

## **PSU Module III—Water Areas**

The water areas module includes information about permanent waterbodies, permanent streams, and stream shoreline characteristics. Previous inventories have collected stream and water data, and this continues with some minor changes. The collection of stream shoreline characteristics is new for 1997.

### ***Definition***

*Water area.* An area where permanent open water exists.

### ***Importance***

The quality and quantity of water are important natural resource issues. Stream shoreline data will provide information useful in models that address water quality and wildlife issues. Also, the PSU-based water area data are used in the process that develops statistical expansion factors for the sample points.

### ***Guidelines and Clarifications***

Delineations and measurements made for PSU data must be consistent with land cover/use determinations made for the sample points.

Data are collected, entered, and checked for small streams prior to data collection for stream shore characteristics.

The recommended sequence of data collection is to first compare 1992 information with 1997 conditions for water areas, document the 1997 conditions on a 1997 PSU support map, perform measurements, and use those measurements to classify the water areas. Enter the data using the PDA. Use information from the PDA to locate stream shoreline characteristics transect locations. Delineate those transects on the automated 1997 PSU support map and record the required data on the PDA.

### **A. Perennial Streams and Waterbodies**

Water area data describing streams and waterbodies were collected in the 1982, 1987, and 1992 NRIs. Water areas are cataloged and recorded by size (large and small) to match the historical distinction made by the U.S. Bureau of the Census. Data are collected for all permanent open water except for small water areas completely surrounded by Federal land. As pointed out in PSU Module I—General Information, some PSUs were previously classified incorrectly as entirely Federal land even though the PSU contained census water. These previous incorrect determinations should be corrected as part of the 1997 NRI data collection process.

## ***Definitions***

***Bay.*** A recess in the shore or an inlet of a sea between two capes or headlands, not so large as a gulf, but larger than a cove. [USACE, 1984]

***Estuary.*** A perennial tidally influenced body of water existing where a river meets the sea. Ocean water is at least occasionally diluted by freshwater. [NRI-97]

***Gulf.*** A relatively large portion of sea, partially enclosed by land. [ASCE, Nomenclature of Hydraulics]

***Intermittent.*** A water area that over a year alternately contains and is empty of water. [NRI-97]

***Lake.*** A natural inland body of fresh or salt water of considerable size occupying a basin or hollow on the Earth's surface, and which may or may not have a current or single direction of flow. [ASCE-Nomenclature of Hydraulics]

***Mean Water Level.*** In a perennial stream the average elevation of the water surface. [NRI-97]

***Normal Pool.*** The average elevation of the surface of a perennial waterbody. [NRI-97]

***Permanent Open Water.*** Water areas, either streams or waterbodies, that are perennial and are not concealed by vegetation. Designation as perennial on the 7.5 minute quadrangle map is evidence of permanent. [NRI-97]

***PSU Support Map.*** A map used as a permanent record to document the extent and location of where data elements were collected. A separate PSU support map is created for each PSU. A different PSU support map is created for each new data collection activity for which the PSU is included in the inventory sample. For example, a PSU selected for the 1982, 1987, and 1992 inventories has separate PSU support maps, one for each year. [NRI-92]

***Reservoir.*** A pond, lake, basin, or other space, created in whole or in part by the building of engineering structures, that is used for storage, regulation, and control of water. [NRI-97]

***Segment.*** A component or part of a transect used for collecting data. [NRI-97]

***Stream Segment.*** Within a PSU, a continuous part of a stream that can be described with an average width statement. A stream segment may begin at a PSU boundary or at the confluence of two or more streams. [NRI-97]

***Waterbody.*** A type of (permanent open) water area that includes ponds, lakes, reservoirs, bays or gulfs, and estuaries. There are three size categories: less than 2 acres, 2 to 40 acres, and at least 40 acres. [NRI-92]

## ***Importance***

Water areas are cataloged and recorded by size (large and small) to match the historical distinction made by the U.S. Bureau of the Census. Matching the Census water data is a vital step in the process of producing expansion factors for sample points. These expansion factors are used to produce estimates of resources conditions and trends for all points.

