



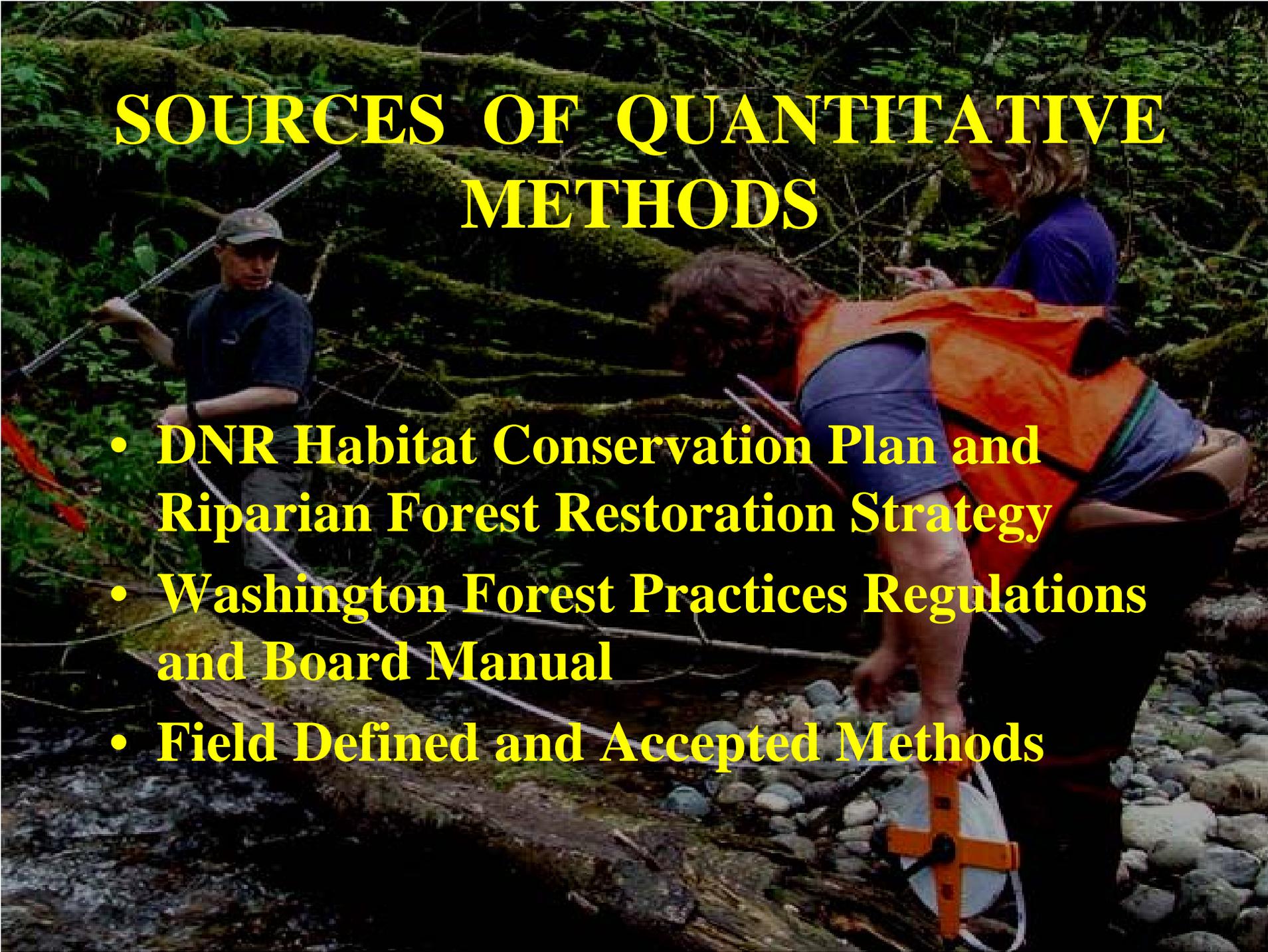
**QUANTITATIVE MEASURES  
USED IN THE RIPARIAN  
CONSERVATION STRATEGY**

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# CLASS OBJECTIVES

- **Identify Sources of Quantitative Methods Used in Riparian Forest Restoration Strategy**
- **Define Terms Necessary to Implement Riparian Forest Restoration Strategy**
- **Review Field Methods Used in the Riparian Forest Restoration Strategy**
- **Conduct Field Exercise Using Riparian Quantitative Methods**



# **SOURCES OF QUANTITATIVE METHODS**

- **DNR Habitat Conservation Plan and Riparian Forest Restoration Strategy**
- **Washington Forest Practices Regulations and Board Manual**
- **Field Defined and Accepted Methods**

A photograph of a river in a snowy forest. The river flows through a dense forest of tall evergreen trees. The banks are covered in snow, and there is a large pile of driftwood in the foreground. The text "RIPARIAN STRATEGY TERMINOLOGY" is overlaid in yellow on the image.

