

# Permitting Background and Stream Crossing Rules



Sandy Crystall, PWS  
DES Wetlands Bureau  
Fall 2010

# Overview

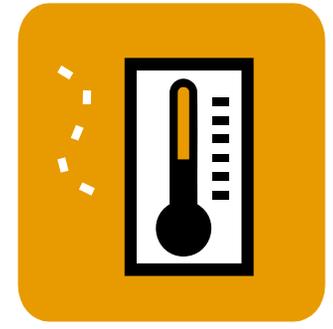
- Background
- Permitting background
- New rules
- Informational resources





# Public Safety

- Recent flood damage
  - Flood Management Study Commission
- Climate change
  - Make the existing built environment better able to handle weather-related impacts.



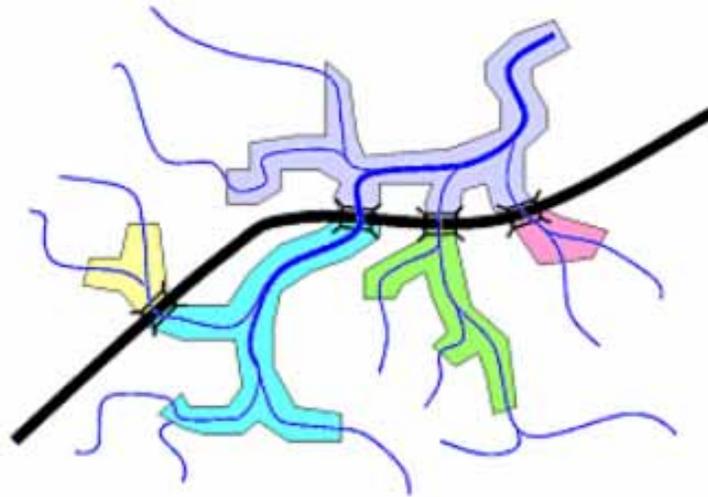
# Environmental Protection

- Eroding crossings degrade surface waters
  - Sediment adds nutrients
  - Accumulation of sediment creates shallow areas → shallow water is warmed → warm water holds less oxygen, which is needed by aquatic organisms.