## ***Guidelines and Clarifications***

Water areas must contain permanent open water. The size of water areas is determined at the normal pool (for waterbodies) or mean water level (in streams). Extreme conditions, such as drought or flooding, do not affect measurement. Consider waterbodies constructed in cells to be separate waterbodies.

Indications of change in size or existence from previous inventories include dam failures, filled areas, geologic activity (i.e., meanders), mined areas and borrow pits that have since filled with water, natural disasters, new canals and drainage channels, new construction, urban expansion, and similar activities.

All census water is inventoried even if completely surrounded by Federal land. However, small water areas surrounded by Federal land are considered part of the Federal land base for the NRI and are not recorded.

## ***Categories and Codes***

The four categories of water areas are:

LS	Large Streams
SS	Small Streams
LW	Large Waterbodies
SW	Small Waterbodies

A comprehensive chart of these categories and the conditions that determine classification is presented in figure 1 in the section Rules, which is later in this module.

## **Steps**

An efficient sequence of work begins with comparison of the 1992 support map and 1997 photography. When true change is detected, the water areas are interpreted and plotted on a 1997 PSU support map. The areas are next measured and classified. The classification sequence is waterbodies and streams, followed by classification of waterbodies and streams as large or small. Next the information is posted to the PDA. Now small stream shoreline characteristics are collected and the results posted to the PDA. Details for the water areas component of this sequence are:

- Establish correct location for data collection.
- Compare 1992 PSU support map with 1997 photography.
- Annotate the 1997 PSU support map to document 1997 conditions:
  1. If no change has occurred for any water area from 1992 to 1997, no action is required on the 1997 PSU support map if the 1992 PSU support map clearly delineates each water area that exists in 1997 and identifies each water area with the correct category symbol, and if the PDA displays accurate water area data.
  2. Verify that previously documented water areas (both stream and waterbodies) display correct values in the PDA. Report the change only if change has truly occurred in the inter-inventory period.
  3. If the size or category of a water area has changed from the 1992 conditions, use the 1997 photography and 1997 PSU support map to document the 1997 conditions. Delineate and label each (all) water area(s) as it exists in 1997.
- Delineate perennial stream segments.
- Delineate perennial waterbodies.
- Measure and note to the nearest tenth of an acre the water surface area within the PSU (at normal pool level) for each perennial waterbody.

- Measure to the nearest tenth of an acre and note the total area (at normal pool level) of each waterbody that extends beyond the PSU boundary
- For each perennial stream segment, measure and note the mean water level width of streams to the nearest foot.
- Measure and note the area, at mean water level, within the PSU of perennial streams greater than or equal to 660 feet wide.
- Apply the rules in table 1 to determine the correct category for each waterbody delineated and measured in the previous steps.

**Table 1** Rules for classification of waterbodies (apply sequentially until a category can be assigned)

<b>Measured area of total waterbody</b>	<b>Additional tests and actions</b>	<b>Category and support map symbol</b>
Greater than or equal to 40.0 acres.	Place in category	Large Waterbody (LW)
Less than 40 acres	If completely surrounded by Federal land, place in category.	Federal land
Less than 40.0 acres and greater than or equal to 10.0 acres.	Place in category	Small Waterbody (SW)
Less than 10.0 acres	If not used for sewage treatment and if not attached or included in an urban area, place in category.	Small Waterbody (SW)
Less than 10.0 acres	If not used for sewage treatment and if attached or included in an urban area of greater than or equal to 10.0 acres, place in category	Large Urban and built-up (UB)
Less than 10.0 acres	If not used for sewage treatment and if attached or included in an urban area of less than 10.0 acres and greater than 0.25 acre, place in category.	Small built-up (SB)
Less than 10.0 acres and greater than or equal to 0.5 acre.	If used for sewage treatment, place in category.	Small Waterbody (SW)
Less than 0.5 acre	If used for sewage treatment and if part of a sewage treatment plant, place in category.	Small built-up (SB)
Less than 0.5 acre and greater than or equal to 0.1 acre	If used for sewage treatment and if not part of a sewage treatment plant, place in category.	Small Waterbody (SW)
Less than 0.1 acre	If used for sewage treatment and if not part of a sewage treatment plant, waterbody is not inventoried.	No category defined.

