of each individual structure or prescription contained in the Project. For projects administered or conducted by DFG and completed in northern and central California, and for which a USCOE General Permit No. 22323N was issued, a “Project Site Completion Form” **must** be filled out and submitted to DFG immediately upon completion of the project. The “Project

Site Completion Form" should be prepared as soon as possible upon project completion. Send it, along with any accompanying Habitat Inventory Data Forms to:

California Department of Fish and Game
Inland Fisheries Division
610 9th Street
Fortuna, CA 95540
Attention: Salmonid Habitat Improvement Project Evaluator
(707) 725-0976.

Instructions for Completing the Project Site Completion Form

1) **Stream** - Name of stream where project is located**.**

2) **Date -** Date the form was completed.

3) **Page __ of __ -** Number the page. For example, if this is page 5 out of 11 total pages for project site evaluation in stream XYZ then indicate: Page 05 of 11.

4) **Contractor/Organization -** Name of individual contractor, firm or agency performing work.

5) **Inspector -** Name of person preparing this form.

6) **Contract No. -** This number should be a DFG or WCB contract number or a Region project identifier code.

7) **FY -** Fiscal year of contract (e.g., "97/98").

8) **Landowner -** Owner and contact person for access permission.

9) **Estimated Cost -** If this is a "multiple site" contract, determine the portion of dollars of the total contract spent within the stream reach or area being treated.

10) **Length of Project/Numbers of Structures -** Enter the total stream length in feet treated and the number of structures constructed.

11) **Reference Point -** The point from which each structure location is measured. This point should be a prominent feature that is easily recognizable and will not change over time. Examples include bridges, mouths of tributaries, survey marker, and buildings. Do not use trees, boulders, etc.

12) **Lat and Long -** Latitude and longitude of reference point.

13) **Feet From Reference Point UP or DN -** Indicate feet from the reference point and check the appropriate box (UP or DN) to show if the measurement is upstream or downstream of reference point. In most cases a "hip chain" should be used.

14) **Channel Type -** Indicate channel type according to Rosgen's system (Part III).

15) **Constructed Using -** Check the appropriate box indicating the type of construction technique use; Hand Crew, Heavy Equipment, or Both.

16) **Project Objective -** Check the appropriate box indicating the objective of the project; Instream Habitat Improvement, Erosion Control, or Fish Passage.

17) **Type of Structure -** This is a 3 digit numeric code. Refer to the structure type code list at the end of these instructions.

18) **Project Completion Check Points -** Check the appropriate box (YES or NO) indicating the answer to the following questions. If the answer is no, provide an explanation for the deviation.

    1. 1.Project techniques according to manual
    2. Materials of recommended type and size
    3. Structure positioned correctly to meet objectives
    4. Followed permit(s) specifications
    5. Landowner(s) agreed with work and materials used

19) **Original Habitat Type -** Use fish habitat type alpha abbreviations (Part III) to describe the habitat originally present before construction or treatment.

20) **Target Habitat Type -** Use habitat type alpha abbreviations (Part III) to describe the habitat the structure was intended to create.

21) **Habitat Maximum Depth -** Record the maximum depth found in the habitat unit.

22) **Bankfull Stream Width -** Record the bankfull stream width near the structure at the nearest velocity crossover point.

23) **Comments -** Include any comments or overall project assessment.

24) **If Revegetation -** Check the appropriate box indicating the location of the revegetation project; Riparian, Upslope, or Both.

25) **Describe Density or Coverage -** Enter the area of revegetation. Indicate species planted, average height, and average density. For example: alders, height 4', density, 2 per sq. yd. For mature projects or exclusion fencing projects density can be described as sparse, moderate, or very dense. Attempt to identify dominant plant species. Photos should be taken of all revegetation projects.

26) **Photographs -** Check the appropriate box indicating if photographs of the project were taken. If yes, enter the location where the photographs are stored.