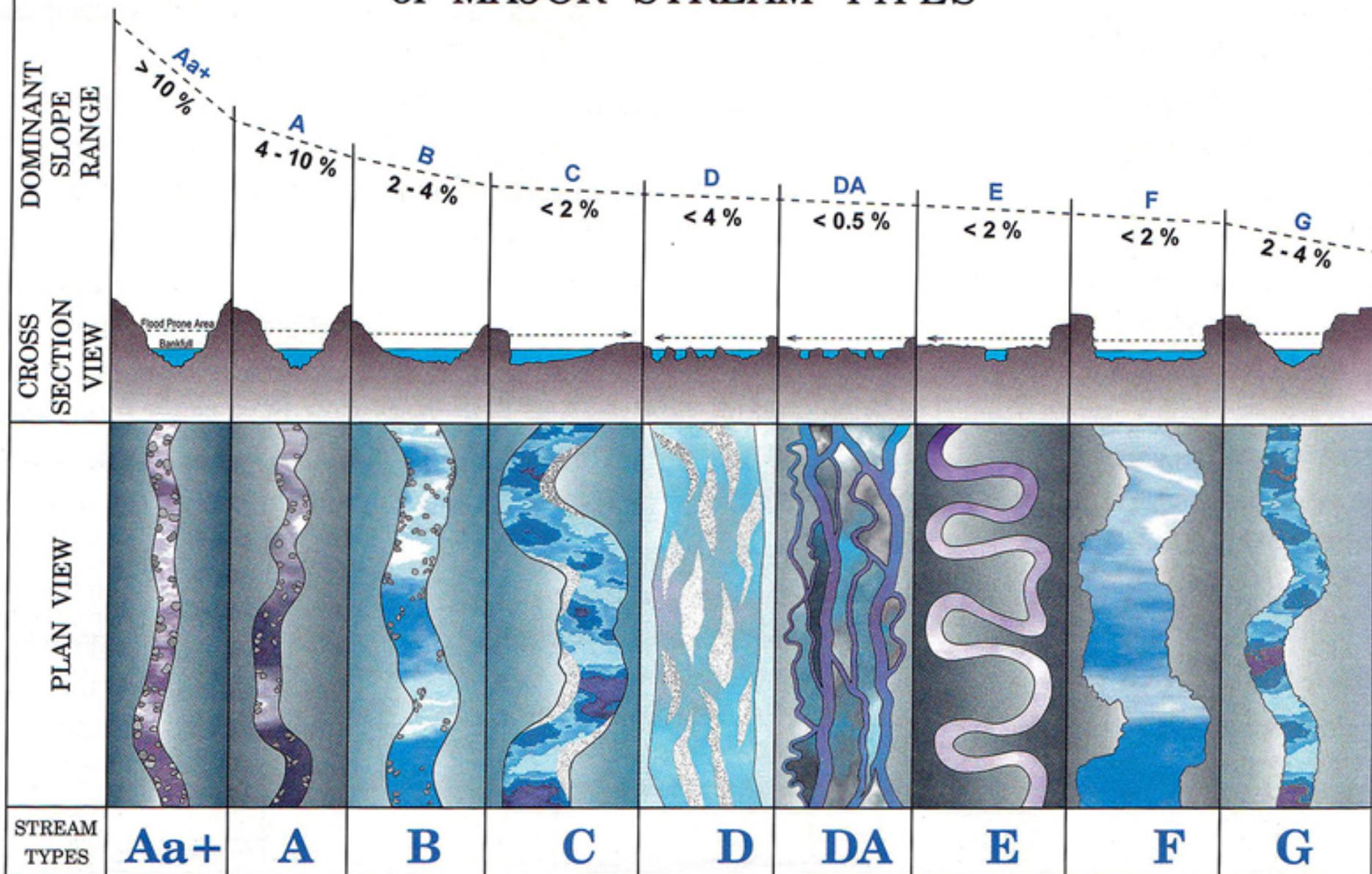


# Stewardship of Natural Resources

- More than **17,000** stream-road crossings
- For viability in fish populations - they must be connected!
  - Many creatures, like mussels, depend on others to move them (larval stage attaches itself to fish)

