# Standard Operating Procedure (SOP) 4.2.1.2

## Physical/Habitat Quality Form

(CARCD 2001, Written by TAC Visual Assessments work group)

Physical habitat assessments are designed to give an overall rating to the condition of the stream habitat. Such assessments are semi-quantitative in that they are designed to produce a numeric product that is used to rate the stream. This rating system does not rely heavily on empirical measurements but instead relies on the observers' interpretation of the visual appearance of the environment and converting that observation into a numeric rating. This procedure therefore does allow a certain amount of subjectivity; hence, such physical habitat assessments are only semi-quantitative at best. Still they are useful in providing consistent comparisons between streams.

The enclosed California Department of Fish and Game (DFG) ***Physical/Habitat Quality Form*** (DFG Water Pollution Control Laboratory, *California Stream Bioassessment Procedure*, May 1999) is now used widely around the State on high gradient streams as an integral component of citizen bioassessment monitoring. This DFG form is actually based on the U.S. EPA protocol for high gradient version is for use on rocky bottom streams in mountainous regions (United States Environmental Protection Agency, *Volunteer Stream Monitoring: A Methods Manual*, EPA 841-B-97-003, 1997). The ***Physical/Habitat Quality Form*** is often completed at the same time as the macroinvertebrate sample collection procedure. It is also recommend that other citizen monitoring groups (those not currently performing bioassessment) also use this form as a supplement to the ***California Stream and Shore Walk Visual Assessment.*** Another version of this protocol, also in EPA's *Volunteer Stream Monitoring: A Methods Manual*, has been developed for use on low gradient, muddy bottom streams. This form, henceforth referred to as the ***Habitat Assessment Field Data Sheet for Muddy Bottom Streams,*** may be more appropriate for groups working in lowland areas. The habitat scoring criteria used in both the DFG ***Physical/Habitat Quality Form*** and the ***Habitat Assessment Field Data Sheet for Muddy Bottom Streams*** represents a standardized method used around the United States by citizen monitors and professional biologists alike.

# INTENSIVE BIOSURVEY:
# HABITAT ASSESSMENT

**Stream Name:** _____

**County:** _____ **State:** _____

**Investigators:** _____

_____

_____

**Site (description):** _____

_____

_____

_____

**Latitude:** _____ **Longitude:** _____

**Site or Map Number:** _____

**Date:** _____ **Time:** _____

**Weather in past 24 hours:**

- ❑ Storm (heavy rain)
- ❑ Rain (steady rain)
- ❑ Showers (intermittent rain)
- ❑ Overcast
- ❑ Clear/Sunny

**Weather now:**

- ❑ Storm (heavy rain)
- ❑ Rain (steady rain)
- ❑ Showers (intermittent rain)
- ❑ Overcast
- ❑ Clear/Sunny

# Sketch of site

On your sketch, note features that affect stream habitat, such as: riffles, runs, pools, ditches, wetlands, dams, riprap, outfalls, tributaries, landscape features, logging paths, vegetation, and roads.

## GENERAL CHARACTERISTICS

**1. Water appearance:** Page 92

θ Clear θ Turbid θ Orange
θ Milky θ Dark brown θ Greenish
θ Foamy θ Oily sheen θ Other _____

**2. Water odor:** Page 92

θ Sewage θ Fishy θ None
θ Chlorine θ Rotten eggs θ Other

**3. Water temperature:** Page 92

_____ °C *or* _____ °F

**4. Approximate width of stream channel:** Page 93

_____ feet θ Measured θ Estimated

## LOCAL LAND USE

***(within about 1/4 mile of the site; adjacent and upstream)***

**5. Land uses in the local watershed can potentially have an impact on a stream.** Check "1" if present, "2" if clearly having an impact on the stream. Page 93

| 1 | 2 | **Residential** |
|---|---|---|
| θ | θ | Single-family housing |
| θ | θ | Multifamily housing |
| θ | θ | Lawns |
| θ | θ | Commercial/institutional |

| 1 | 2 | **Roads, etc**. |
|---|---|---|
| θ | θ | Paved roads or bridges |
| θ | θ | Unpaved roads |

| 1 | 2 | **Construction underway on:** |
|---|---|---|
| θ | θ | Housing development |
| θ | θ | Commercial development |
| θ | θ | Road bridge construction/repair |

| 1 | 2 | **Agricultural** |
|---|---|---|
| θ | θ | Grazing land |
| θ | θ | Feeding lots or animal holding areas |
| θ | θ | Cropland |
| θ | θ | Inactive agricultural land/fields |

