

DEP Form FD 9000-34 Stream Habitat Assessment Training Checklist and Event Log

One copy of this form, FD 9000-34 Stream Habitat Assessment Training Checklist and Event Log, will be completed for each trainee. The trainee or the trainee's supervisor may retain the document. The trainee will be required to provide this document as proof of completion of these training requirements.

By signing here, the Trainee and Supervisor attest to the completion of ALL competencies outlined in this form.

Sign off: _____ / _____ / _____ / _____
Trainee Name (print) Trainee signature Signoff Date Supervisor Signature

Signature and Initial Log (Name, initials and signatures are used to verify authenticity)

<i>Training Role</i>	<i>Name Printed</i>	<i>Initials</i>	<i>Signature</i>
Trainer	_____	/	/
Trainer	_____	/	/
Trainer	_____	/	/
Trainer	_____	/	/
Trainer	_____	/	/
Evaluator	_____	/	/

Introduction

This sampling procedure requires specific training and a demonstration of competency due to the expert judgment exercised during field sampling. It is required that individuals conducting this procedure train with qualified staff (in “pass” status per FA 5720) and successfully obtain all required training and evaluation signatures. It is recommended to train with DEP staff via workshops and/or participating in field sampling

In an effort to establish standardization and consistency, individuals performing the training are required to adhere to the competencies and principles detailed in this document. Following these training protocols will encourage the establishment of an equal foundation among samplers performing the Habitat Assessment.

Order of Events for Habitat Assessment Training and Evaluation

1. First, trainers and the trainee, over the course of training at nine unique sites, will follow the training items described below in the **Training and Evaluation Activities** Section, and initial once each training item has been completed. Each of the nine training events (and any additional events) should be recorded in the **Training and Evaluation Event Log**.
2. Second, in a separate evaluation event at a tenth site, the trainee will convey/and or demonstrate to the evaluator, mastery of each of the items in the **Training and Evaluation Activities** Section, and initial each item once complete competency is demonstrated. The evaluation event also should be recorded in the **Training and Evaluation Event Log**.
3. Third, trainees wishing to submit stream habitat assessment data to DEP, per SOP FT 3000, shall conduct the Habitat Assessment at benchmark proficiency sites, per FA 5720, section 2, and must pass a minimum of three sites (as defined in FA 5720, section 2.6), and may attempt a habitat assessment at up to five established benchmark streams, in order to obtain “Pass” status.

Important Notes

1. Items in the **Training and Evaluation Activities** Section do not need to be completed in any particular order, nor do all items need to be completed in a single event.
2. Each training or evaluation event should be identified in the **Training Event Log**, regardless of whether a competency was completed or not.
3. The **evaluator is NOT the DEP auditor**, but rather a qualified trainer performing a “mock audit” for the trainee to ensure that the trainee has the skills required for the audit process.
4. The same individual may be both a **trainer** and an **evaluator**.
5. The Habitat Assessment procedure is also a companion tool to Bio-Recon sampling (BRN 1100), so individuals wishing to conduct Bio-Recon sampling (BRN 1100) and submit data to DEP should also complete the training and demonstration of proficiency for the Habitat Assessment.
6. Two sites on the same waterbody may be considered unique and count toward the required nine sites, if the stretches are markedly different in character (e.g. different habitats present, degree of channelization or alteration, riparian areas).
7. Logistics and required skills associated with sampling from a boat are significantly different from sampling via wading. It is strongly recommended that trainees who plan to sample large rivers or other nonwadeable systems by boat, train by sampling from a boat, at multiple sites

Training and Evaluation Activities

The trainer will discuss, convey, instruct and demonstrate (where applicable) each of the following items, over the course of training events at the nine required sites. Once training for an item is completed to satisfaction, the trainer will initial and date the item. The trainee will also initial in the appropriate area to signify the item was presented to them and they have received an understanding and competency. The trainee will then convey and/or demonstrate to the evaluator, in a separate required evaluation event, the mastery of each of the following items. Once mastery of an item is demonstrated by the trainee, the evaluator will initial and date the item. Following the successful completion of the evaluation event, if the trainee wishes to submit data to DEP, the trainee shall conduct the Habitat Assessment at benchmark proficiency sites, per FA 5720, section 2, and must pass a minimum of three sites (as defined in FA 5720, section 2.6), and may attempt a habitat assessment at up to five established benchmark streams, in order to obtain "Pass" status.

