

Stream and Wetland Crossing Standards

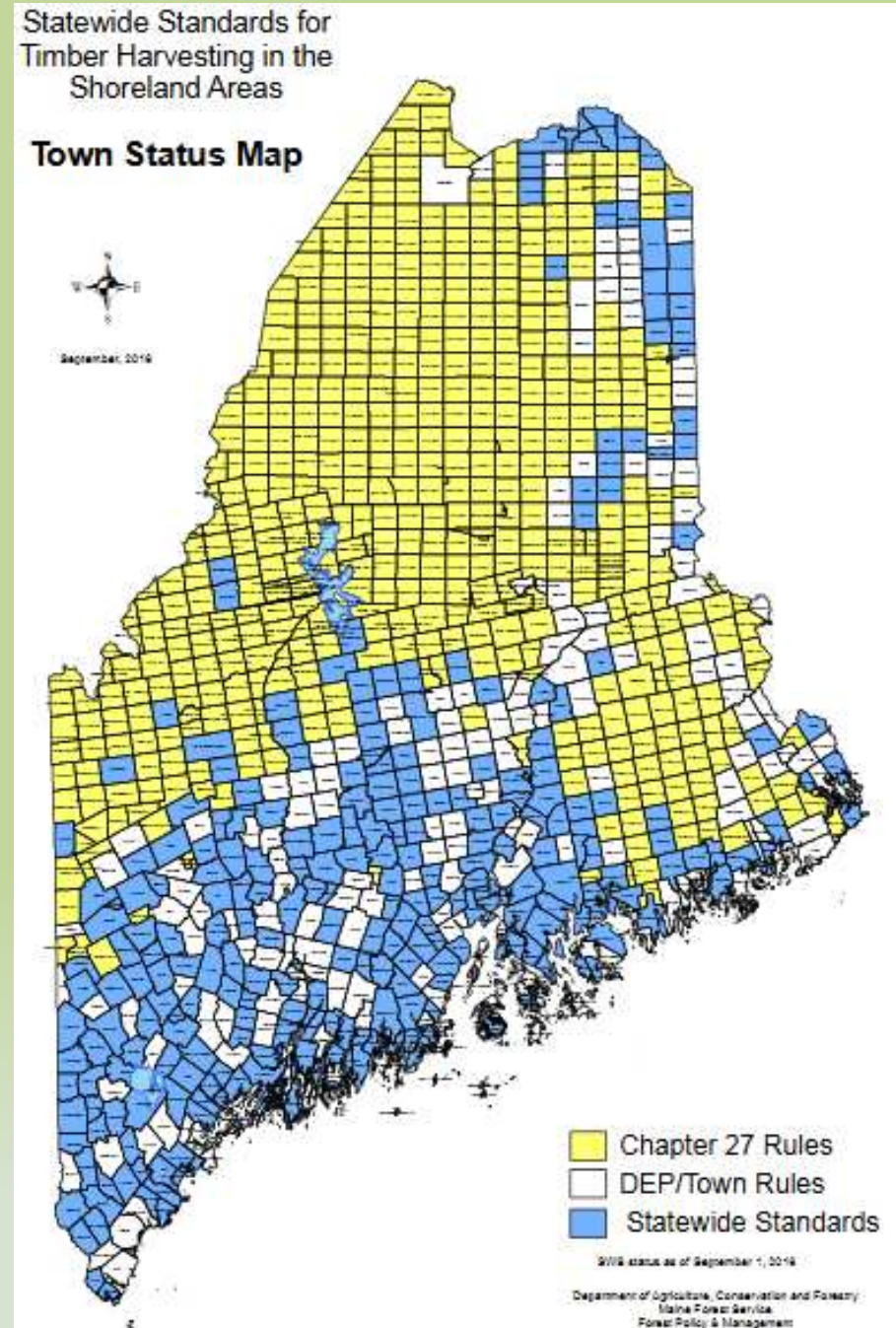


Maine Forest Service

Department of Agriculture, Conservation and Forestry

Chapter 21

Statewide Standards for Timber Harvesting in Shoreland Areas

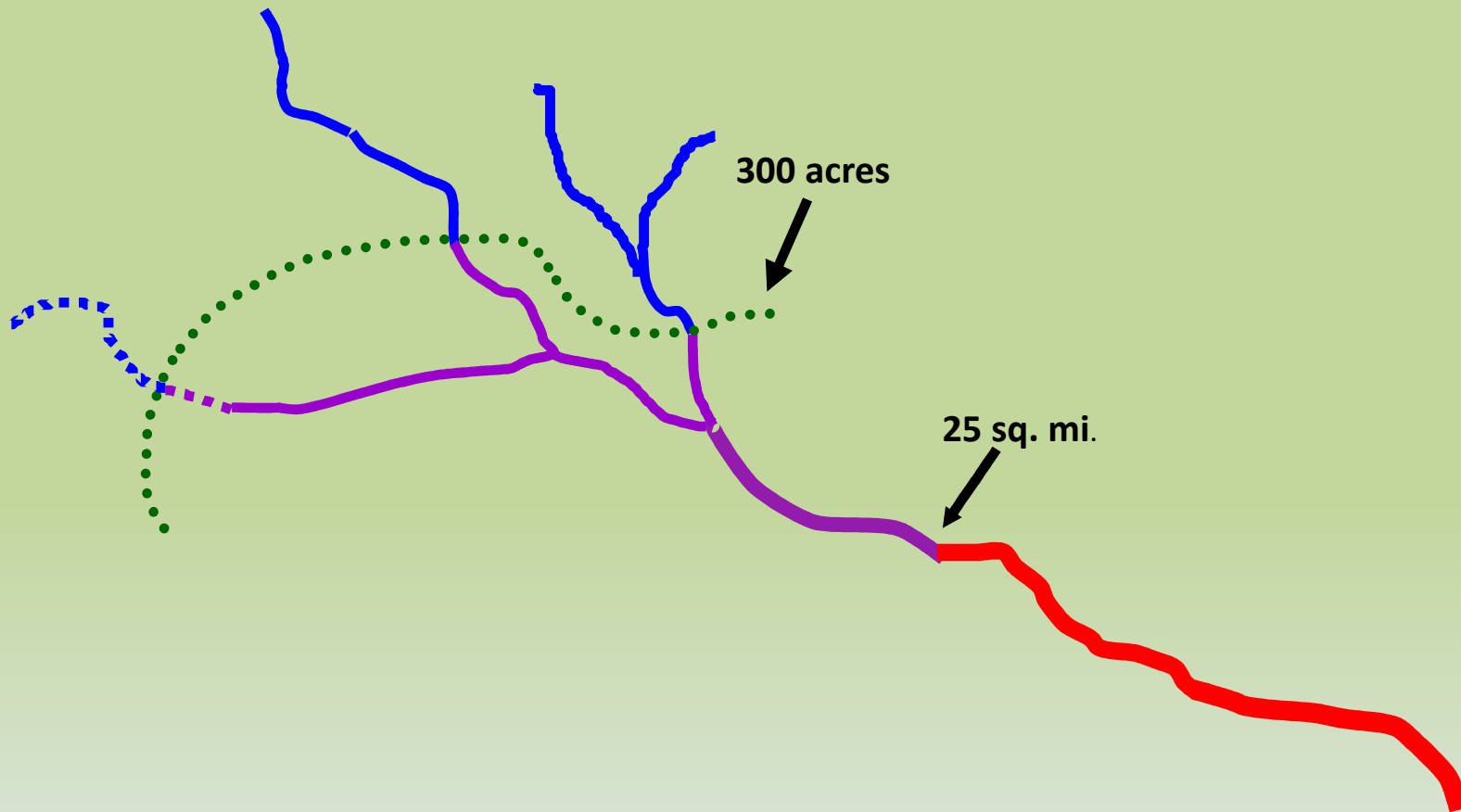


Stream Channel

- Between defined banks
- Contains exposed parent material bed
- Hydrologically connected to other waterbodies
- Does not include
 - Rills or gullies in disturbed soils



Statewide Standards for Timber Harvesting in Shoreland Areas – Regulatory boundaries



Skid Trail Crossings

Above the 25 square mile drainage point:

May be crossed using temporary structures that are not bridges or culverts but meet the following criteria:

- Sedimentation of surface waters is reasonably avoided;
- There is no substantial disturbance of the bank or stream channel;
- Fish passage is not impeded; and
- Water flow is not unreasonably impeded.