| 1 | 2 | **Recreation** |
|---|---|---|
| θ | θ | Power boating |
| θ | θ | Golfing |
| θ | θ | Camping |
| θ | θ | Swimming/fishing/canoeing |
| θ | θ | Hiking/paths |

| 1 | 2 | **Other** |
|---|---|---|
| θ | θ | Mining or gravel pits |
| θ | θ | Logging |
| θ | θ | Industry |
| θ | θ | Oil and gas drilling |
| θ | θ | Trash dump |
| θ | θ | Landfills |

| Habitat Parameter | Category | | | |
|---|---|---|---|---|
| | Optimal | Suboptimal | Marginal | Poor |
| 1. Attachment Sites for Macro-invertebrates Page 93 | Well developed riffle and run; riffle is as wide as stream and length extends 2 times the width of stream; cobble predominate; boulders and gravel common | Riffle is as wide as stream but length is less than 2 times width; cobble less abundant; boulders and gravel common. | Run area may be lacking; riffle not as wide as stream and its length is less than 2 times the stream width; gravel or large boulders and bedrock prevalent; some cobble present. | Riffles or run virtually nonexistent; large boulders and bedrock prevalent; cobble lacking. |
| SCORE ___ | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 2. Embeddedness Page 93 | Fine sediment surrounds and fills in 0-25% of the living spaces around and in between the gravel, cobble, and boulders. | Fine sediment surrounds and fills in 25-50% of the living spaces around and in between the gravel, cobble, and boulders. | Fine sediment surrounds and fills in 50-75% of the living spaces around and in between the gravel, cobble, and boulders. | Fine sediment surrounds and fills in more than 75% of the living spaces around and in between the gravel, cobble, and boulders. |
| SCORE ___ | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 3. Shelter for Fish Page 93 | Snags, submerged logs, undercut banks, cobble and large rocks, or other stable habitat are found in over 50% of the site. | Snags, submerged logs, undercut banks, cobble and large rocks, or other stable habitat are found in over 30-50% of the site. | Snags, submerged logs, undercut banks, cobble and large rocks, or other stable habitat are found in over 10-30% of the site. | Snags, submerged logs, undercut banks, cobble and large rocks, or other stable habitat are found in less than 10% of the site. |
| SCORE ___ | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 4. Channel Alteration Page 93 | Stream straightening, dredging, artificial embankments, dams or bridge abutments absent or minimal; stream with meandering pattern | Some stream straightening, dredging, artificial embankments or dams present, usually in areas of bridge abutments; no evidence of recent channel alteration activity. | Artificial embankments present to some extent on both banks; and 40 to 80% of stream site straightened, dredged, or otherwise altered. | Banks shored with gabion or cement; over 80% of the stream site straightened and disrupted. |
| SCORE ___ | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 5. Sediment Deposition Page 94 | Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition | Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools. | Moderate deposition of new gravel, coarse sand on old and new bars; 30-50% of the bottom affected; sediment deposits at stream obstructions and bends; moderate deposition in pools. | Heavy deposits of fine material, increased bar development; more than 50% of the bottom affected; pools almost absent due to substantial sediment deposition. |
| SCORE ___ | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |

| Habitat Parameter | Category | | | |
|---|---|---|---|---|
| | Optimal | Suboptimal | Marginal | Poor |
| 6. Stream Velocity and Depth Combinations<br>Page 94 | Slow (< 1 ft/s)/deep (> 1.5 ft); slow/shallow; fast/deep; fast/shallow combinations all present. | 3 of the 4 velocity/depth combinations are present; fast current areas generally dominate. | Only 2 of the 4 velocity/depth combinations present. Score lower if fast current areas missing. | Dominated by 1 velocity/depth category (usually slow/shallow areas). |
| SCORE ____ | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 7. Channel Flow Status<br>Page 94 | Water reaches base of both lower banks and minimal amount of channel substrate is exposed. | Water fills > 75% of the available channel; < 25% of channel substrate is exposed. | Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed. | Very little water in channel and mostly present as standing pools. |
| SCORE ____ | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 8. Bank Vegetative Protection (score each bank)<br>Page 95<br>Note: determine left or right side by facing downstream | More than 90% of the streambank surfaces covered by natural vegetation, including trees, shrubs, or other plants; vegetative disruption, through grazing or mowing, minimal or not evident; almost all plants allowed to grow naturally. | 70-90% of the streambank surfaces covered by natural vegetation, but one class of plants is not well-represented; some vegetative disruption evident; more than one-half of the potential plant stubble height remaining. | 50-70% of the streambank surfaces covered by vegetation; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height remaining. | Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 2 inches or less in average stubble height. |
| SCORE ____ (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| SCORE ____ (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| 9. Condition of Banks (score each bank)<br>Page 95 | Banks stable; no evidence of erosion or bank failure; little potential for future problems. | Moderately stable; infrequent, small areas of erosion mostly healed over. | Moderately unstable; up to 60% of banks in site have areas of erosion; high erosion potential during floods. | Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank collapse or failure; 60-100% of bank has erosional scars. |
| SCORE ____ (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| SCORE ____ (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| 10. Riparian Vegetative Zone Width (score each bank riparian zone)<br>Page 95 | Width of riparian zone > 60 feet; no evidence of human activities (i.e., parking lots, roadbeds, clear cuts, mowed areas, or crops) within the riparian zone. | Width of riparian zone 35-60 feet. | Width of riparian zone 20-35 feet. | Width of riparian zone < 20 feet. |
| SCORE ____ (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| SCORE ____ (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 |