PROJECT SITE COMPLETION FORM

Stream: _____ **Date:** _____ **Page** _____ **of** _____
Contractor/Organization: _____
Inspector: _____ **Contract No.:** _____ **FY:** ___/___
Landowner: _____
Estimated Cost: _____
Length of Project/Numbers of Structures: _____
Reference Point: _____ **Lat:** _____ **Long:** _____
Feet From Reference Point: _____ ❑ UP / ❑ DN **Channel Type:** _____
Constructed Using: ❑ Hand Crew ❑ Heavy Equipment ❑ Both
Project Objective: ❑ Instream Habitat ❑ Erosion Control ❑ Fish Passage
Type of structure: _____

Project Completion Check Points:	**YES**	**NO**	
1. Project techniques according to manual	❑	❑	If no, explain: _____
2. Materials of recommended type and size	❑	❑	If no, explain: _____
3. Structure positioned correctly to meet objectives	❑	❑	If no, explain: _____
4. Followed permit(s) specifications	❑	❑	If no, explain: _____
5. Landowner(s) agreed with work and materials used	❑	❑	If no, explain: _____

Original Habitat Type: _____ **Target Habitat Type:** _____

Habitat Maximum Depth: _____ **ft.** **Bankfull Stream Width:** _____ **ft.**

Comments: _____

If Revegetation: ❑ Riparian ❑ Upslope ❑ Both (photo required for revegetation.)

Describe Density or Coverage: _____

Photographs: ❑ Yes ❑ No If yes, location of photographs: _____

Post-Project Evaluation

Post-project evaluation should be performed by an independent person or group. Having no prior connection to the project increases the potential for an objective and credible evaluation. Initial post-project evaluation should occur within one to three years after project completion. The project should have endured at least one, but not more than three, winter's high flow in order to detect and correct situations requiring modification or maintenance. Post-project evaluation considers both physical and biological aspects similar to those categories suggested for pre-project data collection. Physical features associated with a project are generally more easily measured, interpreted, and compared when both pre- and post-project data are available. Habitat quality can be assessed using physical features and biological parameters other than fish data (e.g., vegetation and/or invertebrate communities). Biological data, especially anadromous fish data, are more difficult to collect and interpret. Reliable correlations of anadromous salmonid population responses to habitat improvement prescriptions generally requires many years of trend data.

Habitat Project Evaluation Forms

Standard forms have been developed for evaluating existing habitat improvement projects. The evaluation reviews and documents the physical effectiveness of individual habitat enhancement manipulations. These include stream habitat structures, fish passage modifications, riparian vegetation enhancements, erosion control and stream bank stability improvements. Each structure or habitat prescription site is to be evaluated according to the questions asked on the evaluation forms. To eliminate entering repetitive background information on each field form, two forms have been designed:

1. General Project Information Form.

2. Individual Structure or Site Form.

The “General Project Information Form” provides background information pertaining to the entire project or contract. Much of the information concerning project design and objectives, and pre-project data is held by contract administrators or original project proponents. This form will assist in identifying what background information is available and its location. This form also serves to summarize pertinent stream information necessary for completion of the evaluation process. Completion of the “General Project Information Form” should occur prior to commencing field evaluations of individual structures.

The “Individual Structure or Site Form” is for field use. Key stream and project background information has been abbreviated to serve as a cross reference to the “General Project Information Form.”

Evaluations should be completed by evaluation project personnel or selected individuals familiar with habitat restoration projects. Evaluations of projects lacking documentation of specific features should be conducted with the assistance of the appropriate individual having first-hand knowledge of project details. Project contractors or contract administrators are not to evaluate their own projects, however, they may be consulted regarding project details and site

locations. Contract administrators must complete the "Project Site Completion Form" immediately after project completion for background information purposes.

After completing a project evaluation, send the original completed forms and any electronic data and photos to the DFG address listed below. Label all photos with the stream, date, corresponding evaluation form page number, structure type and location in feet from the reference point.

Any questions concerning this evaluation procedure should be directed to:

California Department of Fish and Game
Inland Fisheries Division
610 9th Street
Fortuna, CA 95540
Attention: Salmonid Habitat Improvement Project Evaluator
(707) 725-0976.

Equipment

The following equipment is necessary to conduct evaluations:

- Hip boots or chest waders with non-skid devices
- Hip chain (a reel tape or drag tape could be used)
- Stadia rod or other water depth measuring device
- Clipboard and pencils
- Evaluation forms (on waterproof paper) and code lists
- Project documents including site maps and structure designs
- Camera and film
- Handheld tape recorder (optional)

Instructions for Completing the General Project Information Form

1) **Stream** - Name of stream where project is located.

2) **Watershed** - Name of watershed system that stream is a component.