Or;

- When stream channels are frozen and snow-covered; or
- When stream channels are composed of a hard surface which will not be eroded or otherwise damaged.

Skid Trail Bridge and Culvert Sizing

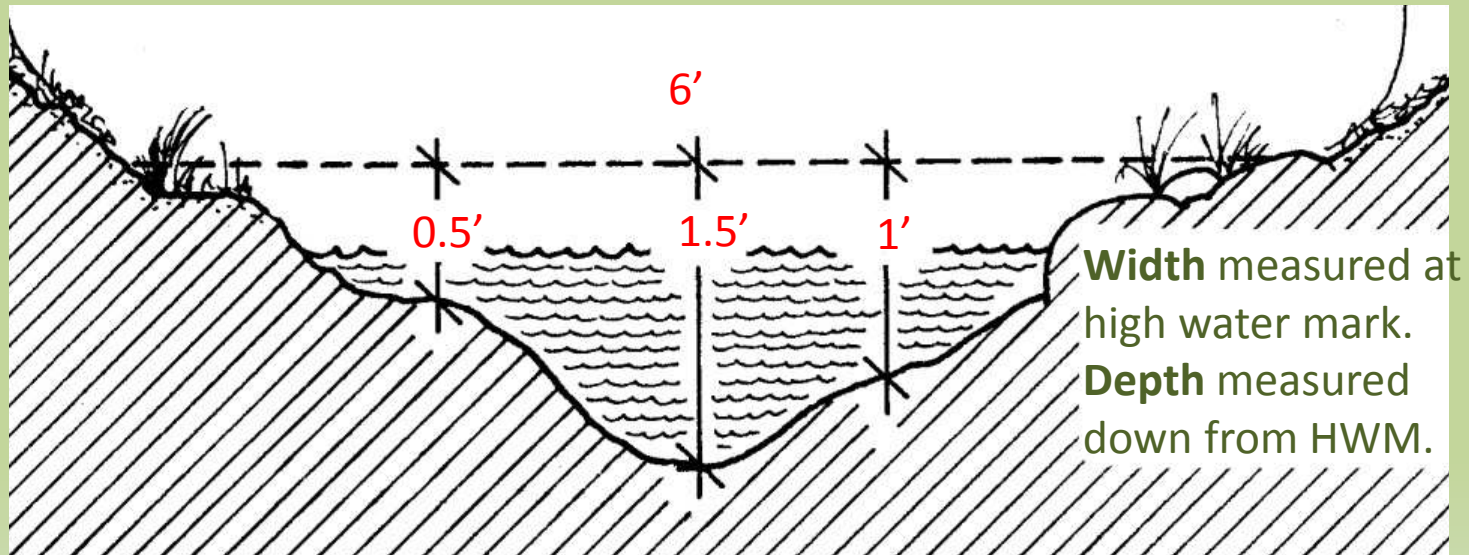
Below the 25 mi. drainage point:

Crossings must be installed and maintained to accommodate 25 year frequency water flows (3 times the cross-sectional area of the stream channel).

Temporary bridges and culverts may be smaller if:

- Crossing structures must be at least as wide as the channel;
- Bridges must be placed above the normal high water line; and
- In the event of failure, the course of water flow is maintained and sedimentation of the water body is avoided.

Skid Trail Bridge and Culvert Sizing



MFS BMP Manual Guidance

3 times the cross sectional area

Table B2 <i>25-year Flood Crossing Opening Size (sq. ft.)</i>				
Stream Width*	Average stream depth* (ft.)			
	0.5	1	1.5	2
1	1.75	3.5	5.25	7.0
2	3.5	7.0	10.5	14
3	5.25	10.5	15.8	21
4	7.0	14	21	28
5	8.75	17.5	26.3	35
6	10.5	21	31.5	42

* at normal high water mark
Bold: bridge or arch may be preferred on these larger streams

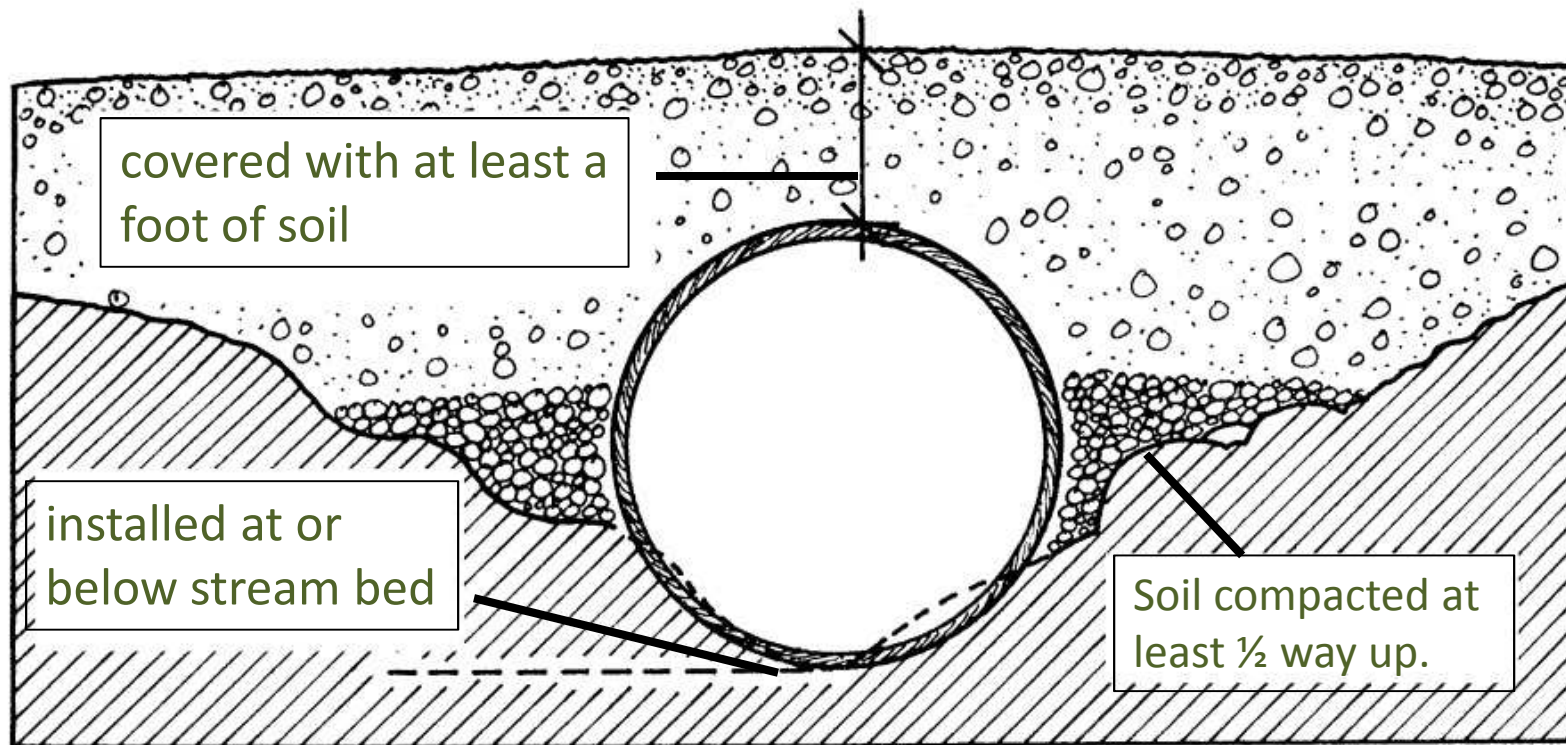
Table C <i>Culvert Diameter And Opening Sizes</i>	
Opening size (sq. ft.)	Diameter (inches)
0.20	6
0.80	12
1.25	15
1.75	18
2.40	21
3.15	24
4.90	30
7.05	36
9.60	42
12.55	48
15.90	54
19.65	60
23.75	66
28.26	72