Total Score ____

**HABITAT ASSESSMENT FIELD DATA SHEET** *MUDDY BOTTOM SAMPLING*

| Habitat Parameter | Category | | | |
|---|---|---|---|---|
| | Optimal | Suboptimal | Marginal | Poor |
| 1. Shelter for Fish and Macro-invertebrates<br>Page 99 | Snags, submerged logs, undercut banks, rubble or other stable habitat found over 50% of the site; logs/snags are old fall. | Snags, submerged logs, undercut banks, rubble or other stable habitat found over 30-50% of the site; some old fall, but preponderance of new fall. | Snags, submerged logs, undercut banks, rubble or other stable habitat found over 10-30% of the site; appears unstable; some new fall | Snags, submerged logs, undercut banks, rubble or other stable habitat found over less than 10% of the site; no old or new fall |
| SCORE ____ | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 2. Pool Substrate Characterization<br>Page 100 | Pools have mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common. | Pools have mixture of soft sand, mud, or clay substrate; mud may be dominant; some root mats and submerged vegetation present. | Pools have all mud or clay or sand substrate, little or no root mat; no submerged vegetation. | Pools have hard pan clay or bedrock substrate; no root mat or vegetation. |
| SCORE ____ | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 3. Pool Variability<br>Page 100 | Even mix of large-shallow, large deep, small-shallow, small-deep pools. | Majority of pools large deep; very few shallow. | Shallow pools much more prevalent than deep pools. | Majority of pools small-shallow or pools absent. |
| SCORE ____ | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 4. Channel Alteration<br>Page 100 | Stream straightening, dredging, artificial embankments, dams or bridge abutments absent or minimal, stream with meandering pattern. | Some stream straightening, artificial embankments or dams present, usually in areas of bridge abutments; no evidence of recent channel alteration activity. | Artificial embankments present to some extent on both banks; and 40 to 80% of stream site straightened, dredged, or otherwise altered. | Banks shored with gabion or cement; over 80% of the stream site straightened and disrupted. |
| SCORE ____ | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 5. Sediment Deposition<br>Page 100 | Less than 20% of stream bottom affected by extensive sediment deposition; minor accumulation of fine and coarse material at snags and submerged vegetation; little or no enlargement of islands or point bars. | 20-50% of stream bottom affected by extensive sediment deposition; moderate accumulation; substantial sediment movement only during major storm event; some new increase in bar formation. | 50-80% of stream bottom affected by extensive sediment deposition; pools shallow, heavily silted; embankments may be present on both banks; frequent and substantial sediment movement during storm events. | Greater than 80% of stream bottom affected by extensive sediment deposition; Heavy deposits; mud, silt, and/or sand in braided or nonbraided channels; pools almost absent due to deposition. |
| SCORE ____ | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 6. Channel Sinuosity<br>Page 100 | The bends in the stream would increase the stream length 3 to 4 times longer than if it was in a straight line. | The bends in the stream would increase the stream length 2 to 3 times longer than if it was in a straight line. | The bends in the stream would increase the stream length 2 to 1 times longer than if it was in a straight line. | Channel straight; waterway has been channelized. |
| SCORE ____ | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |