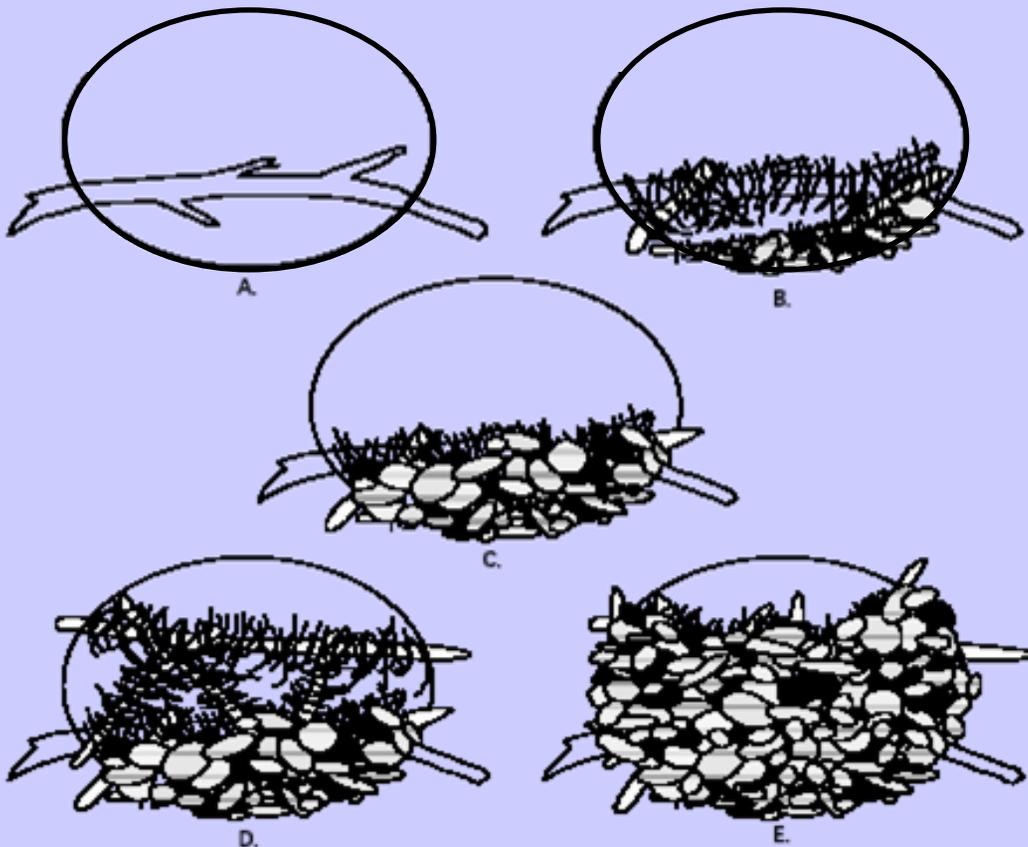


# LONGITUDINAL, CROSS-SECTIONAL and PLAN VIEWS of MAJOR STREAM TYPES



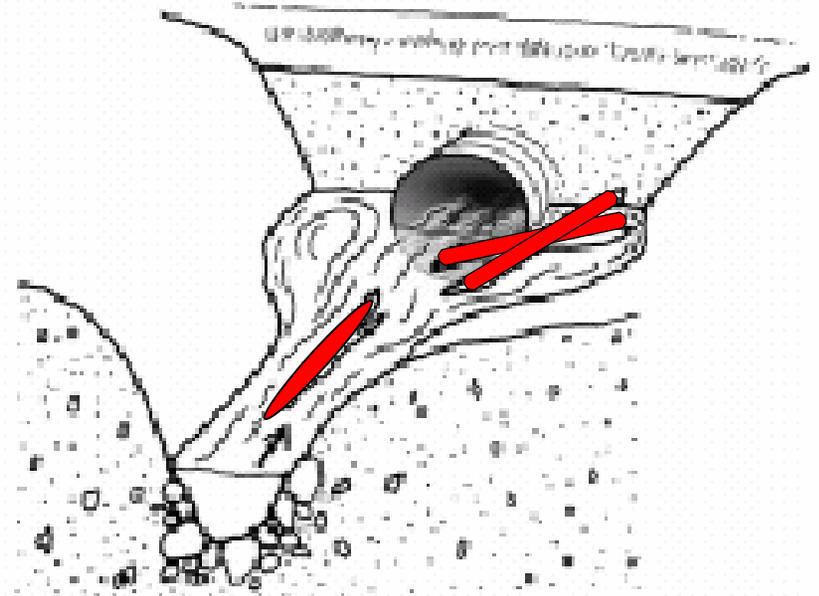
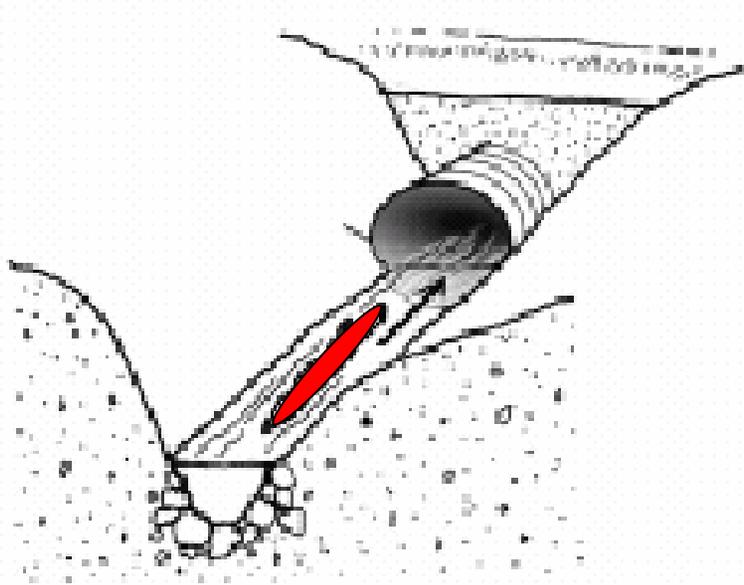
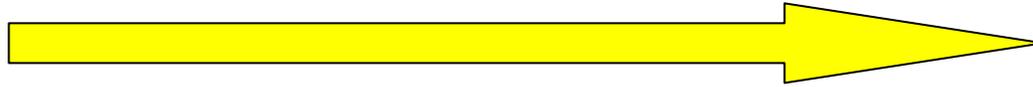
From: Rosgen