- Label by category Large Waterbody (LW), Small Waterbody (SW), Large Urban and Built-up (UB), or Small Built-up (SB).
- Use width measurements made on perennial streams (and the table of streams categories and codes) to classify the stream segments.

**Table 2** Streams categories and codes

Measured width of perennial stream	Category & Support Map Symbol
Greater than or equal to 660 feet	Large Stream (LS)
Less than 660 feet	Small Stream (SS)

- Label by appropriate perennial stream category Large Stream (LS) or Small Stream (SS).
- Refer to the 1992 PSU support map and continue labeling individual perennial streams by combining the water area category and a sequential number (i.e., SS-3 for the third Small Stream, SW-2 for the second Small Waterbody) on the 1997 PSU support map.

### ***PDA Instructions for Large Waterbodies***

- If no large waterbody is either entirely or partially within the PSU, confirm or record the kind category of **None** for large waterbody map label #1.
- Record each large waterbody number on an individual PDA “page.”
- Using table 3, determine and confirm or record kind of water for each large waterbody.

**Table 3** Categories and codes for kind of large waterbodies

Large waterbody	Code
None	0
Reservoir	1
Lake - natural	2
Gulf/Bay	3
Estuary	4

**27013/010101R:PSU Specific Data**

3.4. Large Water Bodies < 1/1 >

(Large bodies =>40 acres) Note

Map label # .....

Kind of water body      92      97

◆      ◆

Size class (for total size) 92      97

◆      ◆

Area within PSU (acres) 92      97

.....

---

⌚ ? 📅 🗑
✖

📄 📅 📦
↑
↺
🔍
💡

Names
Dates
Extras
Undo
Find
Assist

- Determine and confirm or record size class of large waterbodies based upon total size of each large waterbody.

**Table 4** Categories and codes for size of large waterbodies

Large waterbody	Code
Small – less than 100 acres	1
Medium – at least 100 acres and less than 1,000 acres	2
Large – at least 1,000 acres	3

- Confirm or record the area of the portion of the waterbody that is within the PSU to the nearest acre.
- Upon completion of data entry for this screen, tap the completion check box to the left of the screen title 3.4. Water - Large Waterbodies. Resolve any reported edit checks.

***PDA Instructions for Small Waterbodies***

- If no small waterbody is either entirely or partially within the PSU, confirm or record the kind category of NONE for small waterbody map label # 1.
- Record each small waterbody number on an individual PDA “page.”
- Determine and confirm or record kind of waterbody for each small waterbody.

**Table 5** Categories and codes for kind of small waterbody

Small waterbody	Code
None	0
Natural	1
Constructed	2
Undetermined	3

- Confirm or record the area of the total size of each small waterbody to the nearest tenth (0.1) acre.
- Confirm or record the area within the PSU of each small waterbody to the nearest tenth (0.1) acre.
- Upon completion of data entry for this screen, tap the completion check box to the left of the screen title 3.5. Water - Small Waterbody. Resolve any reported edit checks.

### ***PDA Instructions for Large Streams***

- If no large stream exists within the PSU, confirm or record a value of 0 area for Large Stream segment #1.
- Record each large stream segment number on an individual page.
- Record the area of each large stream segment within the PSU to the nearest acre.
- Upon completion of data entry for this screen, tap the completion check box to the left of the screen title 3.1. Water - Large Streams. Resolve any reported edit checks.