# **RIPARIAN STRATEGY TERMINOLOGY**

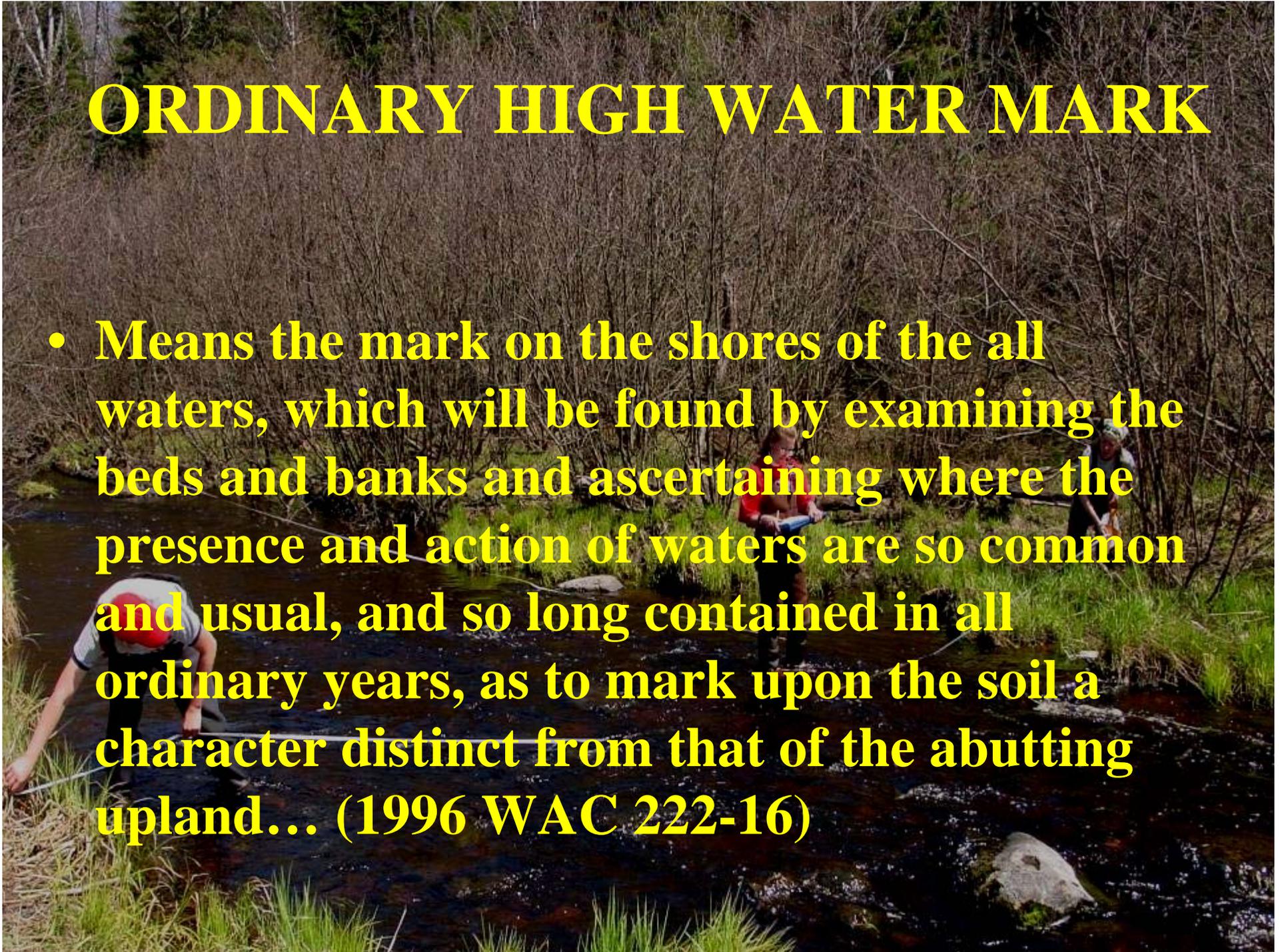
# ACTIVE CHANNEL

A photograph of a person standing in a stream in a forest. The person is wearing a maroon and white jacket and is holding a red cup. The stream is surrounded by mossy rocks and dense green vegetation. The background shows a large, moss-covered log.

- **Defined by DNR as the stream area occupied by typical flood events (i.e. comparable to the two-year recurring flood).**
- **The active channel generally coincides with the ordinary high-water mark (HCP Glossary).**