3) **Evaluator** - Name of individuals conducting evaluation.

4) **Date** - Date of field evaluation.

5) **Contract No.** - This number should be a DFG or WCB contract number or a Region project identifier code.

6) **FY** - Fiscal year of contract (e.g. "96/97").

7) **Fund Source** - Include if known.

8) **DFG Contact** - DFG staff knowledgeable about contract, usually the contract administrator.

9) **Contractor** - Name of individual contractor, firm, or agency performing work.

10) **Does Contract Include Other Streams or Locations** - Indicate if this is a "multiple site" contract. If it is, the next question asks you to determine the portion of dollars of the total contract spent within the stream reach being evaluated.

11) **Property Owner** - Owner and contact person for access permission.

12) **Access Directions** - Specific directions to the project site.

13) **Channel Type** - Use the Rosgen system outlined in this manual (Part III).

14) **Stream Order** - Determined by using method on Page II-3 of this manual.

15) **Drainage Area** - Enter the drainage area for the entire stream where the project is located. Leave blank if project is not instream.

16) **USGS Quad** - Name of 7.5-minute USGS quadrangle map(s).

17) **Project Location at Downstream End** - Determine the latitude and longitude of the most downstream end of the project. This is accomplished using a USGS Quadrangle and a Coordinator, or a GPS unit, if available (Appendix M).

18) **Date Project Completed** - Enter the month and year of project completion.

19) **Date of Last Evaluation** - Enter date of last documented evaluation similar to this method or latest habitat typing date.

20) **Pre-project Evaluation or Data** - Indicate the existence of electrofishing or carcass survey, habitat typing, stream survey, etc. data files or reports. If it exists, give its location.

21) **As-built or Project Designs** - Indicate if plans exist that define what was accomplished or designed to be accomplished for the project. Of particular concern is a sequence list or designs of structure types and their locations where actually constructed. Without this information it is difficult to determine where a structure was located and its original design configuration.

22) **Number of Structures Constructed** - Enter original number of structures known or documented as constructed.

23) **Number of Structures Evaluated** - Enter number of structures actually observed.

24) **Number of Evaluation Pages Associated With This Form** - Attach all related Individual Structure or Site Forms to the General Project Information Form and indicate the number

of forms attached. This information indicates how many field forms should be attached to this general form.

25) **General Project Evaluation or Comments -** Include any comments or overall project assessment. Indicate your judgement of habitat benefits on a project level. This is a summary statement of all observed structures and their collective effects.

STREAM HABITAT ENHANCEMENT PROJECT EVALUATION

GENERAL PROJECT INFORMATION FORM

STREAM: _____ WATERSHED: _____

EVALUATOR: _____ DATE: _____

CONTRACT NO.: _____ FY: _____/_____ FUND SOURCE: _____

DFG CONTACT: _____ CONTRACTOR: _____

DOES THIS CONTRACT INCLUDE OTHER STREAMS OR LOCATIONS: Y ___ N ___

AMOUNT SPENT ON EVALUATED PORTION OF CONTRACT: $_____
(May include total contract amount or a portion of contract)

PROPERTY OWNER: _____

ACCESS DIRECTIONS: _____

_____

CHANNEL TYPE(S): _____ STREAM ORDER: _____ DRAINAGE AREA (SQ MI): _____

USGS QUAD (7.5 MIN): _____

PROJECT LOCATION AT DOWNSTREAM END: LAT. _____ LONG. _____

DATE PROJECT COMPLETED: MONTH _____ YEAR _____

DATE OF LAST EVALUATION: MONTH _____ YEAR _____

PRE-PROJECT EVALUATION OR DATA AVAILABLE: Y ___ N ___ IF YES WHERE? _____

_____

ARE AS-BUILT DATA OR PROPOSED DESIGNS AVAILABLE: Y ___ N ___ IF YES WHERE? _____

_____

NO. OF STRUCTURES CONSTRUCTED: _____ NO. OF STRUCTURES EVALUATED: _____

COMMENTS: _____

_____

NUMBER OF EVALUATION PAGES ASSOCIATED WITH THIS FORM: _____

GENERAL PROJECT EVALUATION OR COMMENTS: _____

_____

_____

_____

Instructions for Completing the Individual Structure or Site Form

1) **Stream** - Name of stream where project is located.