### ***PDA Instructions for Small Streams***

- If no small perennial stream exists within the PSU, confirm or record a value of 0 width for Small Stream segment #1.
- Record each small stream segment number on an individual PDA “page.”
- Record the average width of each segment of each small perennial stream within the PSU to the nearest foot.
- Record the length of each segment of each small perennial stream within the PSU to the nearest foot.
- Upon completion of data entry for this screen, tap the completion check box to the left of the screen title 3.2. Water - Small Streams. Resolve any reported edit checks.

### **Sources**

Potential sources of waterbody data include, but are not limited to:

- Previous inventory PSU support maps
- Maps published by Federal and state agencies.
- Commercially published maps
- NRCS field office records
- Quadrangle maps
- Aerial photography
- Spatial data

The principal criteria for use of a source is that the source be authoritative, accurate, current, and applicable.

**27013/010101R:PSU Specific Data**

3.1. Water - Large Streams — < 1/1 >

(Large streams =>1/8 mile wide) Note

Map label # .....

Area within PSU (acres)

92	97

---

? ☰ C X  
Names Dates Extras Undo Find Assist

**27013/010101R:PSU Specific Data**

3.2. Water - Small Streams — < 1/1 >

(Small streams <1/8 mile wide) Note

Map label # .....

Avg width within PSU (feet)

82	87	92	97

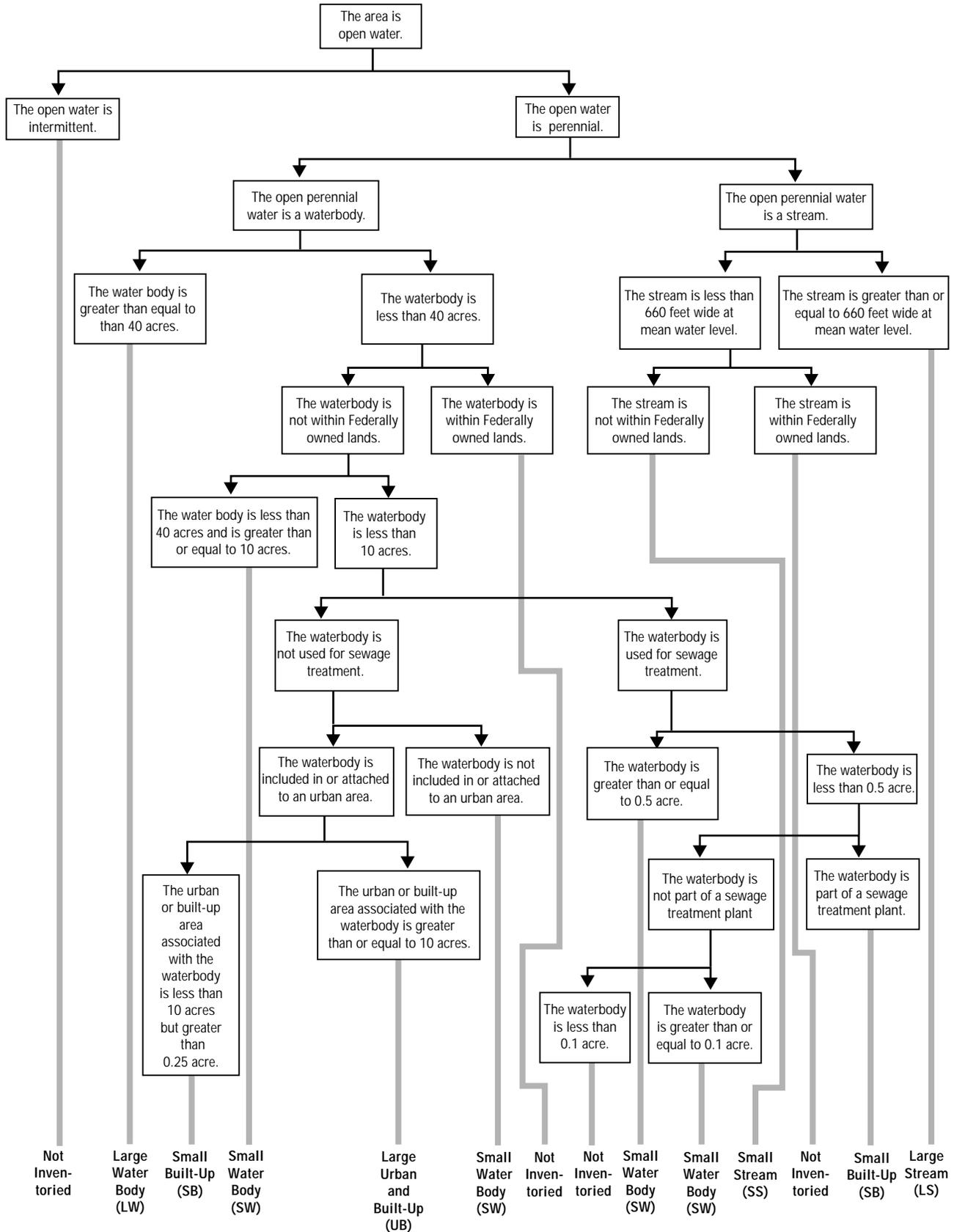
Length within PSU (feet)