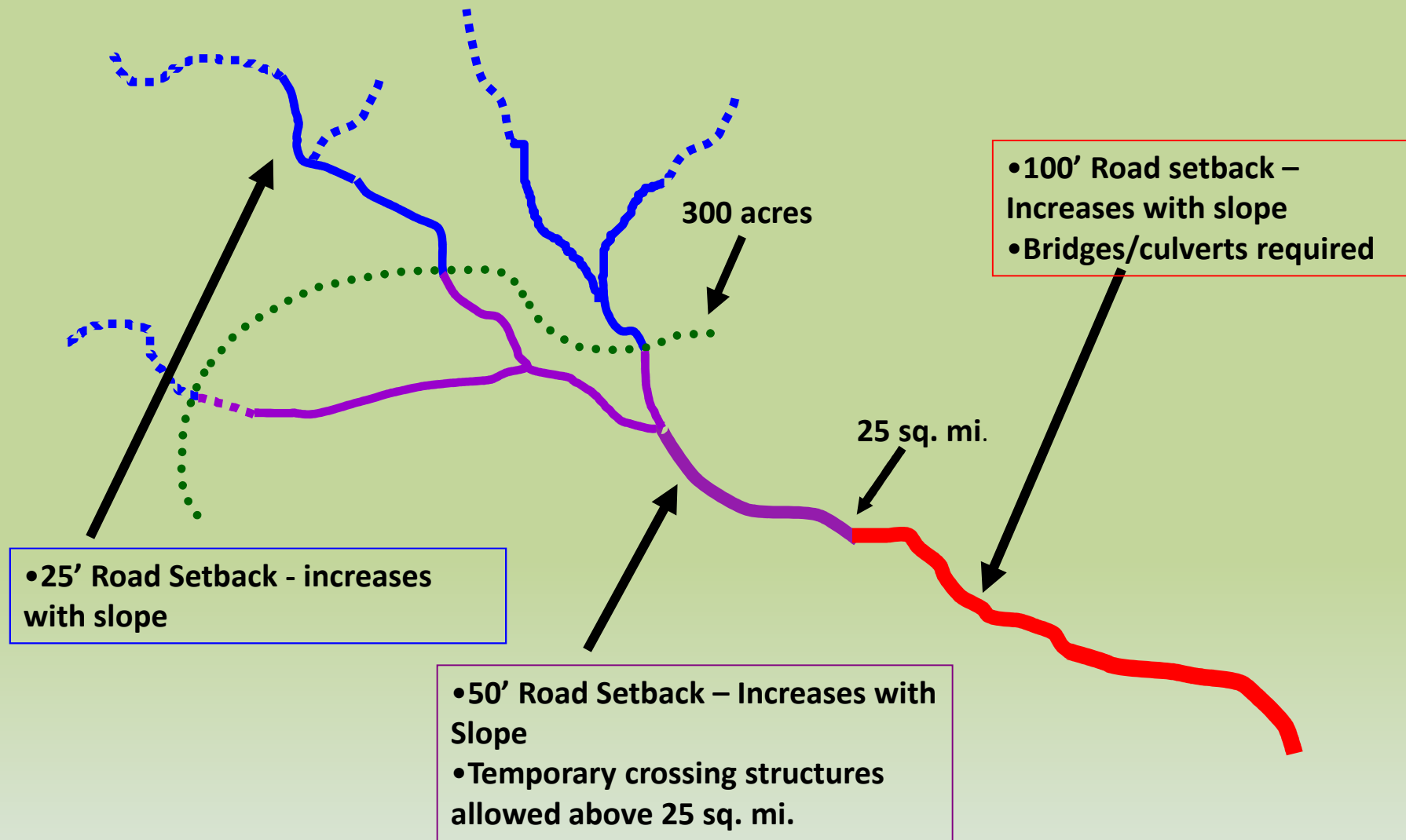
Tip: To provide adequate fish passage the width of the opening for a bridge or culvert should be at least as wide as the stream channel at the normal high water mark (see page 41). Sizing a crossing only based on the 10 or 25 year flood may not always accomplish this goal.

Ch. 21: Culverts utilized in water crossings must:

1. Be installed at or below stream bed.
2. Seated on firm ground.
3. Have soil compacted at least $\frac{1}{2}$ way up the side.
4. Must be covered with at least a foot of soil.
5. Have headwall at inlet end stabilized with rip-rap.



Statewide Standards for Timber Harvesting in Shoreland Areas – Roads and Crossings



*Slope table available in BMP manual

Key Issue: Filter Areas, Pg. 23: “Filter strips, skid trail setbacks, and land management road setbacks must be maintained as specified in the rule, but in no case shall be less than shown in the following table.”