1. Identify the appropriate and applicable SOPs and forms used or referenced for performing a Habitat Assessment. This includes DEP-SOP-001/01:
- Trainer / Trainee / Evaluator / Signoff Date
____/____/____/____

- a. FT 3000 Aquatic Habitat Characterization
- b. FS 7000 General Biological Community Sampling
- c. Form FD 9000-3 Physical/Chemical Characterization Field Sheet
- d. Form FD 9000-4 Stream/River Habitat Sketch Sheet
- e. Form FD 9000-5 Stream/River Habitat Assessment Field Sheet

2. Discuss and recognize circumstances where a Habitat Assessment should be postponed.
- Trainer / Trainee / Evaluator / Signoff Date
____/____/____/____

- a. List the normal stream factors to consider for the determination of representative samples as continuous water flow, intact and available substrate, and accessibility for sampling.
- b. Determine if the stream flow has remained continuous and has not been intermittent or stagnant.
- c. In flood or high water conditions, wait until habitats become accessible, the water recedes, normal flow returns, and/or the habitats have reestablished (approximately 28 days).
- d. Look for flood or high water evidence (locate recent high water mark)
- e. Look for evidence of disturbed vegetation and branches, substrates that have been relocated, high water has scoured and stripped substrates, new sand and silt piles, new flow patterns, and smothered habitat.
- f. In dry conditions, do not sample; wait a minimum of 3 months after the stream returns to normal or sets a new normal level. This allows the habitat and the macroinvertebrate community to reestablish.

3. Identify, measure and mark the 100-meter length sampling area.
- Trainer / Trainee / Evaluator / Signoff Date
____/____/____/____

- a. State that the stream is commonly broken up into 10 meter intervals for sketching purposes.
- b. State that the downstream end of the stretch is the beginning or the 0 meter mark.
- c. State that the upstream end of the stretch is the end or the 100 meter mark.
- d. State that the left and right banks are determined by facing upstream from the 0 meter mark.
- e. State that the sketch always uses the downstream end as the start position and is marked as the 0 meter interval.
- f. Extend tape measure from 0 meter mark to the 100 meter mark.
- g. Place flagging tape on visible substrates to signify the 0, 50, and 100 meter intervals.
- h. Note that it is common to place additional flags every 10 meters.
- i. Note that it is common to place a double flag at the 0, 50, and 100 meter intervals.

4. Complete Form FD 9000-4, Stream/River Habitat Sketch Sheet

Trainer/ Trainee / Evaluator / Signoff Date
____/____/____/____

- a. Record name, date, site name, site location, and county.
- b. Enter a legend symbol for each habitat encountered (snags, roots, leaf packs (or mats), macrophytes and 3 "other").
- c. State the major habitats as snags, roots, leaf material, macrophytes, and rocks.
- d. State the minor habitats as sand, silt, muck and mud.
- e. State that the stream sketch should map the observable (by sight or touch) location and amount of each productive substrate type in the 100 meter stretch. The habitats are drawn 2-dimensionally, but the sketch is understood as a 3-dimensional representation (ex., full coverage floating aquatic vegetation does not equal 100% habitat).
- f. Start at the downstream end (0 meter mark) and proceed upstream.
- g. Stand within the first meter, and look upstream to obtain the basic layout of the stream banks, stream width and curves; select an appropriate scale for sketching the stream.
- h. Sketch the stream banks within the first 10 meter interval of the stream to approximate scale.
- i. Locate the major and minor productive habitats present.
- j. Identify minor habitats as sand, muck, silt, mud.