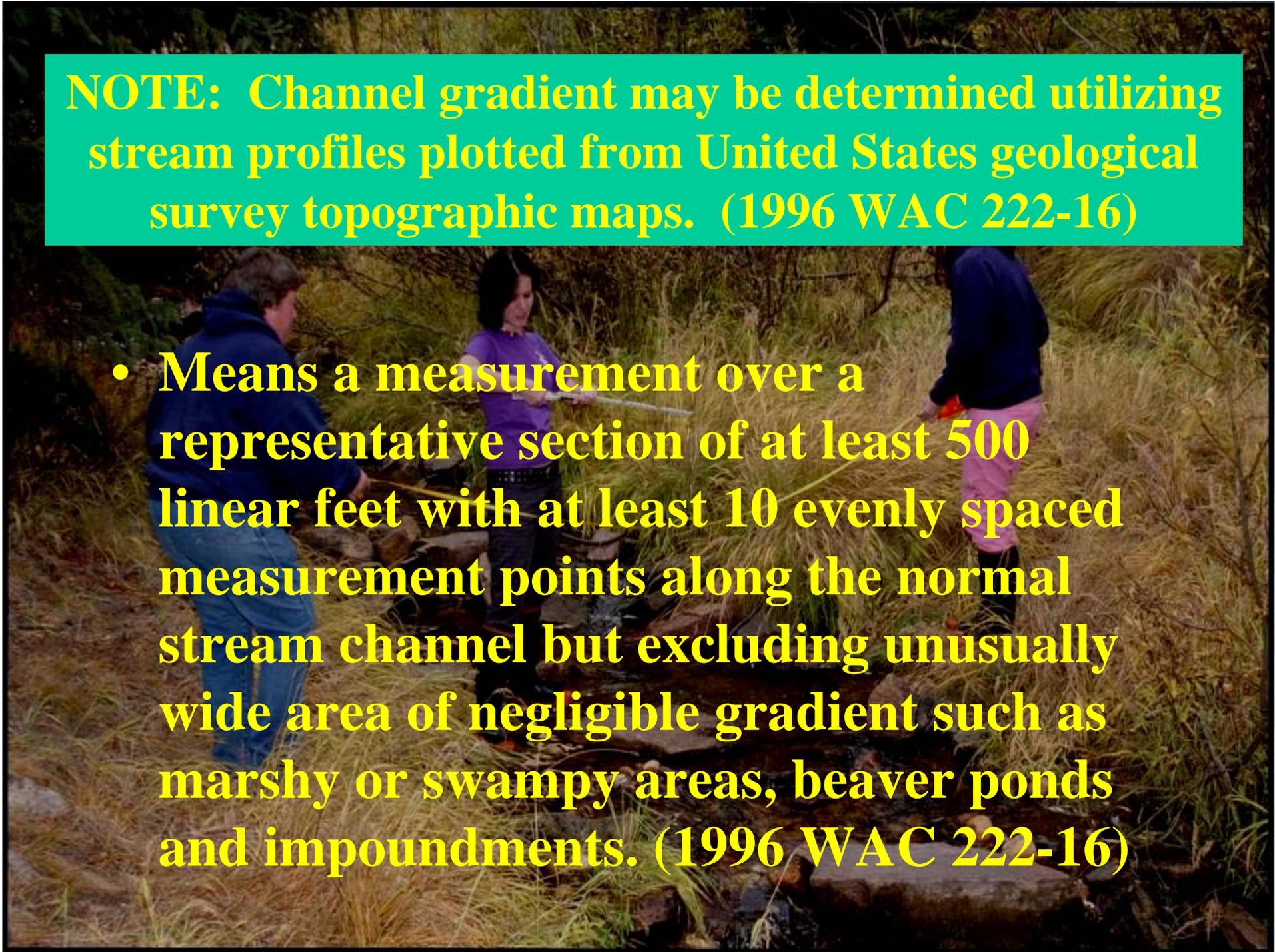
# ORDINARY HIGH WATER MARK

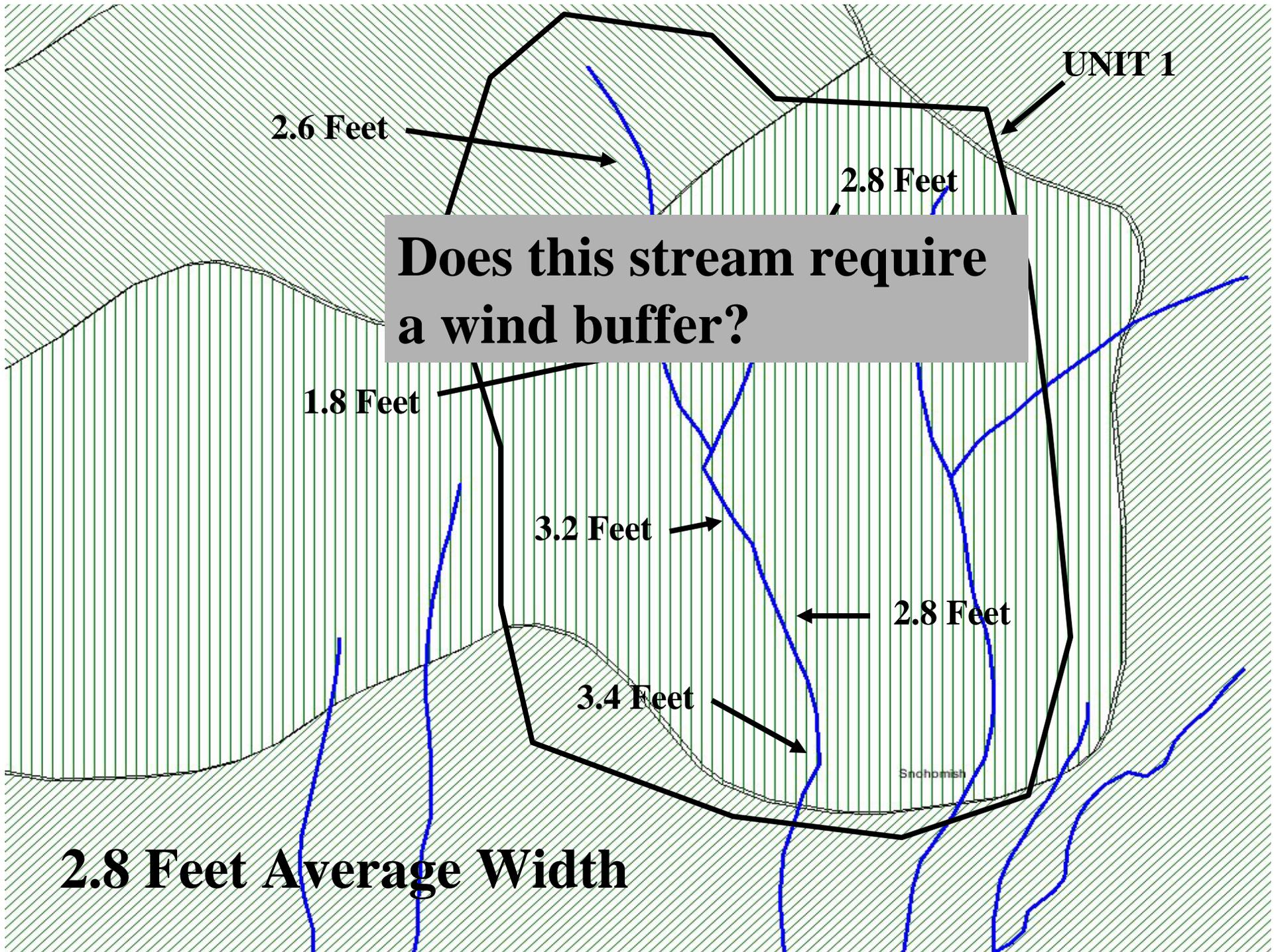
- Means the mark on the shores of the all waters, which will be found by examining the beds and banks and ascertaining where the presence and action of waters are so common and usual, and so long contained in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland... (1996 WAC 222-16)



**NOTE: Channel gradient may be determined utilizing stream profiles plotted from United States geological survey topographic maps. (1996 WAC 222-16)**