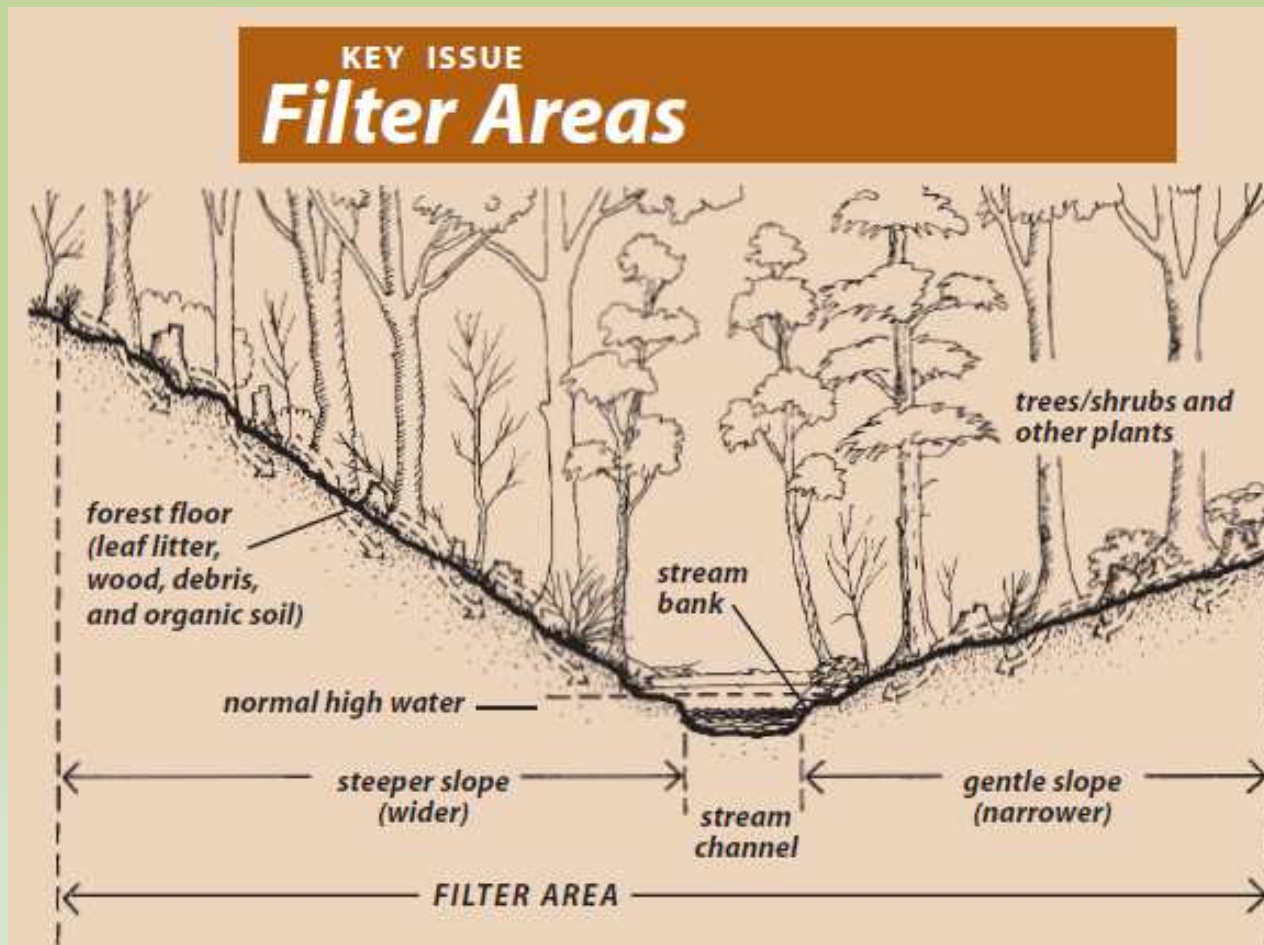
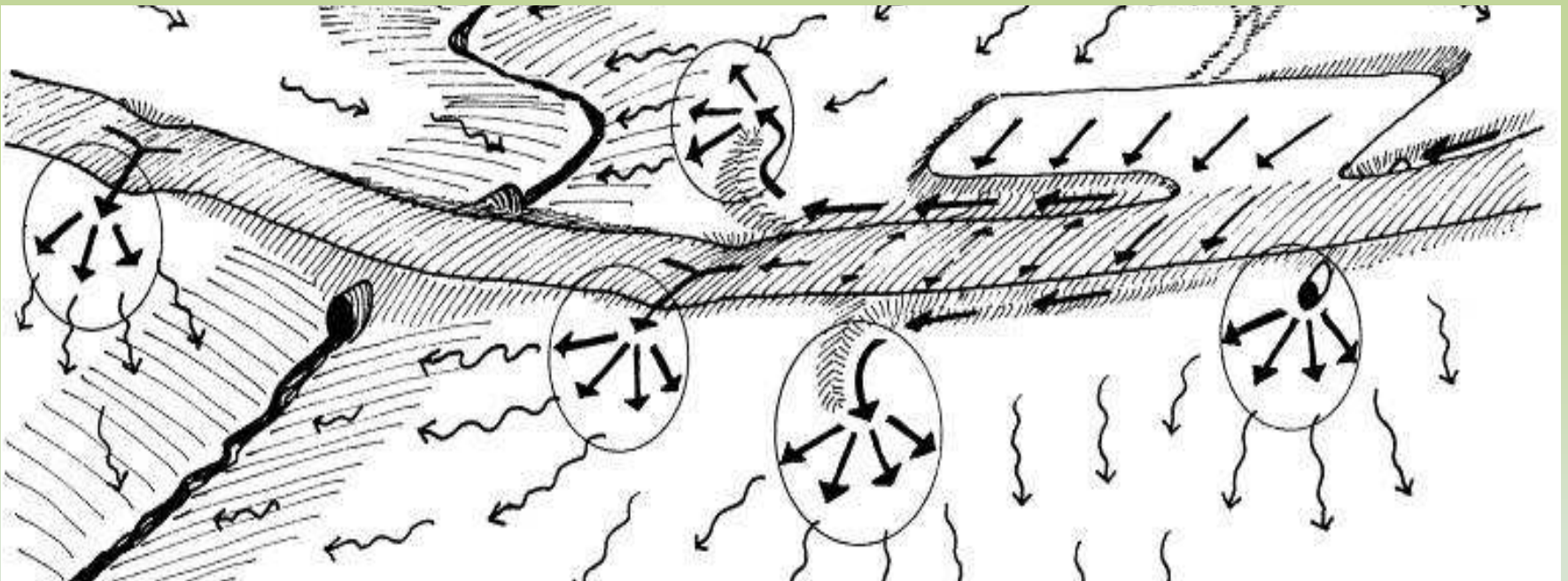