| Habitat Parameter | Category | | | |
|---|---|---|---|---|
| | Optimal | Suboptimal | Marginal | Poor |
| 7. Channel Flow Status<br>Page 100<br>SCORE ____ | Water reaches base of both lower banks and minimal amount of channel substrate is exposed.<br>20 19 18 17 16 | Water fills >75% of the available channel; <25% of channel substrate is exposed.<br>15 14 13 12 11 | Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed.<br>10 9 8 7 6 | Very little water in channel and mostly present as standing pools<br>5 4 3 2 1 0 |
| 8. Bank Vegetative Protection<br>Page 100<br>Note: determine left or right side by facing downstream<br>SCORE ____(LB)<br>SCORE ____(RB) | More than 90% of the streambank surfaces covered by native vegetation, including trees, understory shrubs, or non-woody macrophytes; vegetative disruption through grazing or mowing, minimal or not evident; almost all plants allowed to grow naturally.<br>Left Bank 10 9<br>Right Bank 10 9 | 70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; some vegetative disruption evident; more than one-half of the potential plant stubble height remaining.<br>8 7 6<br>8 7 6 | 50-70% of the streambank surfaces covered by vegetation; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.<br>5 4 3<br>5 4 3 | Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 2 inches or less in average stubble height.<br>2 1 0<br>2 1 0 |
| 9. Condition of Banks<br>Page 100<br>SCORE ____(LB)<br>SCORE ____(RB) | Banks stable; no evidence of erosion or bank failure; little potential for future problems.<br>Left Bank 10 9<br>Right Bank 10 9 | Moderately stable; infrequent, small areas of erosion mostly healed over.<br>9 7 6<br>8 7 6 | Moderately unstable; up to 60% of banks in area have areas of erosion; high erosion potential during floods.<br>5 4 3<br>5 4 3 | Unstable; many eroded areas, "raw" areas frequent along straight sections and bends; obvious bank collapse or failure, 60-100% of bank has erosional scars.<br>2 1 0<br>2 1 0 |
| 10. Riparian Vegetative Zone Width (score each bank riparian zone)<br>Page 100<br>SCORE (LB)<br>SCORE ____(RB) | Width of riparian zone >50 feet; human activities (i.e. parking lots, roadbeds, clear cuts, lawns, or crops) have not affected riparian zone.<br>Left Bank 10 9<br>Right Bank 10 9 | Width of riparian zone 35-40 feet.<br>8 7 6<br>8 7 6 | Width of riparian zone 20-35 feet.<br>5 4 3<br>5 4 3 | Width of riparian zone < 20 feet.<br>2 1 0<br>2 1 0 |

Total Score ____

# HABITAT ASSESSMENT GUIDE

| Percent Similarity to Reference Score | Habitat Quality Category | General Attributes |
|---|---|---|
| > 90% | Excellent | Comparable to the best situation to be expected within an ecoregion. Excellent overall habitat structure conducive to supporting healthy biological community. |
| 75-88% | Good | Habitat structure slightly impaired. Diverse instream habitat generally well-developed. Some degradation of riparian zone and banks. A small amount of channel alteration may be present. |
| 60-73% | Fair | Loss of habitat compared to reference. Habitat is a major limiting factor to supporting a healthy biological community. |
| < 58% | Poor | Severe habitat alteration at all levels. |

NOTE: If your score falls between ranges consider the site's habitat assessment results and chemical data, if available, in making your decision.

## *Overall Assessment:*

Page 106

- ❑ Excellent
- ❑ Good
- ❑ Fair
- ❑ Poor

## COMMENTS:

# STREAM HABITAT WALK

**Stream Name:** _____

**County:** _____ **State:** _____

**Investigators:** _____

_____

_____

**Site (description):** _____

_____

_____

_____

**Latitude:** _____ **Longitude:** _____

**Site or Map Number:** _____

**Date:** _____ **Time:** _____

**Weather in past 24 hours:**

- ❑ Storm (heavy rain)
- ❑ Rain (steady rain)
- ❑ Showers (intermittent rain)
- ❑ Overcast
- ❑ Clear/Sunny

**Weather now:**

- ❑ Storm (heavy rain)
- ❑ Rain (steady rain)
- ❑ Showers (intermittent rain)
- ❑ Overcast
- ❑ Clear/Sunny

# Sketch of site

On your sketch, note features that affect stream habitat, such as: riffles, runs, pools, ditches, wetlands, dams, riprap, outfalls, tributaries, landscape features, logging paths, vegetation, and roads.