82	87	92	97

---

? ☰ C X  
Names Dates Extras Undo Find Assist

# Rules



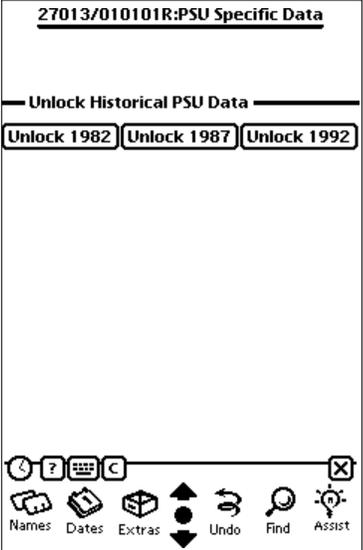
## ***Documentation Required in the PSU File Folder***

- A 1997 PSU support map, with notations as described for waterbodies.
- 1992 PSU Support Map
- 1997 aerial photography or location of 1997 aerial photography
- Any ancillary materials used to make determinations (or notes regarding the location of ancillary materials)

### ***Examples***

**Situation 1:** PSU is entirely located in Federal land. Data on the PDA indicates that earlier inventories collected no data beyond this fact. The documentation for this PSU from prior inventories consists of a 1974 copy of the land survey map produced by the managing Federal agency, the original sample descriptive map, and a plot of the PSU location on the 7.5 minute quadrangle map. Examination of the 20 year old 7.5 minute quadrangle map shows two permanent waterbodies and two streams within the PSU. Current year aerial photography is available. Actions for 1997 include:

<b>Action</b>	<b>Result or comment</b>
<p>Complete PSU Module I to determine PSU location and whether automated PSU support map can be used. Change 1982, 1987, and 1992 designations for entirely Federal to <b>No</b>, which will unlock the other PDA screens, then complete PSU Module II.</p>	<p>1997 PSU_Tool software produces the PSU location automated 1997 PSU support map</p> <p>Instructions are provided in PSU Module I—General Information and PSU Module II—Farmsteads and Developed Areas.</p>
<p>Using a 1997 PSU support map delineate, measure, and classify the permanent open water areas.</p>	<p>Follow steps outlined in these instructions. Result of this activity:</p> <ul style="list-style-type: none"> <li>• There are no large streams in the area.</li> <li>• There are two small stream segments in the PSU. One is 18 feet wide, and the second is 26 feet wide. Because they are completely surrounded by Federal land, they are not delineated on the PSU support map.</li> <li>• LW-1 is assigned to a natural lake of 42.2 acres, thus it is in the large waterbody size class. It is entirely within the PSU.</li> <li>• There is a constructed pond of 22.6 acres with only 1.8 acres within the PSU. It is small water surrounded by Federal land; therefore, it is not delineated on the PSU support map.</li> </ul>
<p>Record results in PDA.</p>	<ul style="list-style-type: none"> <li>• PDA screen 3.5—Small waterbodies. For map label #1, select <b>None</b> for kind category for 1997 and for the other 3 years if not prerecorded..</li> <li>• PDA screen 3.4—Large waterbodies. For map label #1, select 1997 kind of 2 Lake, size class of 1 Small and record area within PSU of 42. Make same entries for 1982, 1987, and 1992 if nor prerecorded. Tap the check box and resolve any edits.</li> </ul>