- **Means a measurement over a representative section of at least 500 linear feet with at least 10 evenly spaced measurement points along the normal stream channel but excluding unusually wide area of negligible gradient such as marshy or swampy areas, beaver ponds and impoundments. (1996 WAC 222-16)**





**UNIT 1**

**2.6 Feet**

**2.8 Feet**

**Does this stream require a wind buffer?**

**1.8 Feet**

**3.2 Feet**

**2.8 Feet**

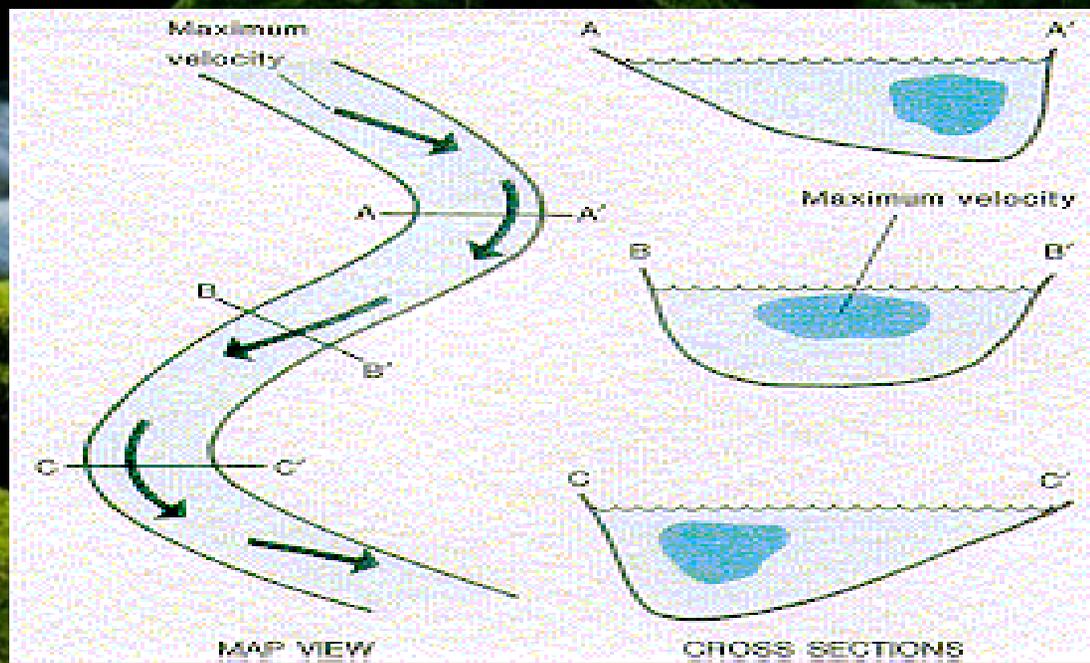
**3.4 Feet**

**2.8 Feet Average Width**

Sachomish

# THALWEG

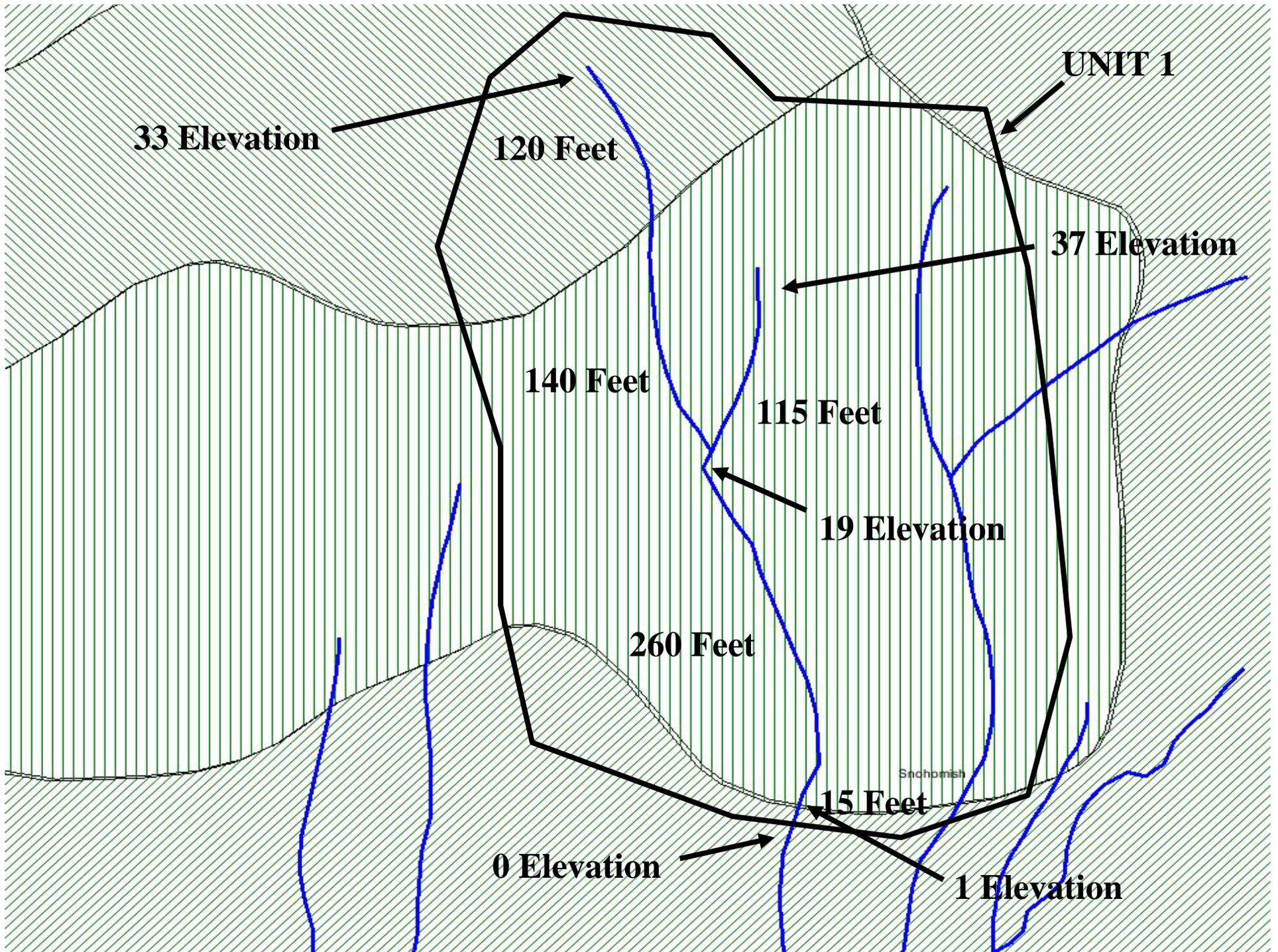
- **Line connecting the deepest part of a stream channel (American Fisheries Society)**