# PHYSICAL CHARACTERIZATION

## *In-Stream Characteristics*

**1. Check which stream habitats are present:** Page 48

*(You can check more than 1 habitat)*

❑ Pool(s) θ Riffle(s) θ Run(s)

**2. Nature of particles in the stream bottom at site** Page 48

| | None/Little | Some | Most |
|---|---|---|---|
| Silt/Clay/Mud | ❑ | ❑ | ❑ |
| Sand (up to 0.1" in diam.) | ❑ | ❑ | ❑ |
| Gravel (0.1 - 2" in diam.) | ❑ | ❑ | ❑ |
| Cobbles (2 - 10" in diam.) | ❑ | ❑ | ❑ |
| Boulders (over 10" in diam.) | ❑ | ❑ | ❑ |
| Bedrock (solid) | ❑ | ❑ | ❑ |

**3. Pick the category that best describes the extent to which gravel, cobbles, and boulders on the stream bottom are embedded (sunk) in silt, sand, or mud.** Page 49

θ Somewhat/not embedded (0-25%) θ Mostly embedded (75%)

θ Halfway embedded (50%) θ Completely embedded (100%)

**4. Presence of logs or large woody debris in stream:** Page 49

θ None θ Occasional θ Plentiful

**5. Presence of naturally-occurring organic material (i.e., leaves and twigs, etc.) in stream:** Page 49

θ None θ Occasional θ Plentiful

**6. Water appearance:** Page 49

θ Clear θ Light brown θ Orange
θ Milky θ Dark brown θ Greenish
θ Foamy θ Oily sheen θ Other _____
θ Turbid

**7. Water odor:** Page 50

θ Sewage θ Fishy θ None
θ Chlorine θ Rotten eggs θ Other _____

**8. Water temperature:** Page 50

_____ °C *or* _____ °F

## *Streambank and Channel Characteristics*

**9. (a) Approximate depth of run(s):** Page 50

θ < 1 ft θ 1-2 ft θ > 2 ft

**(b) Approximate depth of pool(s):**

θ < 1 ft θ 1-2 ft θ > 2 ft

**10. Approximate width of stream channel:** Page 50

_____ feet θ measured θ estimated

**11. Stream velocity:** _____ ft/sec. Page 50

**12. Looking upstream (100 yds.), pick the description that best fits the shape of the stream bank and the channel.** Page 50

**(a) Stream bank:**

| Left | | Right |
|---|---|---|
| θ | Vertical/undercut | θ |
| θ | Steeply sloping (> 30°) | θ |
| θ | Gradual/no slope (< 30°) | θ |

**(b) Extent of artificial bank modifications:**

| Left | | Right |
|---|---|---|
| θ | Bank 0-25% covered | θ |
| θ | Bank 25-50% covered | θ |
| θ | Bank 50-75% covered | θ |
| θ | Bank 75-100% covered | θ |

**(c) Shape of the channel:**

θ Narrow, deep θ Wide, deep
θ Narrow, shallow θ Wide, shallow

**13. Looking upstream (100 yds.), describe the streamside cover. Check "1" if present, "2" if common** Page 51

**(a) Along water's edge and stream bank only:**

| Left | | | Right | |
|---|---|---|---|---|
| **1** | **2** | | **1** | **2** |
| θ | θ | Trees | θ | θ |
| θ | θ | Bushes, shrubs | θ | θ |
| θ | θ | Tall grasses, ferns, etc. | θ | θ |
| θ | θ | Lawn | θ | θ |
| θ | θ | Boulders/rocks | θ | θ |
| θ | θ | Gravel/sand | θ | θ |
| θ | θ | Bare soil | θ | θ |
| θ | θ | Pavement, structures | θ | θ |

(b) From the top of the streambank out to 25 yards.

| Left 1 | Left 2 | | Right 1 | Right 2 |
|---|---|---|---|---|
| θ | θ | Trees | θ | θ |
| θ | θ | Bushes, shrubs | θ | θ |
| θ | θ | Tall grasses, ferns, etc. | θ | θ |
| θ | θ | Lawn | θ | θ |
| θ | θ | Boulders/rocks | θ | θ |
| θ | θ | Gravel/sand | θ | θ |
| θ | θ | Bare soil | θ | θ |
| θ | θ | Pavement, structures | θ | θ |

**14. Pick the category that best describes the extent to which vegetation shades the stream at your site.** Page 52

θ 0% θ 25% θ 50% θ 75% θ 100%

**15. Looking upstream, note general conditions. Check "1" if present, "2" if severe problem is clearly** Page 52

| Left 1 | Left 2 | **Stream Banks** | Right 1 | Right 2 |
|---|---|---|---|---|
| θ | θ | Natural streamside plant cover degraded | θ | θ |
| θ | θ | Banks collapsed/eroded | θ | θ |
| θ | θ | Garbage/junk adjacent to the stream | θ | θ |
| θ | θ | Foam or sheen on bank | θ | θ |
| **1** | **2** | **Stream Channel** | **1** | **2** |
| θ | θ | Mud, silt, or sand in or entering the stream | θ | θ |
| θ | θ | Garbage/junk in the stream | θ | θ |
| **1** | **2** | **Other** | **1** | **2** |
| θ | θ | Yard waste on bank (grass, clippings, etc.) | θ | θ |
| θ | θ | Livestock in or with unrestricted access to stream | θ | θ |
| θ | θ | Actively discharging pipe(s) | θ | θ |
| θ | θ | Other pipe(s) entering the stream | θ | θ |
| θ | θ | Ditches entering the stream | θ | θ |