# Undersized Culverts (less than bankfull width) Become Blocked by Woody Material, etc.



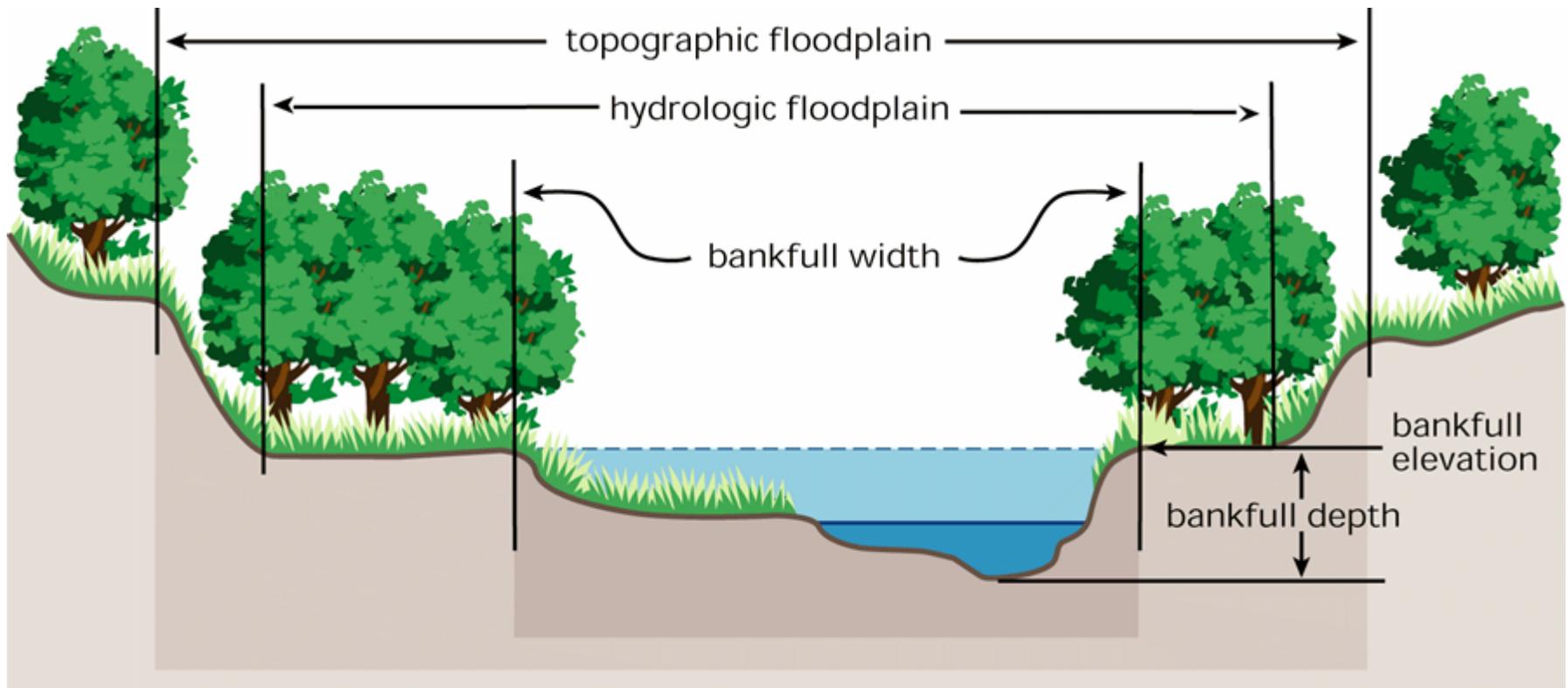
From: *How Culverts Fail*,  
Sam Flanagan,  
NOAA Fisheries

# Increasing Plugging Hazard



# New Definitions: Bankfull flow and width ...

- “Bankfull flow” - the volume of flow in a watercourse at which water begins to overflow into the active floodplain.
- “Bankfull width” - the width of the wetted channel during bankfull flow.