2) **Watershed** - Name of watershed system that stream is a component.

3) **Page __ of __** - Number the page. For example, if this is page 5 out of 11 total pages for project site evaluation in stream XYZ then indicate: Page 05 of 11.

4) **Date** - Date of field evaluation.

5) **Stream PNAME** - The official stream name according to the reach file list

6) **PNAME Code** - The numeric code for the stream corresponding to the PNAME.

7) **Evaluator** - Name of person(s) performing evaluation.

8) **Contract No.** - Make certain this is same number as on the "General Project Information Form."

9) **FY** - Fiscal year of contract.

10) **Reference Point** - The point from which each structure location is measured. This point should be a prominent feature that is easily recognizable and will not change over time. Examples include bridges, mouths of tributaries, survey marker, and buildings. Do not use trees, boulders, etc.

11) **LAT and LONG** - Latitude and longitude of reference point in decimal degrees.

12) **Feet from Reference Point UP or DN** - Indicate feet from the reference point and circle appropriate UP or DN to show if the measurement is upstream or downstream of reference point. In most cases a "hip chain" should be used.

13) **Channel Type** - Indicate channel type according to Rosgen's system.

14) **Structure Objective** - Use one of the following numeric codes:

    1. Fish passage improvement
    2. Watershed and stream bank stability improvement
    3. Stream improvement of rearing and/or spawning habitat

15) **Type of Structure** - This is a 3 digit numeric code. Refer to the structure type code list at the end of these instructions.

16) **How Well Is Structure Meeting Habitat Objective -**

1. (Excellent) Structure is providing the habitat conditions as expected. Examples include: formation of a primary pool, spawning gravel retained, complex cover provided, sediment controlled, vigorous riparian growth achieved, etc.

2. (Good) Structure is meeting objectives and providing habitat but maximum pool depth is between 2.0 to 2.5 feet, shelter complexity is less than 3, spawning gravel is available but not abundant, or riparian growth is moderate.

3. (Fair) Structure is providing some habitat benefit that was not present before construction but it is achieving only partial expected benefits, or it may be providing some benefit but not the intended objective. Examples include: pool scour depth less than 2 feet, very little spawning gravel associated with structure, cover not complex, etc. Use comments section to explain.

4. (Poor) Very little habitat value exists as a result of the structure or prescription. Virtually no pool scour, shelter complexity less than 2, no gravel retained, etc. Use comments to explain.

5. (Failed) Not visible. No value. Structure is not meeting objective. Stranded out of stream channel with no possibility of providing low or high flow benefit. Use comments to explain.

17) **Condition of Structure** - Check appropriate item. Consider structure condition only. Do not include functional aspects in this category. The structure may not be functioning (stranded out of channel) but it may be in excellent structural condition.

1. (Excellent) Structure is intact and structurally sound.

2. (Good) Structure is intact and generally sound but some wear is evident. Pieces may have shifted slightly, erosion cloth visible, wire fence material visible, one or two anchor pins or cables loose but structure still intact. Structure is generally as designed. Use comments to explain.

3. (Fair) Structure has been altered significantly but is still meeting about 50 percent of design criteria. Boulders or logs may have shifted, log weirs undercut, cables loose, etc. Use comments to explain.

4. (Poor) Structure is visible but in a condition that is only about 25 percent of original design. Significant structural damage. Use comments to explain.

5. (Failed) Complete structural failure. Not visible or remnants not in any form of designed configuration. Use comments to explain.

18) **Structure Problems** - Check one or more of the appropriate items. Use comments if necessary.

19) **Repair or Modification Recommended** - Indicate if structure should be repaired or modified to improve effectiveness.

20) **Habitat Type Created** - Use fish habitat type alpha abbreviations (Part III) to describe the habitat created by the structure.

21) **Bankfull Stream Width** - Record the bankfull stream width near the structure at the nearest velocity crossover point.

22) **Maximum Pool Depth** - If structure is associated with a pool, record the maximum depth of pool.

23) **Depth of Pool Tail Crest** - If maximum depth of pool is recorded, also record depth of pool tail crest of pool.