Action	Result or comment
Update 82, 87, and 92 data.	<ul style="list-style-type: none"> <li>• PDA screen 3.1—Water - Large streams. Record 0 for Large Steam Map label # 1 for 97 and for other 3 years if not prerecorded. Tap the check box and resolve any edits.</li> <li>• PDA screen 3.2—Water - Small streams. For map label #1, record 0 for width. Make same entries for other 3 years if not prerecorded.</li> <li>• PDA screen 3.3—Shoreline characteristics. This screen will not appear because there were no small stream segments recorded for 1997.</li> </ul>
	<p>The source material indicates that the water areas have not changed in 20 years. Data gathered for 1997 is projected back through previous inventories. PDA interaction:</p> <ul style="list-style-type: none"> <li>• If the PDA was not automatically unlocked by answers to previous questions, then it should be unlocked manually.</li> <li>• Unlock Historical PSU data, select Unlock 1992, Unlock 1987, and Unlock 1982.</li> <li>• Using the 3.X screens as described in action item 4, complete data for previous years.</li> </ul>

**Situation 2.** Comparison of the 1997 photograph and the 1992 PSU support map shows that the PSU has one small waterbody and no streams. The PDA displays the 1992 record as showing one small waterbody, no large waterbody, no small streams, and no large streams.

**Action:**

This is a determination of no change.

No action concerning water areas is required on the PSU support map.

Verify the records in the PDA.

Transfer data for the small waterbody to the 1997 data fields.

Proceed to small stream shoreline characteristics if directed to do so within the PDA.

## **B. Small Stream Shoreline Characteristics**

Small stream shoreline characteristics data are new in 1997. This element describes the type and width of earth cover adjacent to small streams and determines if a stream modification has occurred. The cover characteristics are reported for both sides of the stream. Data collection for small streams must be completed before this section.

### ***Definitions***

***Artificial and modified surfaces.*** A general cover category consisting of roads and rights-of-way, buildings, parking lots, farmsteads (includes complete polygons of farmsteads and ranch headquarters, urban and built-up, small built-up areas, and rural transportation designated on the PSU support map, and any other buildings that have a surface area greater than 1,000 square feet). [NRI 97]

***Barren.*** A general cover category consisting of nonvegetated lands, including alkaline barrens, unreclaimed mined land, and other barren areas incapable of supporting vegetation. Barren areas are nonvegetated either because the substrate will not support plant growth or because the area is subject to frequent disturbance (i.e., scouring, flooding, etc.) to prevent growth. [NRI 97]

***Crop cover.*** A general cover category consisting of annual plants, or their residue, that are usually grown for food, feed, fiber, or oil seed production. It includes annually cultivated row crops, close grown crops, and horticultural crops, but excludes perennial crops, hay, horticultural shrubs and trees, and aquaculture areas. Included are recently tilled portions of fields. [NRI-97]

Dikes or levees. Embankment constructed parallel to the stream for the purpose of controlling water. [NRI-97]

***Herbaceous.*** A general cover category consisting of predominately perennial herbaceous plants and/or noncultivated annuals. The tall woody canopy cover is less than 5 percent, and the short woody canopy cover is less than 5 percent. Arid rangelands and desert can fall into this category although vegetation density and percent ground cover may be low. [NRI-97]