Table A
Minimum Filter Area Width

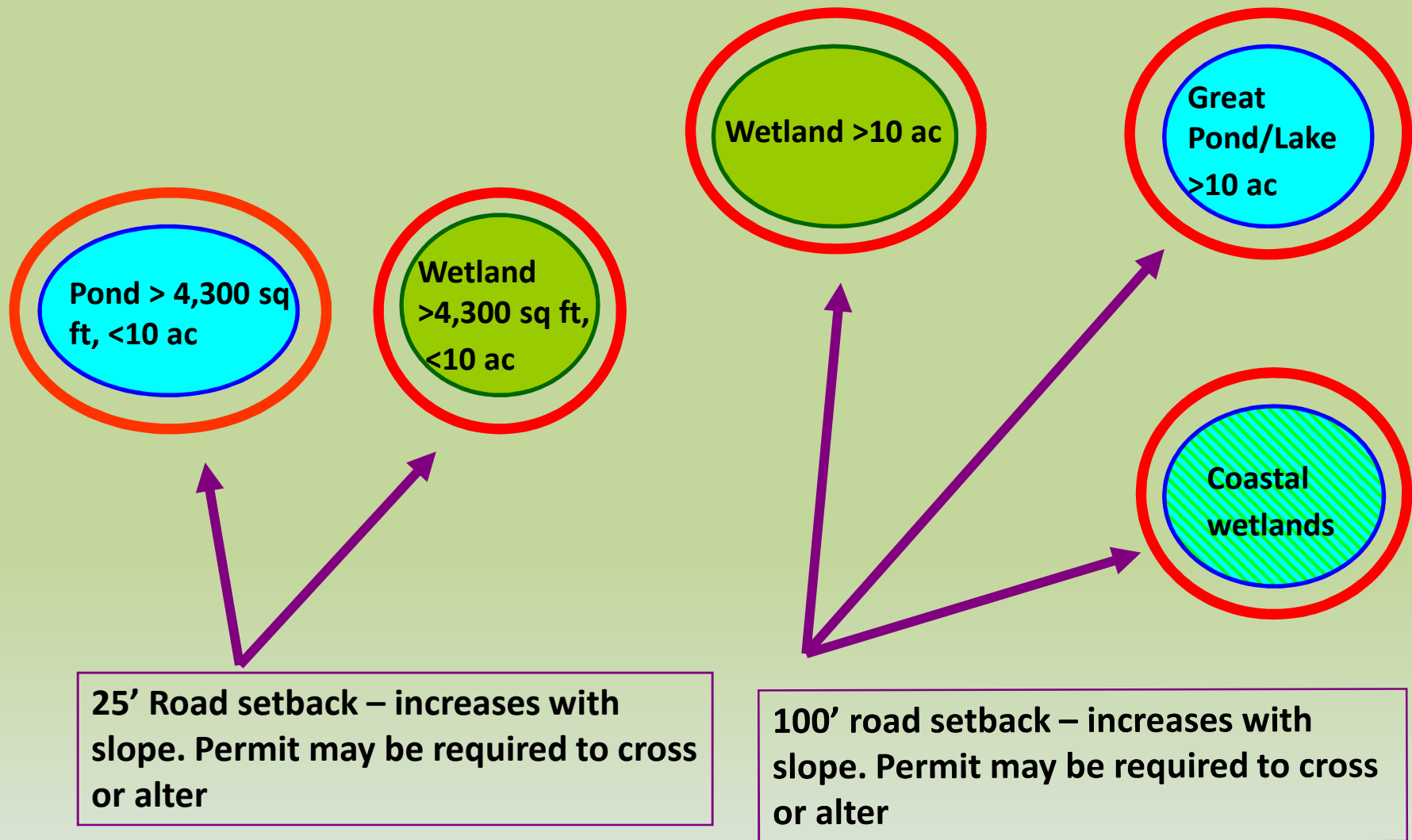
Slope (%)	Width from High Water Mark (ft.)
0	25
10	45
20	65
30	85
40	105
50	125
60	145
70+	165

Ch. 21- Approaches to Water Bodies

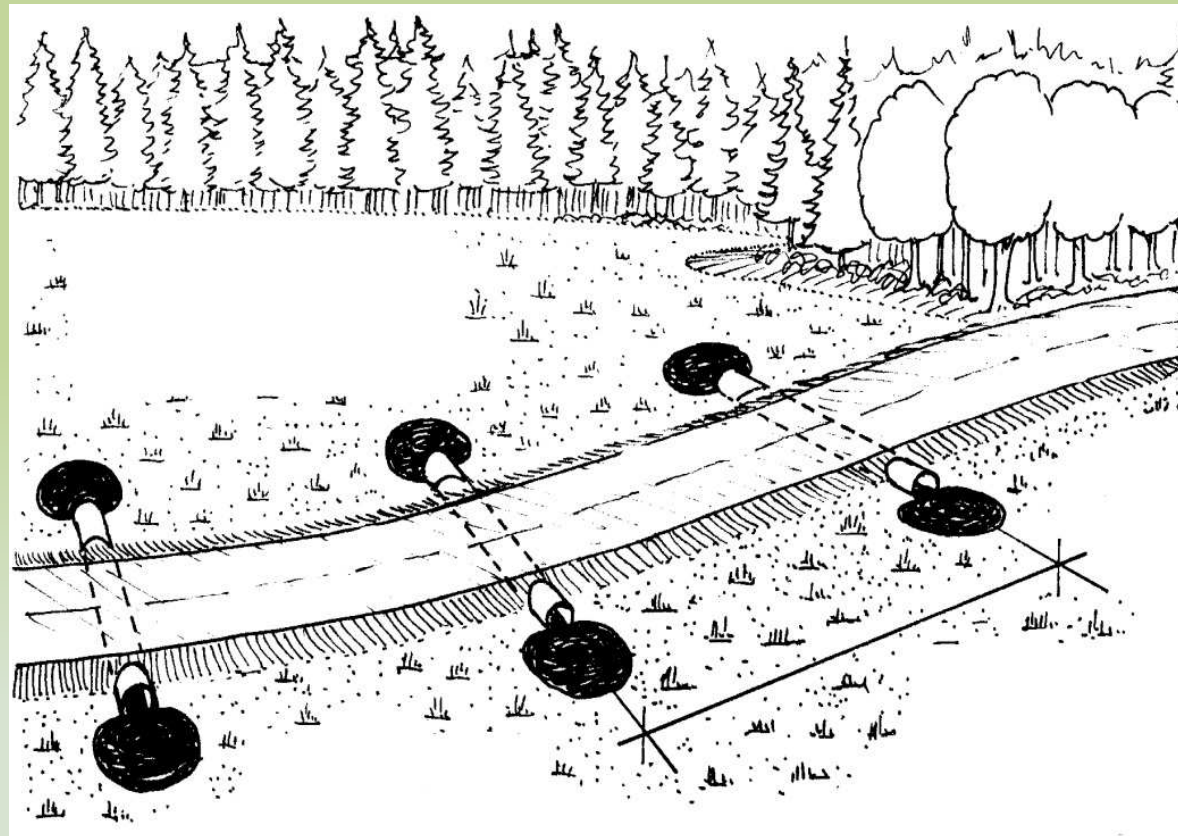
- Concentrated runoff and sediment can not directly enter the waterbody
- Water must be diverted through vegetative filter strips



Statewide Standards for Timber Harvesting in Shoreland Areas – Roads and Crossings



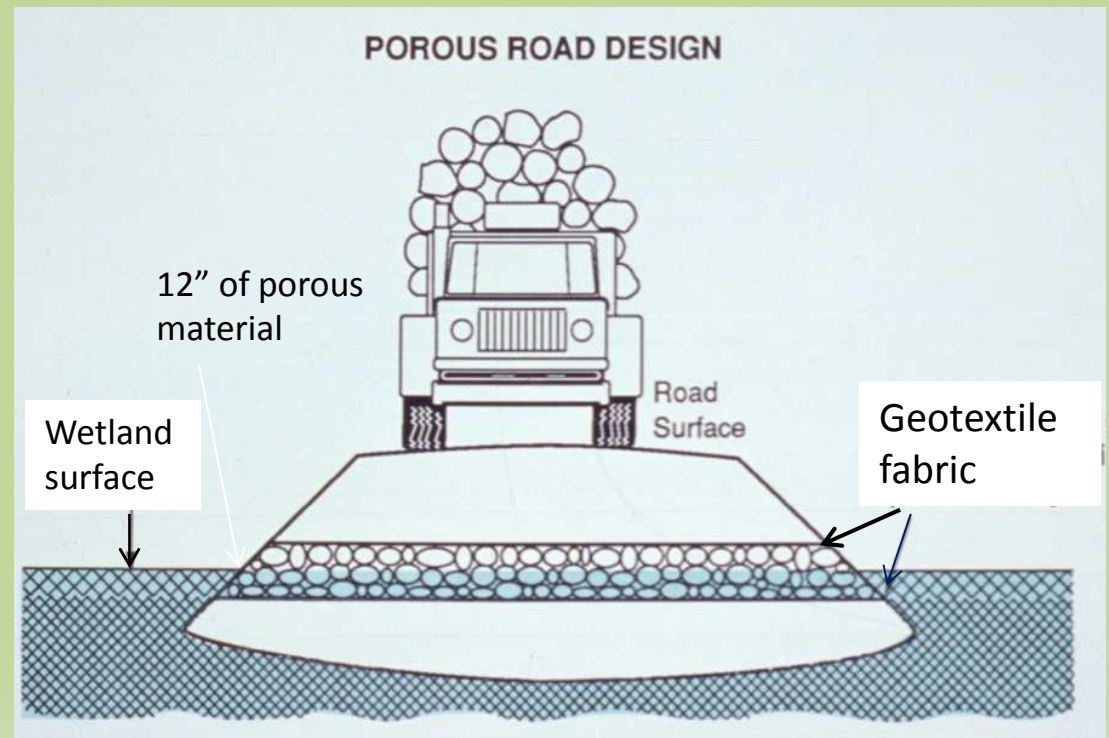
Ch. 21- Freshwater wetlands. Land management road crossings must avoid freshwater wetlands and must maintain the existing hydrology of such wetlands, unless there are no reasonable alternatives, as determined by the Bureau in a written decision.