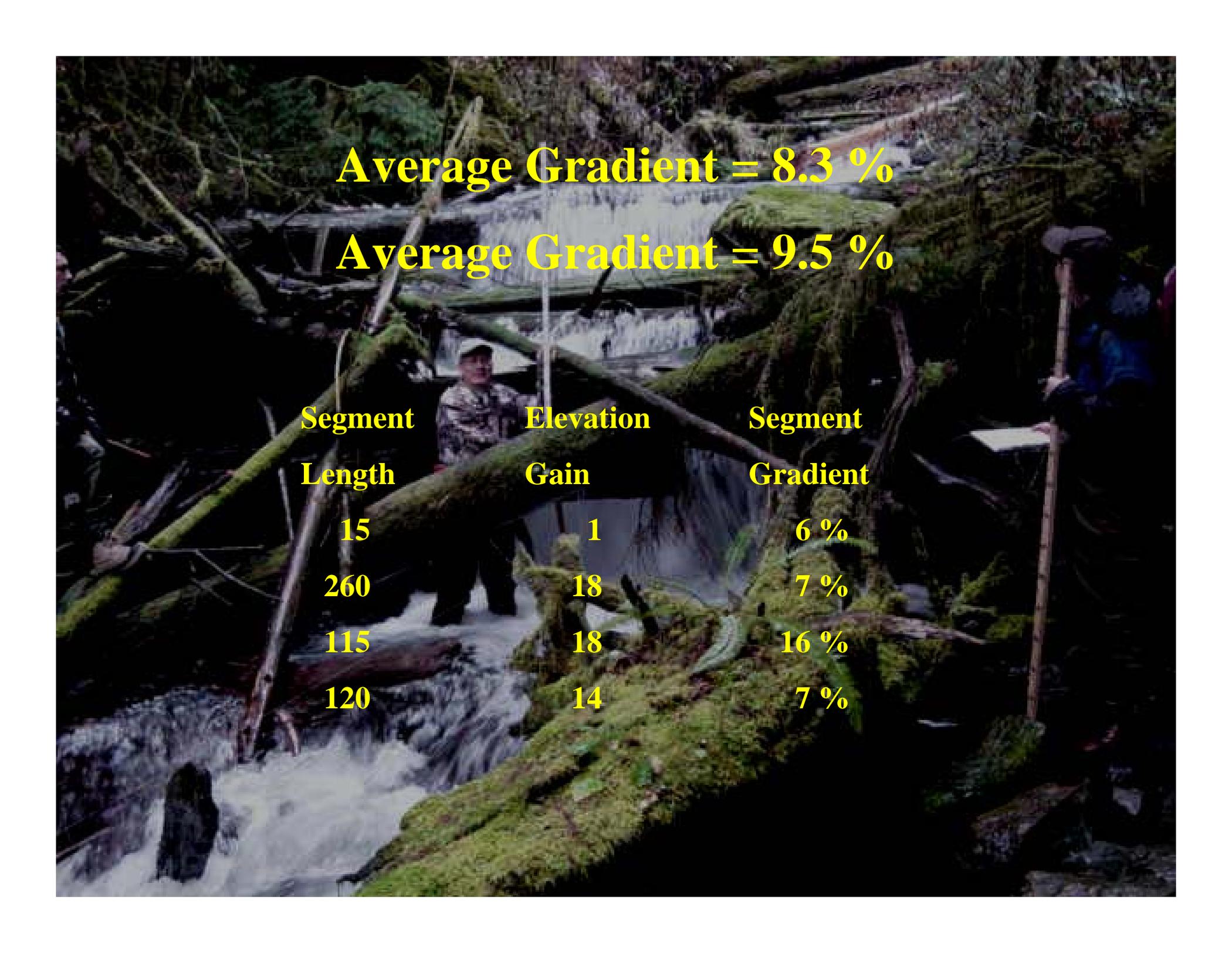


# GRADIENT

- Stream elevation profile following the thalweg.