- k. Discuss the productive habitat substrates and the conditions that make them productive. Trainer / Trainee / Evaluator / Signoff Date
____/____/____/____

I. General Considerations

- a) Productive means the habitat is currently sustaining or can sustain organisms.
- b) Must be in contact with the water.
- c) Minimum of 2 square meters in the entire reach to be counted as "present".
- d) Ideally positioned in the flow areas with adequate water velocity to support sufficient oxygenation.
- e) Do not count smothered portions of habitats.

II. Snags

- a) Count only woody debris, not herbaceous vegetation.
- b) Count only snags greater than thumb size in diameter.
- c) Count portion of snag directly in contact with water.
- d) Do not count smothered portion of snags.

Trainer / Trainee / Evaluator / Signoff Date
____/____/____/____

III. Roots

- a) Count only roots less than thumb size in diameter.
- b) Count portion of roots directly in contact with water.
- c) State that finer (feathery or hairy) roots are usually more productive.
- d) State that roots may contain silt as long as you can still see the roots.
- e) Count adventitious roots hanging into the water.
- f) If the banks are undercut, determine if roots are actually present.
- g) Do not count undercut banks as a productive substrate if roots are not present.

Trainer / Trainee / Evaluator / Signoff Date
____/____/____/____

IV. Leaf Material

- a) Count leaf litter directly in contact with water.
- b) Count leaf packs and leaf mats positioned in flow areas with adequate water velocity to support sufficient oxygenation.
- c) Define a leaf pack as leaf material suspended up against an obstruction in the water column.
- d) Define a leaf mat as an area of leaf material settled on the stream bottom.
- e) State that leaf packs are more productive than leaf mats.
- f) Describe anaerobic versus aerobic conditions for leaf packs/mats.
- g) Count leaf packs as productive only if partially decomposed and aerobic.
- h) Count leaf mat as productive only if partially decomposed and aerobic.
- i) State that the top 2 cm of aerobic leaf mats can be counted as productive habitat.
- j) State that leaf material such as pine needles is not considered productive.

Trainer / Trainee / Evaluator / Signoff Date
____/____/____/____

V. Aquatic Macrophytes

- a) Count aquatic vegetation directly in contact with water.
- b) Count only aquatic vegetation in normal, continuous flow.
- c) Do not count non-aquatic (terrestrial) macrophytes that are temporarily inundated.

VI. Rock

- a) Count rocky outcrops or rocks directly in contact with the water.
- b) Count only rock in normal, continuous flow.
- c) Count only if greater than 5 cm of productive surface.
- d) State rougher surfaces as more productive than smooth surfaces.
- e) State that concrete is considered rock if weathered and present for a long time.
- f) Do not count asphalt (possibly toxic) or pipe clay (not stable) as productive substrates.

- l. Using the established legend symbol, draw to scale each habitat encountered for the first 10 meter interval.
- m. Repeat the sketch process in each 10 meter stream section of the stream, being careful to reevaluate (and compensate for) stream width.
- n. Using the grid on the map, count the number of grid spaces for each productive substrate type.
- o. Divide each of these substrate numbers by the total number of grid spaces contained within the site sketch and multiple by 100 to get the percentage of productive habitat.
- p. If portions of the system are not observable (e.g., due to depth), include only the number of grids where observations were possible as the denominator in this calculation.
- q. Indicate on the sketch where the velocity measurement is taken.
- r. Indicate areas on sketch where sand or silt smothering is present.
- s. Indicate areas on sketch with unstable or eroding banks.
- t. Indicate areas on sketch where natural vegetation along banks is altered or eliminated (riparian buffer zone width).
- u. Record the common vegetation (aquatic and/or terrestrial) present at the stream site.
- v. Record any additional comments that may assist in site characterization.