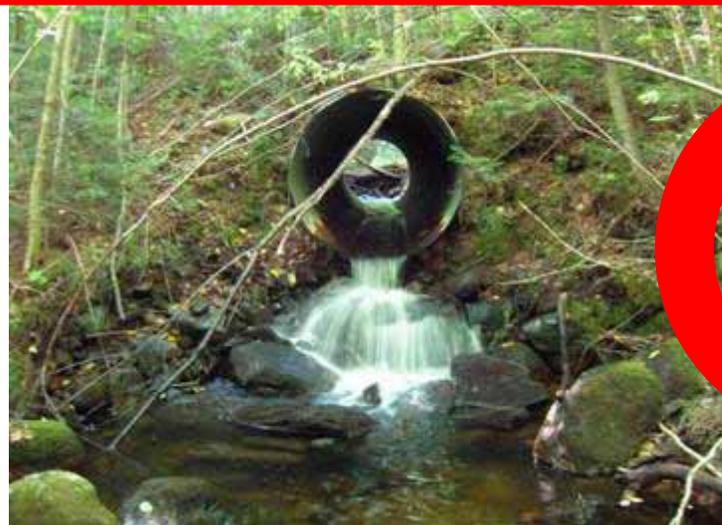
# Corps: NH Programmatic General Permit — Stream Crossings

## 21. Waterway/Wetland Work and Crossings

(a) All temporary and permanent crossings of waterbodies and wetlands shall be suitably culverted, bridged, or otherwise designed to withstand and to prevent the restriction of high flows, to maintain existing low flows, and to not obstruct the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction.

(b) Aquatic Life Movements. No activity may substantially disrupt the necessary life-cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water.

(c) All temporary and permanent crossings of rivers, streams, brooks, etc. (here on referred to as "streams") shall conform to the "New Hampshire Stream Crossing Guidelines" when the State has adopted these guidelines as regulations. The Corps shall review projects under the Minor/Major or IP review procedures if conforming to the Guidelines is impractical. The Guidelines typically require bridge spans, open bottom arches or embedded culverts. Bridge spans are generally preferred.



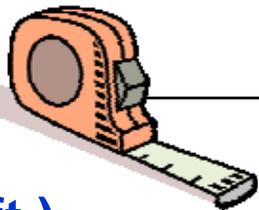


# Timeline: Stream Crossing Rulemaking

- Stream Crossing Guidelines – stakeholder work group (2006-2007)
- Stream Rules Drafting process – stakeholder workgroup (2007- 2008)
- Stream Rules Initial proposal – 6/24/2009 (9/2009)
- Public rulemaking hearings held (5)
- Comment period ended: November 20, 2009
- Extension to file final proposal: January 20, 2010
- DES prepared conditional approval request to allow further clarification to be made to the rules (3/3/10)
- JLCAR hearing (orig 2/19; held 3/5/2010)
- DES response to preliminary objection filed 4/19/10
- JLCAR hearing: May 7 (approved Env-Wt 900)
- JLCAR voting: May 21 (approved Env-Wt 300-500-800)<sup>11</sup>

# Generalized Project Classification Scheme

## Stream Crossing Criteria Not Reflected in Table



	<b>Minimum</b>	<b>Minor</b>	<b>Major</b>
<b>Area</b> (sq. ft.)	< 3,000	3,000 - 20,000	> 20,000
<b>Bank Length</b> (linear feet)	< 50 lf	50 - <200 lf	≥200 lf
<b>Natural Heritage Bureau</b>	Based on NHB & F&G recommendations. Project may justify decrease in classification.		T & E species; Exemplary natural comm.
<b>Type of Work</b>	Repair in-kind for most, seasonal dock	Permanent dock; work in the water	
<b>Protected Resource</b>		Marsh (freshwater)	Tidal wetlands, undeveloped TBZ, prime wetlands and 100' pw buffer, bog



# Permit Applications and Notifications

## Through Municipal Clerk

- Standard Dredge & Fill
- Minimum Impact Expedited
- Minimum Impact Agriculture
- Permit By Notification