Wetland Road Construction BMP

A porous layer (rock sandwich) may be created to move surface water through the road fill material.

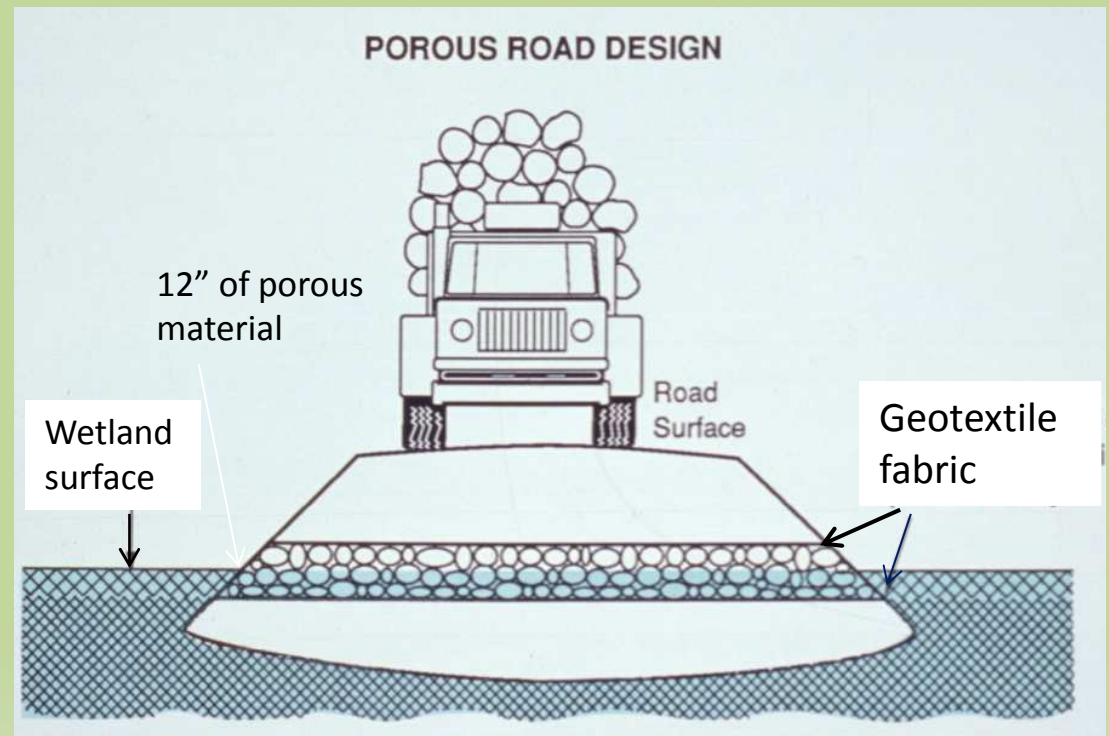
Geotextile fabric must be placed above and below fill material to increase the bearing strength of the road and to prevent contamination of fill material with fine soil particles.



Wetland Road Construction (Ch. 27)

Where the organic layer is > 4'

- Must only take place under **frozen ground** conditions.
- **Geotextile fabric** must be placed directly on the soil surface.
- Cross drainage must be provided by either a continuous porous layer or appropriate placement of culverts or other cross-drainage structures.



Setback Exceptions

- Allows for reductions in setbacks if landowner demonstrates to MFS:
 - No reasonable alternative exists
 - Appropriate techniques are used to prevent sedimentation



Upgrading Existing Roads

Extension, enlargement or maintenance of presently existing nonconforming roads need not conform to the setback requirements if, prior to extension or enlargement, the landowner or designated agent demonstrates that :

- No reasonable alternative exists;
- That appropriate techniques will be used to prevent sedimentation of the water body; and
- Nonconforming conditions are not made more nonconforming.

Significant River Segments – Resource Protection

- New land management roads are not permitted within the shoreland areas along Significant River Segments or Resource Protection Districts unless:
 - Landowner demonstrates to MFS that no reasonable alternative route exists;
 - The new road must be set back as far as practical; and
 - Screened from the river by existing vegetation.