## *Local Watershed Characteristics*

***(within about 1/4 mile of the site; adjacent and upstream)***

**16. Land uses in the local watershed can potentially have an impact on a stream. Check "1" if present, "2" if clearly having an impact on the stream.** Page 53

| 1 | 2 | **Residential** |
|---|---|---|
| θ | θ | Single-family housing |
| θ | θ | Multifamily housing |
| θ | θ | Lawns |
| θ | θ | Commercial/institutional |
| **1** | **2** | **Roads, etc.** |
| θ | θ | Paved roads or bridges |
| θ | θ | Unpaved roads |
| **1** | **2** | **Construction underway on:** |
| θ | θ | Housing development |
| θ | θ | Commercial development |
| θ | θ | Road bridge construction/repair |
| **1** | **2** | **Agricultural** |
| θ | θ | Grazing land |
| θ | θ | Feeding lots or animal holding areas |
| θ | θ | Cropland |
| θ | θ | Inactive agricultural land/fields |
| **1** | **2** | **Recreation** |
| θ | θ | Power boating |
| θ | θ | Golfing |
| θ | θ | Camping |
| θ | θ | Swimming/fishing/canoeing |
| θ | θ | Hiking/paths |
| **1** | **2** | **Other** |
| θ | θ | Mining or gravel pits |
| θ | θ | Logging |
| θ | θ | Industry |
| θ | θ | Oil and gas drilling |
| θ | θ | Trash dump |
| θ | θ | Landfills |

# BIOLOGICAL CHARACTERIZATION

## VISUAL BIOLOGICAL SURVEY

**17. Wildlife in or around the stream?** *(Mark all that apply)* Page 53

θ Amphibians θ Waterfowl θ Reptiles θ Mammals

**18. Fish in the stream?** *(Mark all that apply)* Page 53

θ No θ Yes, but rare θ Yes, abundant

θ Small (1-2 in.) θ Medium (3-6 in.) θ Large (7 in. and above)

Are there any barriers to fish movement?

θ Beaver dams θ Waterfalls > 1' θ None

θ Dams θ Road barriers θ Other _____

**19. Aquatic plants in the stream.** *(Mark all that apply)* Page 53

θ None θ Occasional θ Plentiful

θ Attached θ Free-floating

θ Stream margin θ Pools θ Near riffle

**20. Extent of algae in the stream.** *(Mark all that apply)* Page 53

(a) Are the submerged stones, twigs, or other material in the stream coated with a layer of algal "slime"?

θ None θ Occasional θ Plentiful

θ Light coating θ Heavy coating

θ Brownish θ Greenish θ Other _____

(b) Are there any filamentous (string-like) algae?

θ None θ Occasional θ Plentiful

θ Brownish θ Greenish θ Other _____

(c) Are any detached "clumps" or "mats" of algae floating on the water's surface?

θ None θ Occasional θ Plentiful

θ Brownish θ Greenish θ Other _____

# MACROINVERTEBRATE SURVEY *(Optional)*

**21. If macroinvertebrates were collected from the stream bottom, which type of method/habitat was selected?** Page 53

θ Rock-rubbing method: From cobbles and large stones selected from riffles.

θ Stick-picking method: From woody objects in streams with sandy, silty bottoms.

θ Leaf-pack sorting method: From submerged leaves in streams with either a rocky or sandy, silty bottom.

**22. Are macroinvertebrates present?** Page 54

θ No θ Yes, but rare θ Yes, abundant

**23. If present, describe the types of macroinvertebrates found.** Page 54

*(Mark all that apply)*

| | | |
|---|---|---|
| Wormlike | θ Occasional | θ Plentiful |
| Snails/clamlike | θ Occasional | θ Plentiful |
| Insects | θ Occasional | θ Plentiful |
| Crayfish | θ Occasional | θ Plentiful |