5. Complete Form FD 9000-3, Physical/Chemical Characterization Field Sheet.

- a. Fill in the information requested at the top of the Physical/Chemical Characterization Field Sheet (FD 9000-3), including the STORET station number, sampling date, sampling location, field identification and receiving body of water. Much of this information can be recorded prior to field sampling. Record the time of sampling when water quality samples are first taken or when the assessment begins. If available, use a GPS tool to identify the latitude and longitude of the sampling location.
- b. Observe and estimate the percentage of land-use types in the watershed that drain to the site, including all that may potentially affect water quality. Examination of maps prior to field sampling is a necessary component of this determination.
- c. Rate the potential for erosion within the portion of the watershed that affects your site.
- d. "Local non-point-source pollution" refers to contamination introduced by storm water runoff. Estimate this input and record this information.
- e. When sampling a 100 meter section of a river or stream, measure or estimate the width of the system, from shore to shore, at a transect representative of the site.
- f. Take three measurements of water depth across this transect using the ruled dip net handle or ruled rope of the Secchi disk and record this information.
- g. Take three measurements of water velocity (one at each of the locations where water depth was measured) using either a flow meter or the ruled dip net handle, watch/stopwatch, and a floating leaf or other object. Record this information on the data sheet. If there is no water velocity to measure, note that on the form. In some systems, the velocity will depend upon tidal cycle. Note the velocity during sampling and relate that to where it occurs in the tidal cycle.
- h. Measure the vegetated riparian buffer zone width on each side of the stream or river; this is the distance from the edge of the water to where clearing or other human activities begin. Record the distance for the least buffered side or point of the system. If the vegetated buffer zone width for the least buffered side or point is greater than 18 m, record ">18 m."
- i. Indicate whether or not the area in the vicinity of the sampling station has been artificially channelized and to what extent the system has recovered.

- j. Indicate the presence or absence of impoundments in the area of the sampling station that may alter the natural flow regime or the movement of biota.
- k. Where applicable, estimate and record the vertical distance from the current water level to the peak overflow level. Peak overflow level is indicated by debris hanging in bank, floodplain vegetation, or deposition of silt or soil. When bank overflow is rare, a high water mark may not be apparent. Add this distance to the current water depth (see letter f above) to determine the distance of the high water mark above the streambed and record this value.
- l. Check the box for the percentage range that best describes the degree of shading in the sampling area. This percentage should be an integration over the entire 100 meter reach and is not influenced by the season (for example, in the fall or winter when leaves are not present on surrounding trees, this is not to be interpreted as "open" canopy cover).
- m. Note any odors associated with the bottom sediments and check the appropriate box. Note the presence or absence of oils in the sediment. For this step, it may be helpful to observe the extent of sheen on the water after the substrate has been disturbed. Finally, note any deposits in the area, including the degree of smothering by sand or silt.
- n. Indicate the type of aquatic system being sampled. If the station is in a stream or river, indicate stream order.
- o. Note the presence and types of any noticeable water odors and check the appropriate box. Note the term that best describes the relative coverage of any oil on the water surface.
- p. Based on visual observation, check the term that best describes the amount of turbidity in the water before it was disturbed by sampling.
- q. Check box for the term that best describes the color of the water, indicating whether the water is tannic, green, clear or other. If "other" is checked, indicate what the color is.
- r. Describe the weather conditions during the time of sampling, particularly the relative amount of sunshine/cloud cover, temperature, and wind speed and direction. Record any other conditions/observations that may be helpful in characterizing the site.
- s. Estimate and record the relative abundances of the following: periphyton, fish, aquatic macrophytes and iron/sulfur bacteria. Note that periphyton and fish are very seldom absent from most systems. Abundant periphyton can be thick enough to prevent macroinvertebrate colonization on habitats.
- t. Sign and date the form.