***Left.*** The bank of a stream called “left” is on the left of a person facing downstream. [NRI-97]

***Open canopy short woody plants.*** A general cover category consisting of short woody canopy cover of 5 to 25 percent and tall woody canopy cover of less than 5 percent. The distinction between tall (greater than 4 meters) and short (less than 4 meters) woody plants is made for current conditions, not potential. Arid rangelands and desert can fall into this category although vegetation density and percent ground cover may be low. [NRI-97]

***Open canopy tall woody plants.*** A general cover category consisting of tall woody canopy cover of 5 to 25 percent and short woody canopy cover of less than 25 percent. The distinction between tall (greater than 4 meters) and short (less than 4 meters) woody plants is made for current conditions, not potential. Arid rangelands and desert can fall into this category although vegetation density and percent ground cover may be low. [NRI-97]

***Other human alterations.*** Changes other than dikes, levees, stream straightening, or channelization to the stream or streambank resulting from human activity. Examples include revetments, flow deflection devices, and installation of jacks. [NRI-97]

***Right.*** The bank of a stream called “right” is on the right of a person facing downstream. [NRI-97]

***Shoreline points.*** The points where a line perpendicular to the stream centerline intersects the smoothed shoreline. [NRI-97]

***Short woody plants.*** A general cover category consisting of short woody canopy cover of greater than 25 percent, and tall woody canopy cover is less than 25 percent. Short woody plants are less than 4 meters tall, often multistemmed; i.e., shrubs, seedlings. The distinction between tall (greater than 4 meters) and short (less than four meters) woody plants is made for current conditions, not potential. [NRI-97]

***Straightening or channelization.*** Changes to a stream due to human activity resulting in a new pathway for the flow of the water. [NRI-97]

***Tall woody plants.*** A general cover category consisting of tall woody canopy cover of greater than 25 percent. Tall plants are greater than 4 meters tall, usually single stemmed trees. The distinction between tall (greater than 4 meters) and short (less than 4 meters) woody plants is made for current conditions, not potential. Thus a 3-meter-tall Douglas fir is a short woody plant. [NRI-97]

***Water.*** A general cover category consisting of permanent water, such as a perennial stream, lake, or pond with at least 25 percent open water. If the vegetative canopy obscures more than 75 percent of the view, record category appropriate for the vegetative cover. Four types of water areas are large streams, large waterbodies, small streams, and small waterbodies. [NRI-97]

## ***Importance***

Shoreline characteristics provide information for modeling water quality as well as base data for monitoring conditions and trends of natural resources associated with water.

## ***Guidelines and Clarification***

Data elements are collected by photo interpretation. These elements describe the type and width of earth cover adjacent to small streams and determine if a stream modification has occurred. The cover characteristics are reported for both sides of the stream. The section on Small Streams must be completed before this section.

The shoreline to be evaluated is located from a starting point on the stream centerline. This starting point is located at a distance downstream from the upstream end of the stream segment under consideration. Both the stream segment and the distance to the starting point will be displayed by the PDA following the small stream inventory. Not all stream segments will be sampled. Not more than one small stream segment will be designated on a single PSU.

The cover adjacent to the stream will be evaluated as to type, width (up to 500 feet), and the cover type at the end of the cover adjacent to the stream. The objective is to describe the cover adjacent to the stream.

**Steps:**

From PDA screen 3.3. Shoreline Characteristics, obtain the small stream segment number and distance identified as the data collection site.