KEY ISSUE

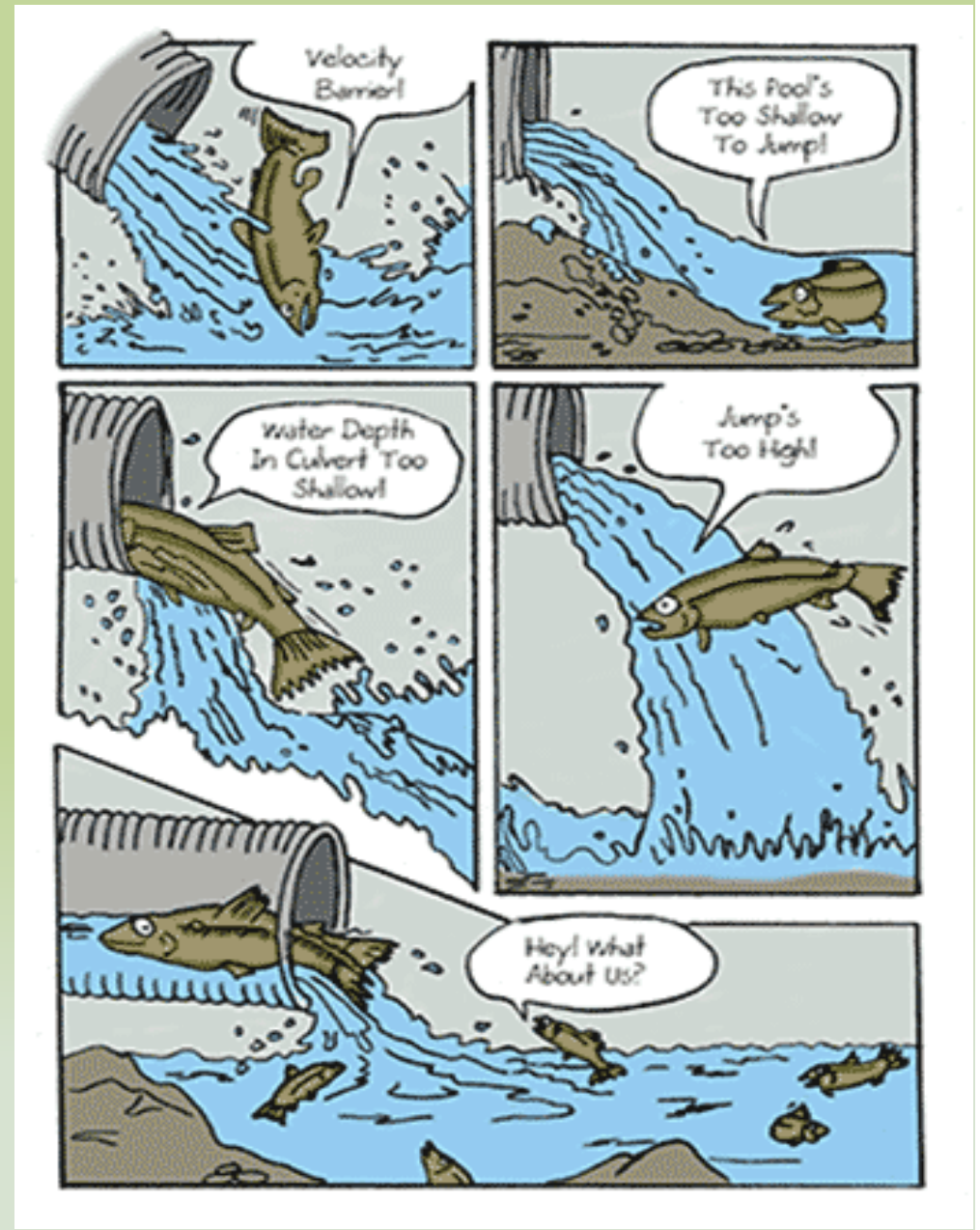
Fish Passage



Types of Barriers to Fish

- Velocity
- Low-Flow
- Jump
- Debris

Often a combination



Velocity Barrier

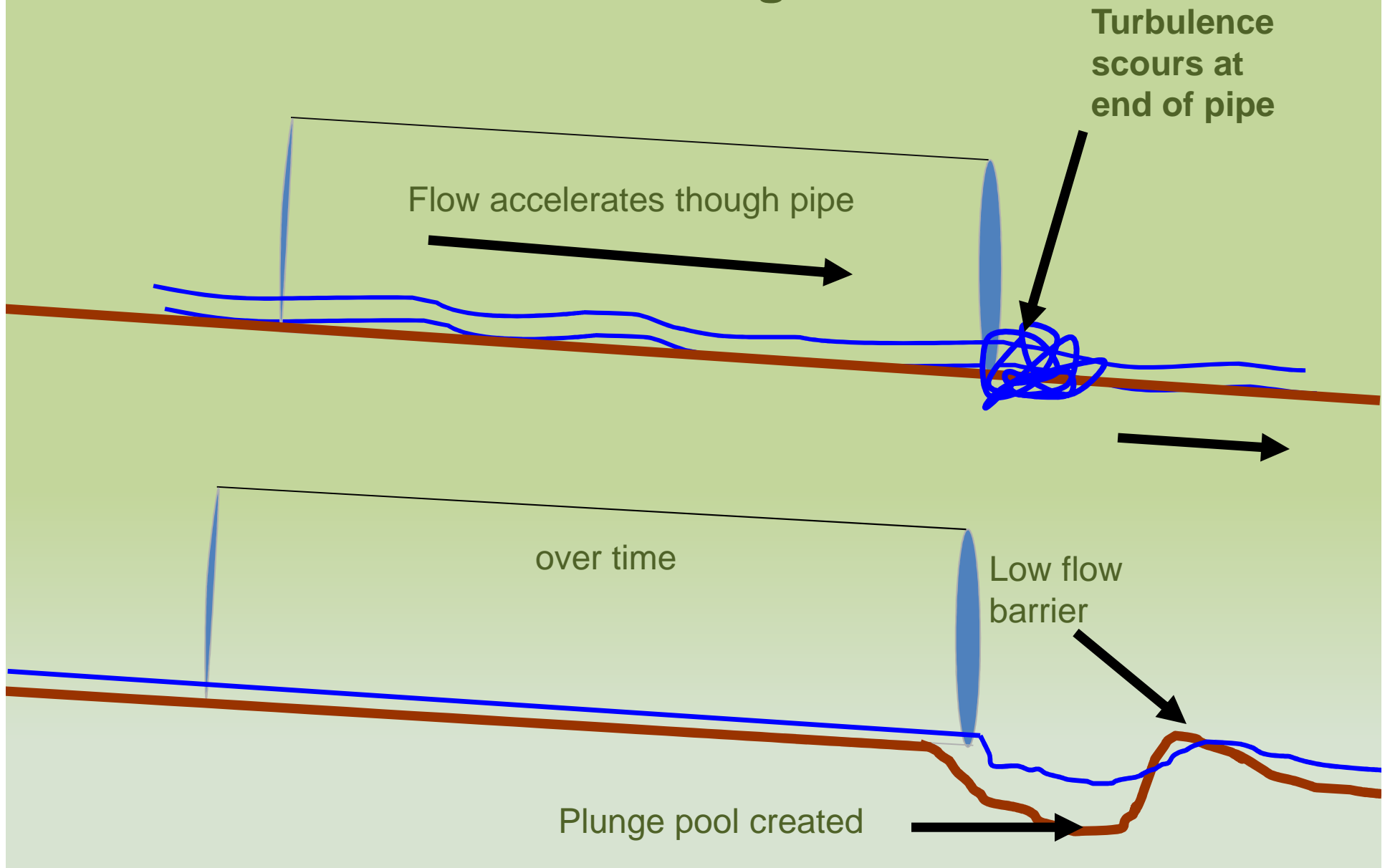


- Important points
 - Different species and sizes of fish have different swim speeds
 - Becomes a barrier if water is moving faster than the fish can swim

Causes: Constricted stream channel = increases water velocity



Pipe that does not span the channel set at stream grade



Jump Barriers



- Important Points
 - Fish have varying abilities to jump depending on size, species and other factors
 - Becomes a barrier if pipe outlet height is too great for fish to jump into
- Causes
 - Pipes set too high, (ledge, big rock on top of old blocked pipe etc.)
 - Pipes that do not span the stream can become perched over time

Low-Flow Barriers



- Important points
 - Fish require a minimum water depth to swim
 - Barrier is created by water that is too shallow (summer)
- Causes
 - Flat bottomed structures set too high in elevation
 - Multiple pipes that are not offset