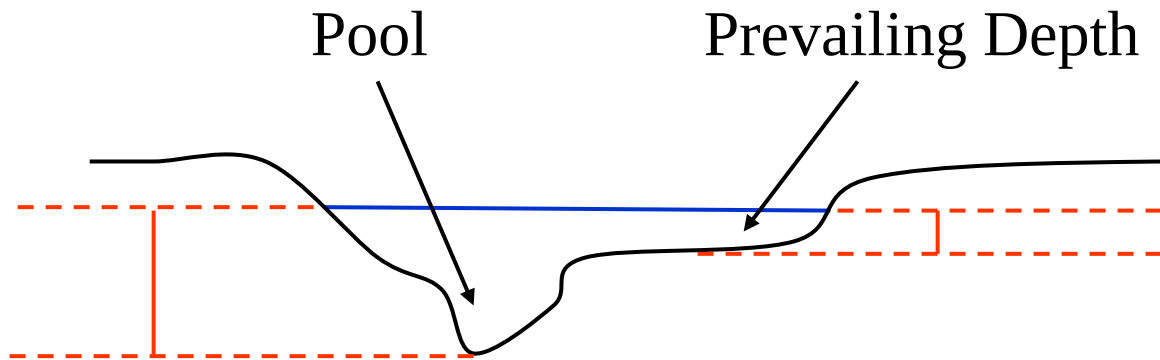
Trainer / Trainee / Evaluator / Signoff Date

6. Complete Form FD 9000-5, Stream/River Habitat Assessment Field Sheet.

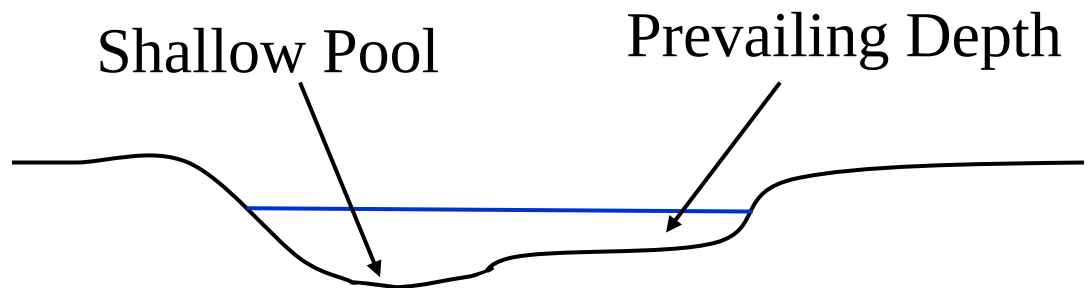
- a. Fill in the information requested at the top of the Stream/River Habitat Assessment Field Sheet (FD 9000-5), including the STORET station number, sampling date, sampling location, field identification and receiving body of water. Record the time of sampling as described in FT 3001, section 2.1.
- b. Follow the criteria given on the data sheet within each category to determine the appropriate score for that category.
- c. Score the **Substrate Diversity** by evaluating the number of different kinds of productive substrates present. Refer to the Stream/River Habitat Sketch Sheet (FD 9000-4) and the Physical/Chemical Characterization Field Sheet (FD 9000-3). The following substrates are considered productive: snags (woody debris or logs larger than thumb diameter); roots (less than thumb diameter, with finer roots usually being more productive); aquatic vegetation (in contact with the water); leaf packs/mats in association with flow (leaves must be partially decomposed to be better habitat; leaf mats at the bottom may be productive if sufficient oxygen is present, but anaerobic leaf mats are not considered productive habitat); rocky substrate (usually limestone outcrops with a diameter greater than 5 cm). Once the number of substrates has been determined, assign a score for substrate diversity in the appropriate spot on the sheet. (Higher values indicate a better condition than lower values.) The quality of the substrates present should then be given consideration in the scoring process. For example, partially decomposed leaf packs and "old" snags are better than fresh substrates and should be given higher scores within the same category. A minimum occurrence of two square meters of a particular substrate in the reach is necessary to count that substrate as being "present."
- d. **Substrate Availability** is the relative spatial abundance of productive habitats present. Refer to the entry on FD 9000-3, as determined from FD 9000-4. A minimum occurrence of two square meters of a particular substrate in the reach is necessary to count that substrate as being "present." Include only productive habitats in the mapping and scoring process. Score substrate availability on the data sheet based on the sum of the percentages of productive habitats in the stream reach.
- e. Using the ranges given on the data sheet, assign a **Water Velocity** score based on the maximum velocity observed at the typical cross-section of stream or river. Note that in the majority of Florida streams, velocities over 1 m/s are considered unusually high, and should be included in the "poor" category. An exception to

this policy would be in narrow or shallow areas of streams with natural limestone bottoms, where velocities approaching 1 m/s may be normal and, thus, would be scored in the “optimal” category.