**Average Gradient = 8.3 %**

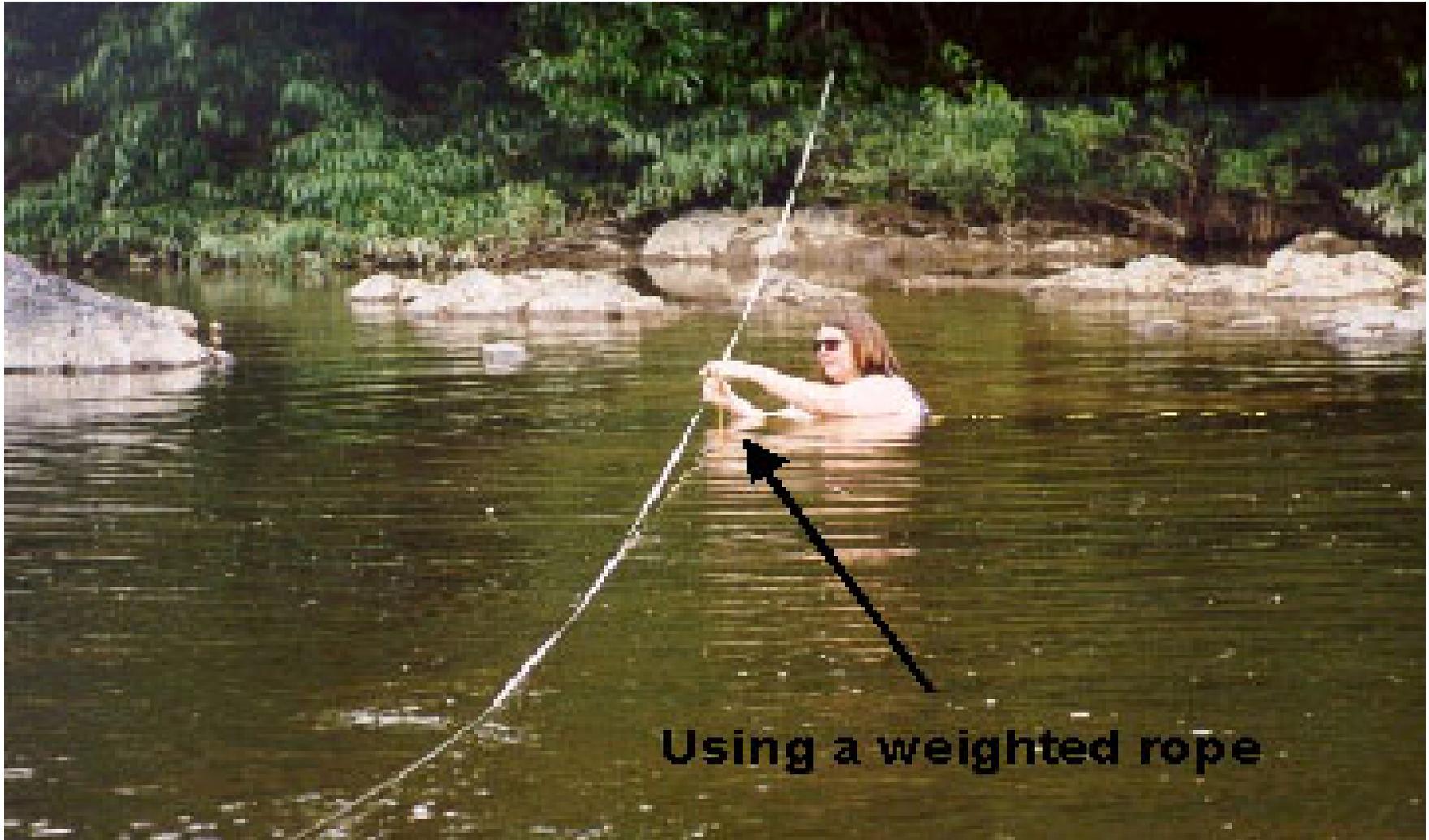
**Average Gradient = 9.5 %**

<b>Segment Length</b>	<b>Elevation Gain</b>	<b>Segment Gradient</b>
<b>15</b>	<b>1</b>	<b>6 %</b>
<b>260</b>	<b>18</b>	<b>7 %</b>
<b>115</b>	<b>18</b>	<b>16 %</b>
<b>120</b>	<b>14</b>	<b>7 %</b>

# 100 YEAR FLOOD PLAIN

- **On higher-gradient streams in moderate to steep terrain, the 100-year floodplain typically coincides with the active channel margin or extends only a few feet beyond the active channel (HCP IV-58).**
- **The area adjacent to a stream that has a 1 percent chance of being flooded during any given year (Scientific Literature).**