Debris Barriers



- Causes
 - The smaller the pipe, the more likely to clog
 - Lack of maintenance

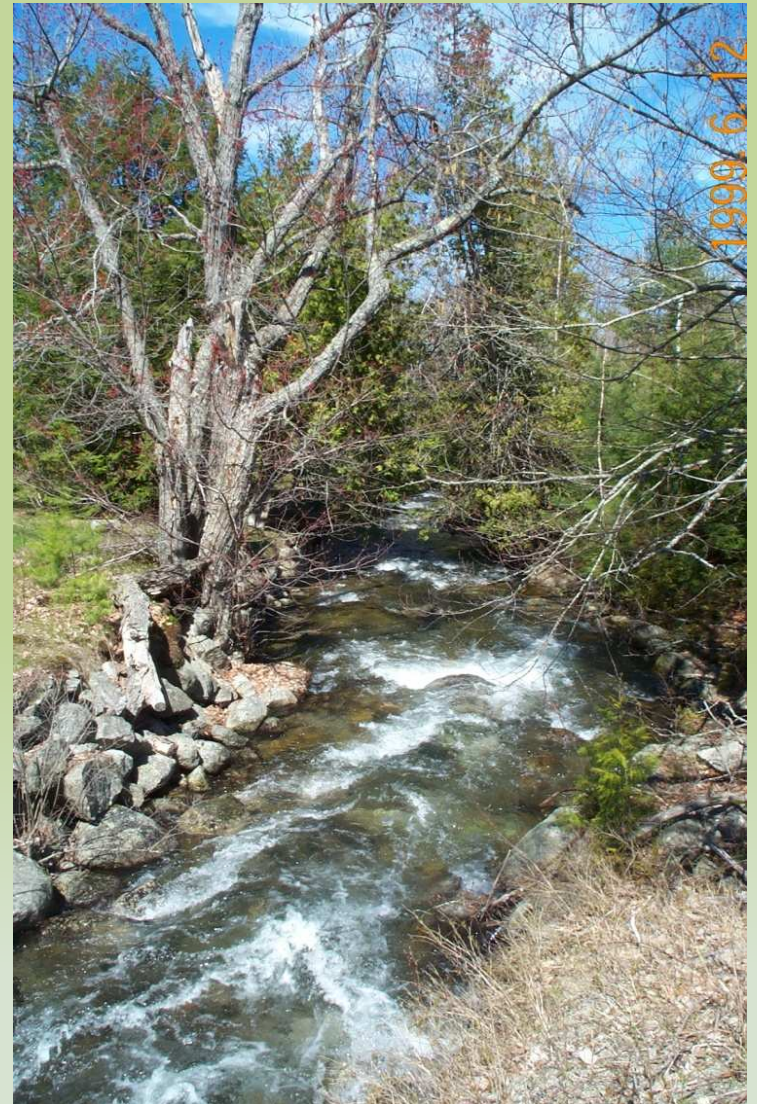
Rules of Thumb (4 S's)

Span the stream

Set elevation right

Slope matches stream

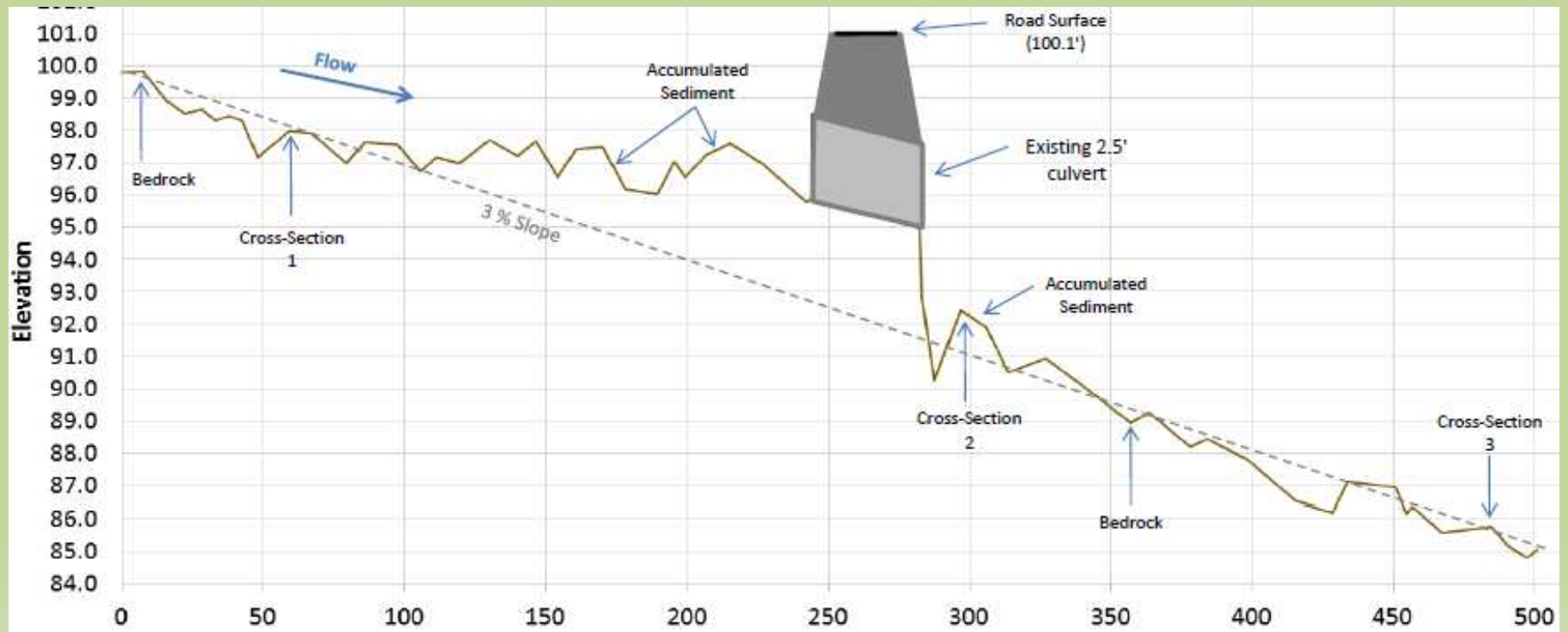
Substrate in the crossing



Principle #1 – Span the Stream Channel



Principle #2 – Set the Elevation Correctly

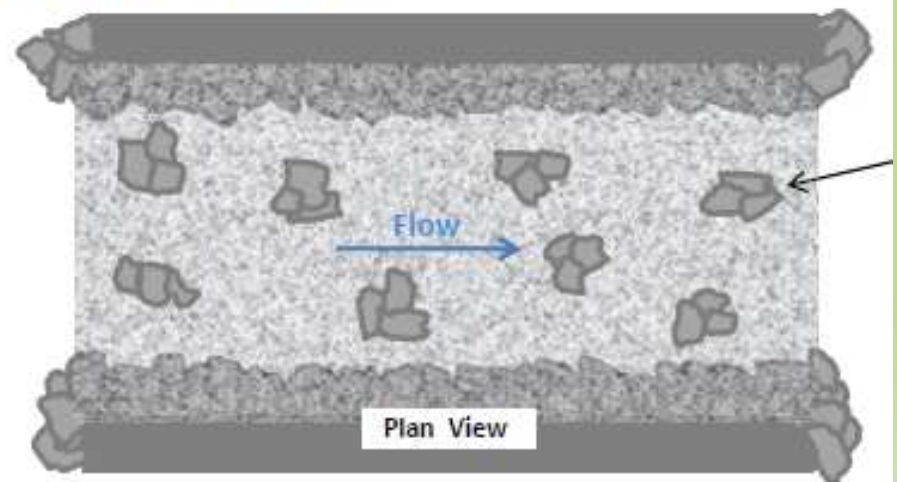


Principle #3 – Slope Matches the Stream

Principle #4 – Substrate in the Crossing



Bed and Bank Schematic:



Banklines are meant to connect to the natural stream banks on both sides upstream and downstream to improve scour protection and terrestrial organism passage. Additional smaller rock and fine material is necessary for filling voids in the larger material to provide a stable bed and banklines. Fines must be watered into bed and banks to fill voids, and to avoid stream flow percolating into bed and banks.

Stream-Smart Crossings...

Allow the stream to act like a stream, passing fish and wildlife as well as the higher flows that come with larger, more frequent storms.



Maintain fish and wildlife habitat while protecting roads and public safety.



FOR MORE INFORMATION:

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