Riparian Assessment

4 Commonly Used Approaches

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- Greenline Assessment
  - A.H. Winward
- Visual Assessment of Riparian Health
  - T.A. Ward and E.R. Atwill
- Multiple Indicators
  - E.R. Cowley and T.A. Burton
- Proper Functioning Condition
  - Multi-Agency Team

Types of Assessment Protocols

- Chemical/Physical
  - Water quality
- Vegetation Assessment
  - Greenline, transects, canopy cover, etc.
- Habitat Assessment
  - Many states have developed protocols
- Bioassessment – looking at the bugs, fish, or other wildlife.
- Others are a combo, eg. Hydrogeomorphic (HGM) assessment, MIM and PFC.

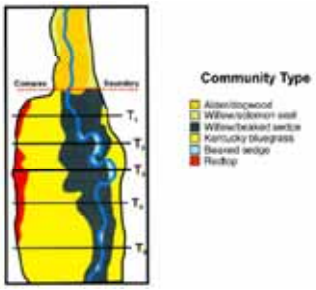
Vegatation Assessment

- **Cross-section transects**
  - Line-intercept (community, plant type)
  - Nested frequency
  - Percent cover
- **Greenline**: the first continuous perennial vegetation from the water's edge.
- **Woody Species regeneration**
- **Canopy cover using densiometers**

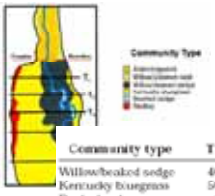
Greenline Assessment

- Monitor vegetation changes in 3 ways:
  - Vegetation cross-section composition
  - Greenline composition
  - Woody species regeneration

Cross-section composition:



Cross-section composition:

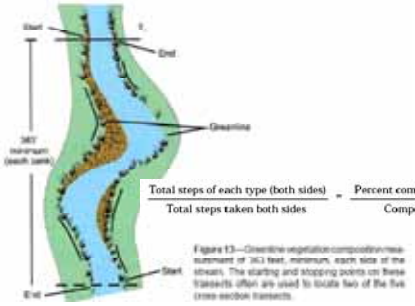


Community type	T1	T2	T3	T4	T5		Steps (ct)		Steps total		Percent comp
Willow/beaked sedge	40	45	40	35	20	=	180	/	480	=	38
Kentucky bluegrass	50	50	45	45	75	=	265	/	480	=	55
Beaked sedge	0	5	10	0	0	=	15	/	480	=	3
Redtop	5	0	10	5	0	=	20	/	480	=	4
					Total	=	480				100

Greenline Composition:

Greenline—The first perennial vegetation that forms a lineal grouping of community types on or near the water's edge. Most often it occurs at or slightly below the bankful stage.

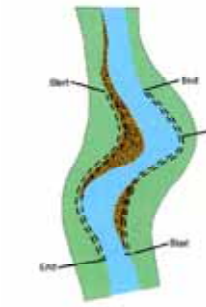
Greenline Composition:



$$\frac{\text{Total steps of each type (both sides)}}{\text{Total steps taken both sides}} = \frac{\text{Percent community type}}{\text{Composition}}$$

Figure 13—Greenline vegetation composition measurement of 328 feet, minimum, each side of the stream. The starting and stopping points on these transects often are used to locate two of the five cross-section transects.

Woody Species Regeneration:



Number of stems at ground surface	Age class
1	Sprout
2 to 10	Young
>10, >½ stems alive	Mature
>10, <½ stems alive	Decadent
0 stems alive	Dead

Example

Sprouts	3
Young	21
Mature	12
Decadent	10
Dead	2

= Healthy Reproduction

Woody Species Regeneration:

Figure 16—Correct placement of the sampling pole along the greenline water interface.

Woody Species Regeneration:

Figure 17—Placement of the measuring pole such that the left end does not reach beyond the centerline of a stream less than 6 feet wide.

Greenline Assessment

- Calculations of Change
  - Based on “Early” and “Late” Successional Communities

Similarity to PNC		Successional status
0-15		Very early seral
16-40		Early seral
41-60	⇒	Mid seral
61-85		Late seral
86+		PNC

Calculation of Change:

Community types	Steps	Percent composition
Popr	200 / 230 =	87%
Juba	30 / 230 =	13%
	Total = 230	100%

(a) Not proportioning types

Successional status	Early	Late
Kentucky bluegrass	87	
Baltic rush		13

13% Late seral types = Very Early successional status

(b) Proportioning types

Popr (*Cane*)	87% x 60 = Popr	= 52%
	87% x 40 = Cane	= 35%
Juba (*popr*)	13% x 60 = Juba	= 8%
	13% x 40 = Popr	= 5%
		100%

Popr =	52 + 5 = 57%	= Early
Cane =	35%	= Late
Juba =	8%	= Late
	100%	

35%+ 8% = 43% Late seral types = Mid successional status

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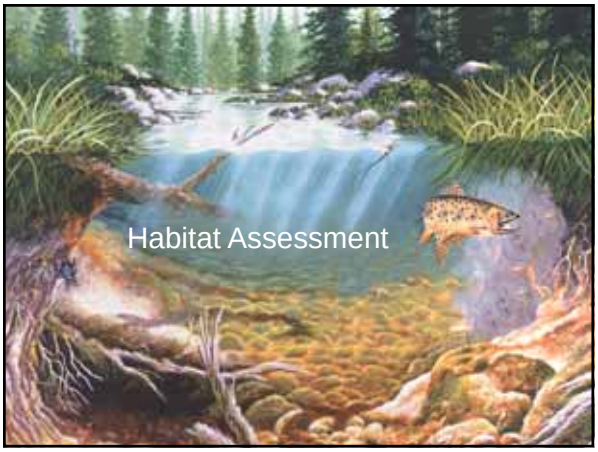


Macroinvertebrates

- Macroinvertebrates provide an important index for detecting changes in water quality
- Some species are sensitive to perturbation or stress, while others are more tolerant to changes in the stream environment.
- Most Macros live as long as one to two years, and usually remain in one location for a long time. As a result of prolonged exposure to changing stream conditions, their presence or absence provides an indication of stream health.

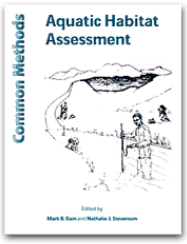
Habitat Assessment

- For example:
  - Good trout habitat depends on:
    - Water temperature
    - Water velocity
    - Cover
    - Discharge/flow pattern
    - Aquatic insects/food
    - A series of environmental factors acting together
- Then, develop a protocol

Fish Habitat

Deep pools (left) and undercut banks (above) provide good fish habitat

Habitat Assessment, example:



Stream-lining Protocol

- American Fisheries Society surveyed biologists to determine assessment protocols in use.
- Published a book that includes basic assessment methods

www.fisheries.org/publications/bookpdf/aquaticintro.htm
this site also has a really great Glossary of Stream Terms

Comprehensive or "Combo" protocols

- Combine physical, chemical & biological attributes
- Directed at specific uses or values

Proper Functioning Condition

"Riparian or wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid in floodplain development; improve flood-water retention and groundwater recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and water depth, duration, and temp. necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. The functioning condition of riparian-wetland areas is a result of interaction among geology, soil, water, and vegetation."