**COMMENTS:** *(Note changes or potential problems such as spills, new construction, type of discharging pipes)*

# STREAMSIDE BIOSURVEY: HABITAT WALK

**Stream Name:** _____

**County:** _____ **State:** _____

**Investigators:** _____

_____

_____

**Site (description):** _____

_____

_____

_____

**Latitude:** _____ **Longitude:** _____

**Site or Map Number:** _____

**Date:** _____ **Time:** _____

**Weather in past 24 hours:**

- ❑ Storm (heavy rain)
- ❑ Rain (steady rain)
- ❑ Showers (intermittent rain)
- ❑ Overcast
- ❑ Clear/Sunny

**Weather now:**

- ❑ Storm (heavy rain)
- ❑ Rain (steady rain)
- ❑ Showers (intermittent rain)
- ❑ Overcast
- ❑ Clear/Sunny

# Sketch of site

On your sketch, note features that affect stream habitat, such as: riffles, runs, pools, ditches, wetlands, dams, riprap, outfalls, tributaries, landscape features, logging paths, vegetation, and roads.

# PHYSICAL CHARACTERIZATION

## *In-Stream Characteristics*

**1. Check which stream habitats are present:** Page 73

*(You can check more than 1 habitat)*

θ Pool(s) θ Riffle(s) θ Run(s)

**2. Nature of particles in the stream bottom at site** Page 73

| | *Percent* |
|---|---|
| Silt/Clay/Mud | _____ |
| Sand (up to 0.1" in diam.) | _____ |
| Gravel (0.1 - 2" in diam.) | _____ |
| Cobbles (2 - 10" in diam.) | _____ |
| Boulders (over 10" in diam.) | _____ |
| Bedrock (solid) | _____ |
| *TOTAL* | *100%* |

**3. Pick the category that best describes the extent to which gravel, cobbles, and boulders on the stream bottom are embedded (sunk) in silt, sand, or mud.** Page 74

θ Somewhat/not embedded (0-25%) θ Mostly embedded (75%)

θ Halfway embedded (50%) θ Completely embedded (100%)

**4. Streambed sinks beneath your feet in:** Page 74

θ No spots θ A few spots θ Many spots

**5. Presence of logs or large woody debris in stream:** Page 74

θ None θ Occasional θ Plentiful

**6. Presence of naturally-occurring organic material (i.e., leaves and twigs, etc.) in stream:** Page 74

θ None θ Occasional θ Plentiful

**7. Water appearance:** Page 74

θ Clear θ Turbid θ Orange
θ Milky θ Dark brown θ Greenish
θ Foamy θ Oily sheen θ Other _____

**8. Water odor:** Page 74

θ Sewage θ Fishy θ None
θ Chlorine θ Rotten eggs θ Other _____

**9. Water temperature:** Page 74

_____ °C *or* _____ °F

## *Streambank and Channel Characteristics*

**10. (a) Approximate depth of run(s):** Page 75

θ < 1 ft θ 1-2 ft θ > 2 ft

**(b) Approximate depth of pool(s):**

θ < 1 ft θ 1-2 ft θ > 2 ft

**11. Approximate width of stream channel:** Page 75

_____ feet θ measured θ estimated

**12. Stream velocity:** _____ ft/sec. Page 75

**13. Looking upstream (100 yds.), pick the description that best fits the shape of the stream bank and the channel.** Page 75

**(a) Stream bank:**

| Left | | Right |
|---|---|---|
| θ | Vertical/undercut | θ |
| θ | Steeply sloping (> 30°) | θ |
| θ | Gradual/no slope (< 30°) | θ |

**(b) Extent of artificial bank modifications:**

| Left | | Right |
|---|---|---|
| θ | Bank 0-25% covered | θ |
| θ | Bank 25-50% covered | θ |
| θ | Bank 50-75% covered | θ |
| θ | Bank 75-100% covered | θ |

**(c) Shape of the channel:**

θ Narrow, deep θ Wide, deep
θ Narrow, shallow θ Wide, shallow

**14. Looking upstream (100 yds.), describe the streamside cover** Page 76

**(a) Along water's edge and stream bank only:**

| Left *(Percent)* | | Right *(Percent)* |
|---|---|---|
| _____ | Trees | _____ |
| _____ | Bushes, shrubs | _____ |
| _____ | Tall grasses, ferns, etc. | _____ |
| _____ | Lawn | _____ |
| _____ | Boulders/rocks | _____ |
| _____ | Gravel/sand | _____ |
| _____ | Bare soil | _____ |
| _____ | Pavement, structures | _____ |
| *TOTALS* *100%* | | *100%* |