- f. The **Habitat Smothering** parameter is an assessment of sand and silt deposition onto what would otherwise be productive habitats. Scoring is a two-step process. Assign a habitat smothering score as determined by the following two steps:
 - I. First, determine (by referring to FD 9000-4) if adequate pools are present. A pool is defined as an area where the depth is at least 2 times the prevailing depth.



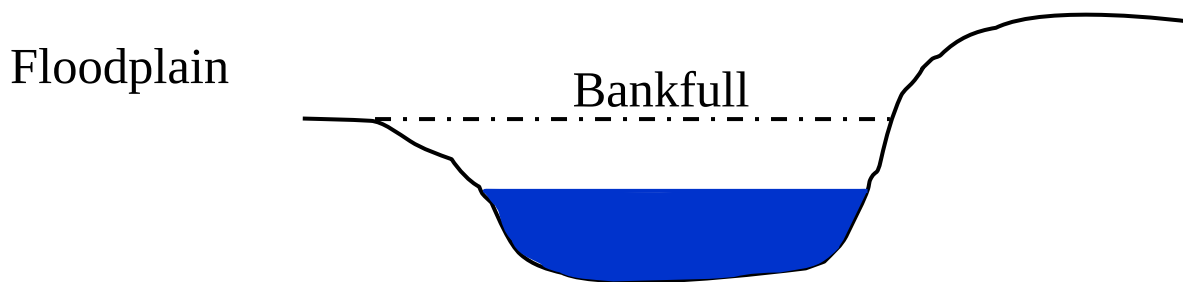
A natural system should have 1 to 2 pools every 12 times the width of the stream. (For large rivers it may be more appropriate to base estimates on the amount of smothering present on the actual habitats rather than the number of pools.) For example, a 3 meter wide stream should have at least 1 pool every 36 meters or a total of 3-6 pools per 100 meter reach ($100\text{m}/36\text{m} = 2.8$ segments). If there are no pools; i.e., the stream depth is nearly the same throughout the 100m reach, assign a score in the “poor” category. For large rivers, if there are minimal (less than 1 pool every 12 times the width) or shallow pools (a shallow pool is any pool where the depth is much less than 2 times the prevailing depth), score the stream in the “marginal” category.



Pools should occur on the outside of curves in the stream and on the downstream side of large, woody debris. A score in the “suboptimal” or “optimal” categories should be assigned to a stream with adequate pools based on the percent smothering as described in II. below.

- II. Second, check for deposition of sand or silt on visible habitats. While a light dusting of sand or silt is normal, excessively thick coatings will reduce habitability of the substrate. Sand smothering on visible habitats is indicated if sand is present on a substrate in an amount greater than a light dusting (3-5 mm). Silt smothering is indicated if a substantial turbidity plume results from agitating the substrate, especially fine roots and leaf packs. Silt smothering can sometimes also be determined by direct observation of the silt coating. Determine a percentage value for visible habitats that are not habitable due to sand and/or silt smothering.
- g. Add the scores for the primary habitat components (see sections c - f above) and record this primary score on the form. The primary habitat components refer to in-stream features.
- h. Observe whether or not the reach of stream or river in the sampling area is artificially channelized. Assign a score for **Artificial Channelization** using the following guide:

- I. Poor- A highly altered system with ALL of the following; straightened stream channel, box-cut banks and a monotypic depth. Spoil banks or other indications of dredging may be visible.
 - II. Marginal- An altered system with some sinuosity in stream channel, often developed within the old dredged area, OR some diversity in depth but no pools as defined in 2.6 above. Spoil banks may be visible.
 - III. Suboptimal- Good sinuosity has developed within and outside of the old channelized area AND the bottom has a diversity of depths approaching what's expected of a non-dredged system (1 to 2 pools every 12 times the width of the stream). Spoil banks may be visible, but have established vegetation growing on them.
 - IV. Optimal- A system with good stream channel sinuosity AND a diversity of depths as defined in section f. above. No evidence of dredging or straightening.
- i. Refer to FD 9000-4 for areas along the bank that have eroded or have the potential for bank sloughing. Score artificially stable banks such as concrete according to bank stability, not according to natural vs. artificial stability. Determine the extent of erosion potential for the site and assign a Bank Stability score for each bank (The "left bank" is on your left when you are looking upstream).
- I. First, determine where "bankfull" is in relation to the height of each bank. Bankfull is defined as the stage at which channel maintenance is most effective and occurs on average every 1-2 years. For most natural Florida streams, bankfull is the height of the lowest bank, where the stream is connected to the floodplain.



Other indicators of bankfull (especially in larger systems) are the tops of point bars, staining and vegetation lines. If the substrate at bankfull is limestone, pipe clay or concrete, then automatically score the bank in the "optimal" category and skip sections II. and III. below. Ideally, bankfull should be greater than 60% of the bank height or above the woody root zone. If this is the case, the bank gets a "plus" for this subcomponent. Otherwise, bankfull is less than 60% of bank height and below the woody root zone and it should receive a "minus".

- II. Second, determine the slope of the bank. The more gentle the slope the more stable the bank. Score a bank with a slope less than 60° with a plus for this subcomponent. A bank with a slope of greater than 60° warrants a minus.
 - III. Third, determine if bankfull is above or below the root zone. If bankfull is above the root zone and there are few raw or eroded areas, score this subcomponent a plus. Otherwise, score it a minus. Woody vegetation/roots are more stable than herbaceous and should be scored accordingly.
 - IV. Lastly, count up the number of pluses from each subcomponent (a total of 3 possible) and score within each category as described below:
 - a) Poor- 0 pluses
 - b) Marginal- 1 plus
 - c) Suboptimal- 2 pluses
 - d) Optimal- 3 pluses
- j. Assign a score for the Riparian Buffer Zone Width that best characterizes the width of native vegetation on each side of the channel. This zone is measured from the edge of the stream bank to where clearing or other adverse human activity begins. A native vegetated buffer zone of greater than 18 meter (approximately 60 feet) is currently considered optimal. Adjust scores accordingly if human activities encroach on some part of the 18 m buffer. For example, if approximately 20 meters of the stream bank is cleared but the other 80 m has the required buffer, the score should be reduced by approximately 20%.
- k. Identify the plants in the riparian zone, determining the extent of coverage and whether the vegetation is native or exotic. Look for these classes of plants: bottomland or mesic hardwoods, understory shrubs and non-woody macrophytes. Assign a Riparian Zone Vegetation Quality score based on the classes of plants

present, the degree of bank vegetative cover, and how closely the plant community at the site approaches that expected of an undisturbed community in the region.

- l. Add the scores for the secondary habitat components (see sections h - k) and record this secondary score on the form. The secondary habitat components refer to morphological and riparian zone features.
- m. Add the primary score (see section g) and the secondary score (see section l) to get the habitat assessment total score. Record the habitat assessment total score on the form.
- n. Sign and date the form.

Trainer / Trainee / Evaluator / Signoff Date

_____/_____/_____/_____

7. Trainer will observe and critique trainee for items 2-6 above at a minimum of nine separate unique training sites; include at least three good (minimally disturbed) sites, and three poor (disturbed or altered) sites.

Trainer / Trainee / Evaluator / Signoff Date

_____/_____/_____/_____

8. Trainee will convey and/or demonstrate to the evaluator mastery of items 2-6 above, at a separate evaluation event, at a tenth unique site.

Training and Evaluation Event Log

Trainer or evaluator should initial and date the entry, as applicable.

Write a brief description of the training or evaluation. Describe the site name, habitats mapped, etc.

(Unnumbered rows are for additional training events beyond the required nine, or additional evaluation events beyond the required one)

	Trainer Initials	Date	Training Event Description
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	Evaluator Initials	Date	Evaluation Event Description
1.			