24) **Instream Shelter Complexity** - For structures or treatments forming instream salmonid habitat determine the shelter complexity value using the following criteria:

Value	Instream Shelter Complexity Value Examples:
0	● No shelter.
1	● One to five boulders. ● Bare undercut bank or bedrock ledge. ● Single piece of large wood (>12" diameter and 6' long) defined as large woody debris (LWD).
2	● One or two pieces of LWD associated with any amount of small wood (<12" diameter) defined as small woody debris (SWD). ● Six or more boulders per 50 feet. ● Stable undercut bank with root mass, and less than 12" undercut. ● A single root wad lacking complexity. ● Branches in or near the water. ● Limited submersed vegetative fish cover. ● Bubble curtain.

3 Combinations of (must have at least two cover types):

- LWD/boulders/root wads.
- Three or more pieces of LWD combined with SWD.
- Three or more boulders combined with LWD/SWD.
- Bubble curtain combined with LWD or boulders.
- Stable undercut bank with greater than 12" undercut, associated with root mass or LWD.
- Extensive submersed vegetative fish cover.

25) **Instream Shelter Percent Cover** - Instream shelter percent cover is a measure of the area of the habitat unit that is occupied by instream shelter. The area is estimated from an overhead view.

26) **Shelter Rating** - Shelter rating is the product of multiplying shelter complexity times instream shelter percent cover.

27) **Observed Salmonids Number** - Enter the number of salmonids or redds observed within the habitat associated with the structure. Keep in mind that this observation must be made as you first approach the habitat unit. Use comments for species identification, if applicable. Differentiate juveniles by age class:

0+ less than about 3 inches in length,

1+ greater than 3 inches in length.

2+ greater than 6 inches in length

28) **Revegetation** - Check appropriate area of revegetation. Indicate species planted, average height, and average density. Example: alders, height 4', density 2 per sq. yd. For mature projects or exclusion fencing projects density can be described as sparse, moderate, or very dense. Attempt to identify dominant plant species. Photos should be taken of all revegetation projects.

29) **Photo No. -** Enter photo roll and frame number, if applicable. Submit labeled photos with field forms. Photos are highly encouraged of each structure or treatment.

STREAM HABITAT ENHANCEMENT PROJECT EVALUATION
INDIVIDUAL STRUCTURE OR SITE FORM

STREAM: _____ DRAINAGE: _____ PAGE_____ of _____

DATE: _____/_____/_____ STREAM PNAME: _____ PNAME CODE: _____

EVALUATOR(s): _____ CONTRACT NO.: _____ FY: _____/_____

REFERENCE POINT: _____ LAT: _____._____ (DECIMAL DEGREES) LONG: _____._____ (DECIMAL DEGREES)

FEET FROM REFERENCE POINT: _____ ❑ UP ❑ DN CHANNEL TYPE: _____

RESTORATION OBJECTIVE: ❑ 1 ❑ 2 ❑ 3 TYPE OF STRUCTURE: _____

HOW WELL IS STRUCTURE MEETING HABITAT OBJECTIVE? (circle number)

1 (EXCELLENT) _____ **2 (GOOD)** _____ **3 (FAIR)** _____ **4 (POOR)** _____ **5 (NO VALUE)** _____

COMMENTS: _____

CONDITION OF STRUCTURE - consider structural integrity only (circle number):

1 (EXCELLENT) _____ **2 (GOOD)** _____ **3 (FAIR)** _____ **4 (POOR)** _____ **5 (NO VALUE)** _____

COMMENTS: _____

STRUCTURE PROBLEMS (check appropriate items):

1. ❑ ANCHOR FAILURE,
2. ❑ CABLE FAILURE,
3. ❑ CHANNEL SHIFT,
4. ❑ BOULDER/LOG SHIFT,
5. ❑ UNDERMINED,
6. ❑ BURIED BY BEDLOAD,
7. ❑ UNDERBUILT,
8. ❑ LOGS/BOULDERS STRANDED OUT OF CHANNEL,
9. ❑ BANK EROSION AT SITE AND/OR DOWNSTREAM,
10. ❑ CREATED SEDIMENT TRAP,
11. ❑ POOR DESIGN,
12. ❑ POOR PLACEMENT,
13. ❑ EX-FENCE FAILURE,
14. ❑ OTHER.

COMMENTS: _____

Repair recommended: ❑ Yes ❑ No Enhancement to improve cover or effectiveness recommended: ❑ Yes ❑ No

HABITAT TYPE (associated with structure) _____ BANKFULL STREAM WIDTH _____ FT.