**(b) From the top of the streambank out to 25 yards.**

| Left *(Percent)* | | Right *(Percent)* |
|---|---|---|
| _____ | Trees | _____ |
| _____ | Bushes, shrubs | _____ |
| _____ | Tall grasses, ferns, etc. | _____ |
| _____ | Lawn | _____ |
| _____ | Boulders/rocks | _____ |
| _____ | Gravel/sand | _____ |
| _____ | Bare soil | _____ |
| _____ | Pavement, structures | _____ |
| *TOTALS* *100%* | | *100%* |

**15. Pick the category that best describes the extent to which vegetation shades the stream at your site.** Page 77

θ 0% θ 25% θ 50% θ 75% θ 100%

**16. Looking upstream, note general conditions.** Page 77

Check "1" if present, "2" if severe problem is clearly evident.

| Left | | | Right | |
|---|---|---|---|---|
| **1** | **2** | **Stream Banks** | **1** | **2** |
| θ | θ | Natural streamside plant cover degraded | θ | θ |
| θ | θ | Banks collapsed/eroded | θ | θ |
| θ | θ | Garbage/junk adjacent to the stream | θ | θ |
| θ | θ | Foam or sheen on bank | θ | θ |
| **1** | **2** | **Stream Channel** | **1** | **2** |
| θ | θ | Mud, silt, or sand in or entering the stream | θ | θ |
| θ | θ | Garbage/junk in the stream | θ | θ |
| **1** | **2** | **Other** | **1** | **2** |
| θ | θ | Yard waste on bank (grass, clippings, etc.) | θ | θ |
| θ | θ | Livestock in or with unrestricted access to stream | θ | θ |
| θ | θ | Actively discharging pipe(s) | θ | θ |
| θ | θ | Other pipe(s) entering the stream | θ | θ |
| θ | θ | Ditches entering the stream | θ | θ |

## *Local Watershed Characteristics*

***(within about 1/4 mile of the site; adjacent and upstream)***

**17. Land uses in the local watershed can potentially have an impact on a stream.** Check "1" if present, "2" if clearly having an impact on the stream. Page 78

| **1** | **2** | **Residential** |
|---|---|---|
| θ | θ | Single-family housing |
| θ | θ | Multifamily housing |
| θ | θ | Lawns |
| θ | θ | Commercial/institutional |
| **1** | **2** | **Roads, etc**. |
| θ | θ | Paved roads or bridges |
| θ | θ | Unpaved roads |
| **1** | **2** | **Construction underway on:** |
| θ | θ | Housing development |
| θ | θ | Commercial development |
| θ | θ | Road bridge construction/repair |
| **1** | **2** | **Agricultural** |
| θ | θ | Grazing land |
| θ | θ | Feeding lots or animal holding areas |
| θ | θ | Cropland |
| θ | θ | Inactive agricultural land/fields |
| **1** | **2** | **Recreation** |
| θ | θ | Power boating |
| θ | θ | Golfing |
| θ | θ | Camping |
| θ | θ | Swimming/fishing/canoeing |
| θ | θ | Hiking/paths |
| **1** | **2** | **Other** |
| θ | θ | Mining or gravel pits |
| θ | θ | Logging |
| θ | θ | Industry |
| θ | θ | Oil and gas drilling |
| θ | θ | Trash dump |
| θ | θ | Landfills |

# BIOLOGICAL CHARACTERIZATION

## VISUAL BIOLOGICAL SURVEY

**18. Fish in the stream?** *(Mark all that apply)* Page 78

θ No θ Yes, but rare θ Yes, abundant

θ Small (1-2 in.) θ Medium (3-6 in.) θ Large (7 in. and above)

**19. Are there any barriers to fish movement?** Page 78

θ Beaver dams θ Waterfalls (>1') θ None

θ Dams θ Road barriers θ Other _____

**20. Aquatic plants in the stream.** *(Mark all that apply)* Page 78

θ None θ Occasional θ Plentiful

θ Attached θ Free-floating

θ Stream margin θ Pools θ Near riffle

**21. Extent of algae in the stream.** *(Mark all that apply)* Page 78

**(a) Are the submerged stones, twigs, or other material in the stream coated with a layer of algal "slime"?**

θ None θ Occasional θ Plentiful

θ Light coating θ Heavy coating

θ Brownish θ Greenish θ Other _____

**(b) Are there any filamentous (string-like) algae?**

θ None θ Occasional θ Plentiful

θ Brownish θ Greenish θ Other _____

**(c) Are any detached "clumps" or "mats" of algae floating on the water's surface?**

θ None θ Occasional θ Plentiful

θ Brownish θ Greenish θ Other _____

**COMMENTS:** *(Note changes or potential problems such as spills, new construction, type of discharging pipes)*