# TWO TIMES DEPTH METHOD

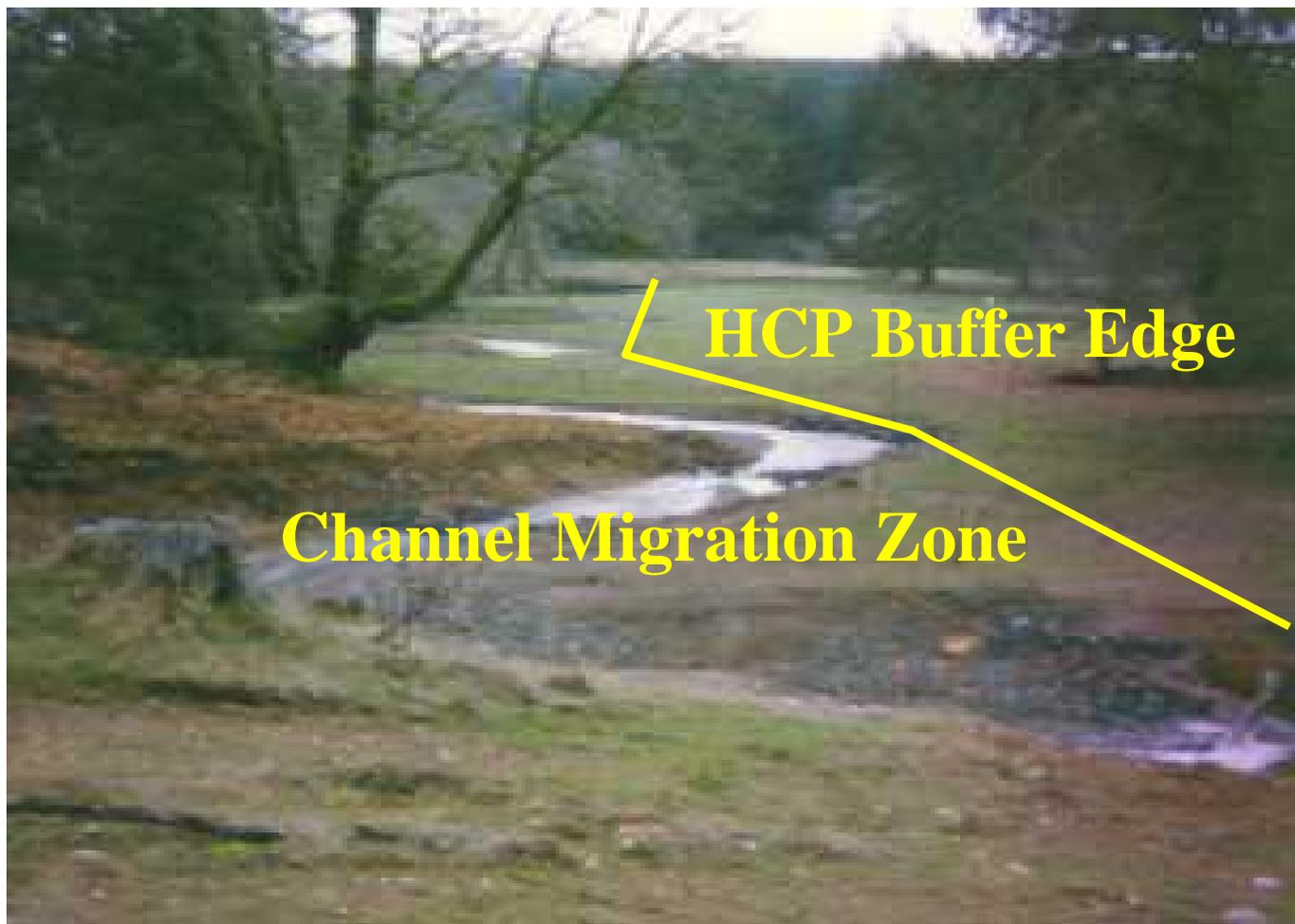


Using a weighted rope

# THREE TIMES WIDTH METHOD



# STREAM MEANDERS



# **BUFFER WIDTH**

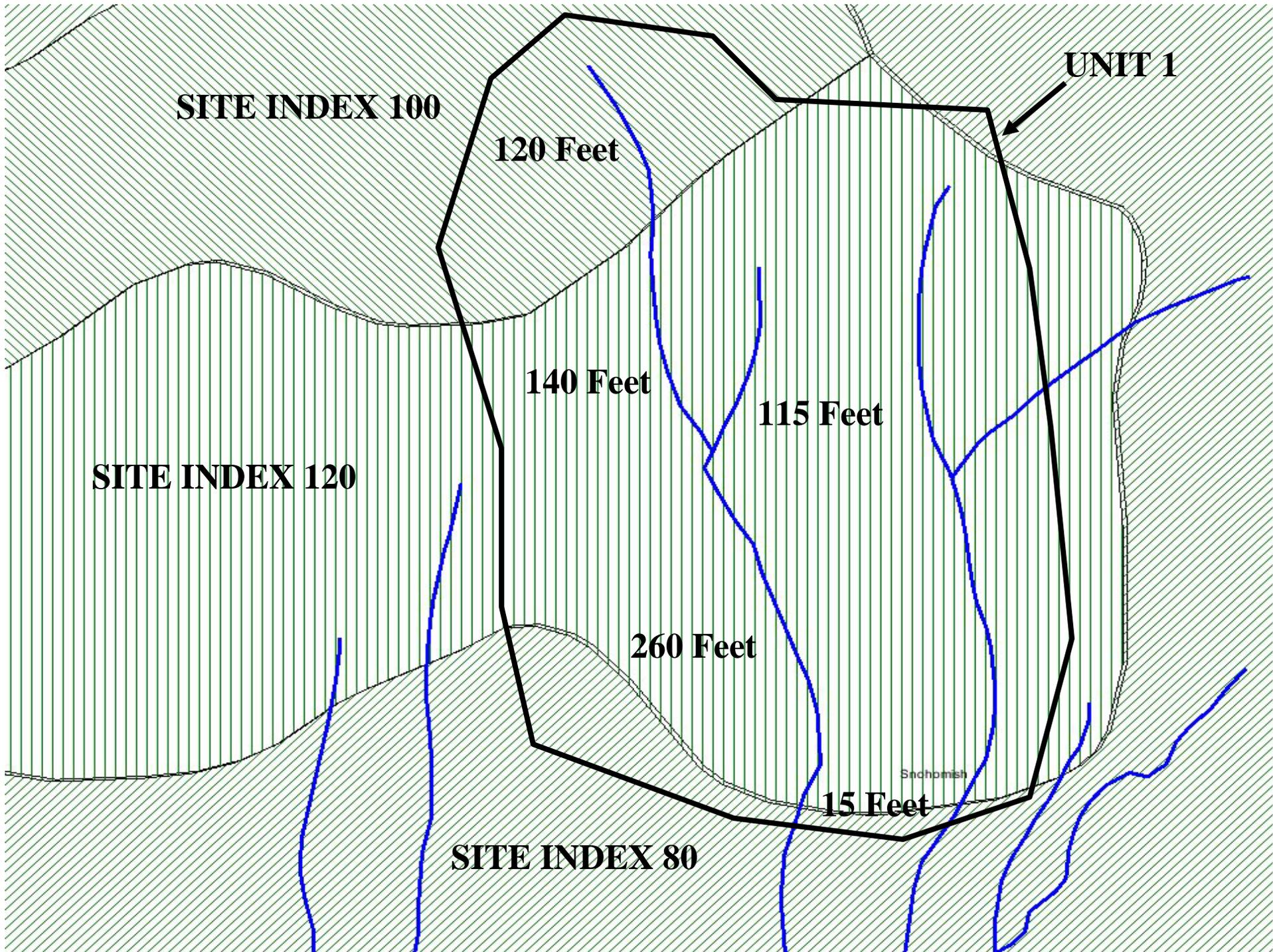
- **Type 1-3 streams buffer width is greater than or equal to the average height that an adjoining upland conifer stand would be expected to reach at age 100 or 100 feet whichever is greater measured from the outer edge of the 100-year flood plain or CMZ whichever is greater.**
- **Type 4 stream buffer width is 100 feet or greater.**