MAXIMUM POOL DEPTH _____ FT. DEPTH OF POOL TAIL CREST _____ FT.

SHELTER COMPLEXITY: ❑ 0 ❑ 1 ❑ 2 ❑ 3 × SHELTER % COVER: _____ = SHELTER RATING: _____

OBSERVED SALMONIDS NO.: 0+ _____, 1+ _____, 2+ _____, ADULTS _____, REDDS _____

COMMENTS: _____

REVEGETATION: RIPARIAN ___ UPSLOPE ___ BOTH _____ (Photo required for reveg.) DESCRIBE DENSITY: _____

PHOTO NO. PRINT: ROLL _____ FRAME _____ SLIDE: ROLL _____ FRAME _____

COMMENTS: _____

Structure objective codes:

1 fish passage improvement

2 watershed and stream bank stability improvement

3 rearing and spawning stream channel improvement

Structure type codes:

100 Fish passage improvement (general)

- 110 fishways - general
  - 111 step-and-pool
  - 112 Denil ladder
  - 113 Alaskan steeppass
  - 119 other
- 120 culvert modification
  - 121 back-flooding weirs
  - 122 culvert baffles - general
  - 123 Washington baffles
  - 124 steel-ramp CMP baffles
  - 129 other
- 130 natural barrier modification or removal
  - 131 log jam removal or modification
  - 132 beaver dam removal or modification
  - 133 waterfalls and chutes - blasting modifications
  - 134 landslide removal or modification
  - 139 other
- 140 fish screens

200 Watershed and stream bank stability (general)

- 210 stream bank stabilization structures - general
  - 211 boulder riprap or bank armor
  - 212 boulder wing-deflectors
  - 213 log cribbing
  - 214 log bank armor
  - 215 log wing-deflector
  - 216 boulder/log deflector

217 tree revetment
218 gabions
219 other

220 mulching

230 revegetation

240 exclusion fencing

250 checkdams
251 redwood board checkdam
252 brush and rock checkdam
253 post brush checkdam
254 tree checkdam
255 brush and rock mattress

260 waterbars

270 bioengineering
271 live vegetative crib wall
272 native material revetment
273 willow wall revetment
274 brush mattress
275 willow siltation baffles

299 other

300 Stream channel improvement (general)

310 boulder weir
311 boulder weir with sill log
312 boulder cluster
313 boulder wing-constrictor - single
314 boulder wing-constrictor - opposing
315 vortex boulder weir

320 boulder/log combo constrictor - single

325 boulder/log combo constrictor - opposing

330 log weir (plunge)
331 log wing-constrictor - single
332 log wing-constrictor - opposing

- 333 digger/cover log (vertical)
- 334 divide log
- 335 spider logs or cover log complex
- 336 Hewitt ramp
- 337 upsurge log weir

340 cover root wads
- 341 cover logs (horizontal)
- 342 cover boulders (edge cover)
- 343 boulder cluster with woody cover (root wads or logs)
- 344 unanchored large woody debris

350 gabion weir
- 351 gabion wing-constrictor - single
- 352 gabion wing-constrictor - opposing
- 353 boulder cluster field - >5 clusters spaced 20-30 ft. apart
- 354 log/gabion constrictor - single
- 355 log/gabion constrictor - double

Construction method codes:

1 hand crew
2 heavy equipment

SUMMARY

Project evaluation should be considered an important element in the project development and implementation process. The evaluation process provides a measure of the benefits and provides insight and guidance for future projects.

Although post-project evaluation is intended to be performed by individuals other than project contractors or contract administrators, it is essential that those individuals involved with project planning and implementation are aware of the data and documentation needs of the evaluator.

The evaluation process begins in the early planning stages with documentation of historical and existing pre-project conditions. A well documented description of species composition, distribution, adult and juvenile abundance, habitat type and quality, channel types, summer and early-fall flow and temperature regimes, gravel quality, and general watershed characteristics should be available for future project evaluation.

Specific project structures or prescriptions should be described, diagramed and photographed to indicate location and structural specifics. The intended objective of each prescription should be indicated. Most habitat projects have an expected project-life exceeding 10 years. It is, therefore, essential to provide documentation and guideposts to enable workers in the following decades to locate, evaluate, and learn from projects completed today.