- Locate and record the identified stream segment centerline on the PSU support map.
- On the PSU support map draw a line across the stream downstream from the upper end of the segment at the specified distance, perpendicular to the centerline of the stream at the centerline point intersecting the stream channel banks. Ignore any islands or bars. Braided and branched streams are treated as a single stream, and the constructed line continues until both normal streambanks (i.e., outer banks) are intersected.
- At the intersection of the line drawn across the stream and the normal stream channel bank, draw a line on each shoreline/bank that smoothes out any minor bank irregularities. The points where the line across the stream intersects the smoothed shoreline are called shoreline points. Data will be collected, even if one of the shoreline points is on or outside of the PSU boundary.
- From each of the two shoreline points, construct a 500-foot line perpendicular to the smoothed shoreline (perpendicular to the tangent of the shoreline). From the perspective of looking downstream, identify one line as **left** and one as **right**. These lines are called transects.
- Data are collected for the entire 500-foot transect. A transect may continue beyond the PSU boundary. It may also continue across county, state, or national boundaries, or onto Federal land. Determine whether there is human alteration and whether both shorelines are in the PSU at the shoreline points.
- For both the left and right transects, characterize the cover adjacent to the stream into one of the eight categories presented in Categories and Codes for Cover exclusive of water. The cover categories are the same as those used in the Habitat Module (Point Module V). Cover adjacent to stream must be at least 10 feet wide.
- Determine width of cover adjacent to the stream. Measure and round widths to the nearest 10 feet. If cover width is greater than 500 feet, record 501 feet. If adjacent cover next to the stream is less than 500 feet wide, characterize the type of the "next" cover encountered along the transect. Characterize the "next" cover into one of the nine categories presented in Categories and Codes for Cover. The cover must be at least 10 feet wide. No additional width determination is necessary. If the transect line encounters the same stream segment again without a change in cover, as in the case of a sharp bend or oxbow, record next cover as **w**.

### ***Categories and Codes***

<b>Code</b>	<b>Category</b>
c	Crop
h	Herbaceous
s	Short woody plants
t	Tall woody plants
r	Open canopy short woody plants
p	Open canopy tall woody plants
b	Barren
w	Water
a	Artificial surfaces

## ***Documentation Required in the PSU file folder***

A 1997 PSU support map with:

- stream segment label
- stream centerline delineated
- shoreline points identified
- left and right transects drawn
- cover change identified by tick mark between adjacent and next covers
- aerial photograph or location of 1997 aerial photograph

### ***Examples***

**Situation:** After completing the water areas inventory on the PSU support map and recording and checking data on the PDA, Screen 3.3 Shoreline Characteristics appears with Seg# 2 and Distance 140. At this location, stream channelization work has been performed. The banks are within the PSU. There are no levees or other evidence of work at the location. The left bank is covered by willow and alder shrubs, and a corn crop is growing on the bottomland field beyond the shrubs. This corn field is more than 1,000 feet across. The right bank has a similar shrub cover that gradually blends into a bottomland hardwood forest which extends for miles.

#### **Actions:**

- Refer to PDA screen 3.3 Shoreline Characteristics and determine the stream segment number and distance to the data collection site.
- Locate SS-2 on the 1997 PSU support map.
- Using the topographic map, determine the direction of flow in the stream.
- Mark the direction of flow on the PSU support map.
- On the PSU support map, measure downstream along the centerline of the stream in the stream segment labeled SS-2, a distance of 140 feet.
- Mark this point on the PSU support map with a +, one axis of the + aligns with the stream centerline, and the other is at a right angle to the centerline.
- Observe that the stream has been channelized at this location, but no other modifications are apparent.
- Establish the shoreline points perpendicular to the centerline of the stream at the designated distance.
- Smooth each shoreline.
- From the left shoreline point, draw a 500-foot line perpendicular to the smoothed shoreline.
- On the PSU support map, mark the transect line at the point where the shrub cover and crop field meet.
- Measure this distance (assume 57 feet).
- Record the left cover as **s** and the distance as **60**.
- Record the left Next cover as **c**. No distance is required.
- From the right shoreline point, draw a 500-foot line perpendicular to the smoothed shoreline.
- On the PSU support map, mark the transect line at the point that best represents where the shrub cover fades into tall forest.