# **SITE POTENTIAL TREE HEIGHT**

- **The height a dominant tree may attain, given site conditions where it occurs (HCP Glossary).**
- **The height of the dominant conifer species at the base age of 100 years determined using the 50 year site index curves (Riparian Conservation Strategy).**

# 100 YEAR CONIFER SITE POTENTIAL

Site Class	70	80	90	100	110	120	130	140	150
Douglas-fir (Feet)	98	112	127	142	157	172	188	203	218
Western Hemlock	111	122	133	144	156	168	181	194	208



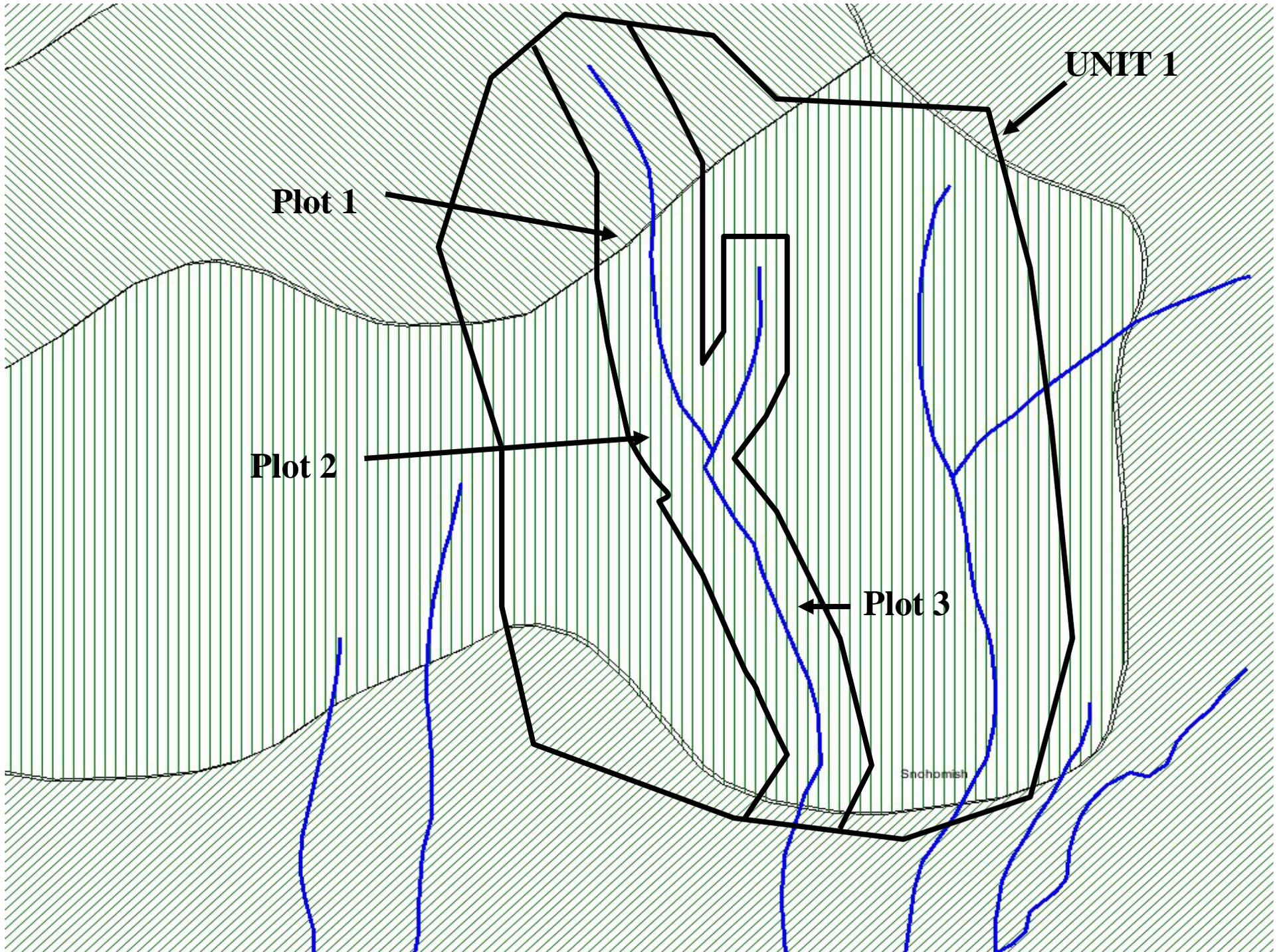
# Weighted Average Buffer Width = 165 Feet

Segment Length	Site Index	100 Year Site Potential	Weighted Site Potential
15	80	112	1680
260	120	172	44720
115	120	172	19780
140	120	172	24080
120	100	142	17040
650			107300

# RIPARIAN CRUISE

- **Riparian Plots Are To Be Proportionally Represented In Appraisal Cruise**
- **Trees greater than 7.0 Inches DBH Contribute To RDFC**
- **Trees greater than 3.5 Inches DBH Are Used to Distinguish Scenarios**
- **Stand Boundaries Are Defined In The Field**





**UNIT 1**

**Plot 1**

**Plot 2**

**Plot 3**

Snichomish

# CRUISE SUMMARY

	Plot A	Plot B	Plot C
Conifer TPA	36	12	128
Conifer BA	42	9	145
Hardwood BA	96	124	5
Conifer QMD7	14.5	8.6	14.1
Conifer QMD3.5	13.9	7.2	13.9
Conifer Height	145	78	92
Scenario	Release	Conversion	Type II