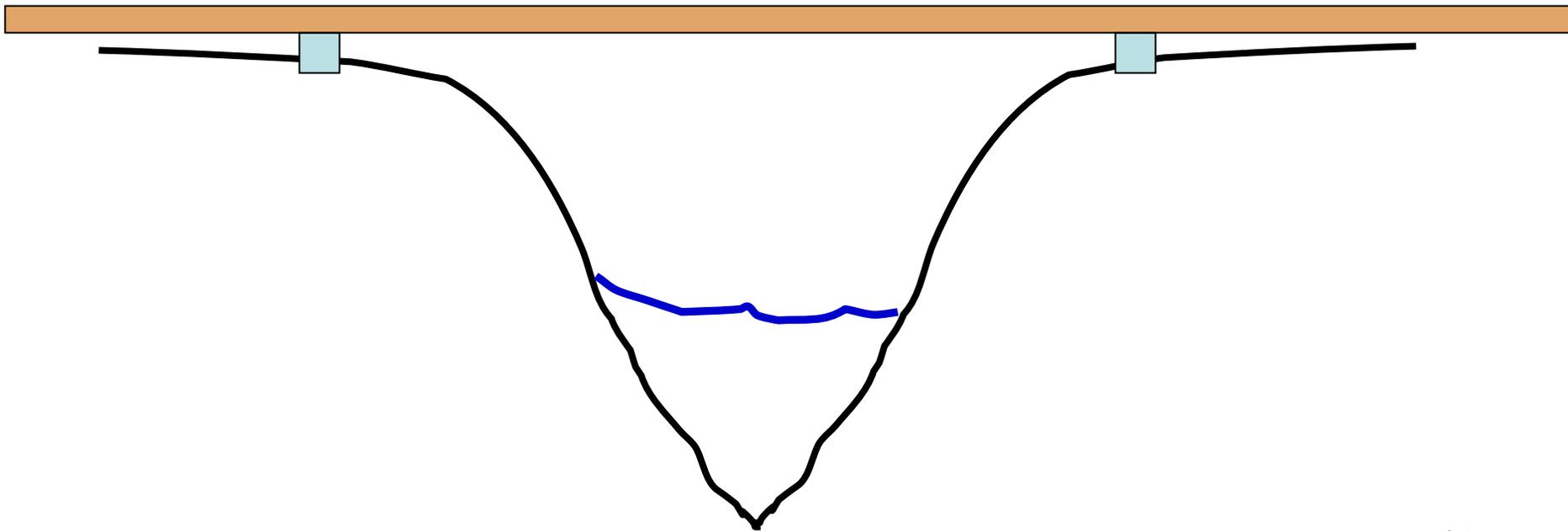
## Directly to DES

- Notification of Routine Roadway & Railway Maintenance Activities
- Notification of Minimum Impact Forestry
- Notification of Minimum Impact Trails
- Seasonal Dock Notification for Lakes & Ponds
- Recreational Mineral Dredging
- Utility Maintenance Notification

# Previous Exemption Clarified

## [Env-Wt 303.05(r)]

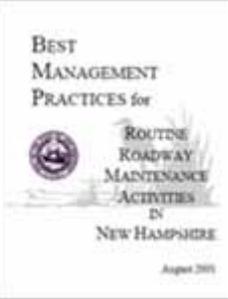
- Any stream crossing built landward of the top of one bank to landward of the top of the opposite bank so as not to impact jurisdictional areas.





# What Has Not Changed

- Routine Roadway and Railway Notification
- Bridge crossings with impacts to banks only
- Wetland crossings for forest management, trails, agriculture



# Notification for Routine Roadway Maintenance: Allowable Projects

- *Locations with single culvert crossings only (max 36")*
- Culvert **Extension** at the same location
  - Up to 10 feet at each end
  - Max **single** culvert crossing of 36"
- Culvert Replacement and **Relocation**
  - Max **single** culvert crossing of 36"
  - Can increase a smaller culvert up to 50% to a max of 36"
- Embankment Stabilization
- Headwall Repair, Replacement and **Construction**
- Roadside Ditch Maintenance and Culvert Cleaning



# Access for Forest Management

## [Env-Wt 303.04(g)]

- Installation of a structure and associated fill to cross wetlands, including streams.
- Roadway width shall not exceed 20 feet; fill width not exceed 50 feet; fill for any single crossing shall not exceed 50 feet in length.
- Wetlands crossings: no standing water for 10 months of the year.
-  Access shall not be used for subdivision, development, or other land conversion to non-forestry uses. Forestry uses may be combined with **normal agricultural operations** or trail construction or maintenance, or both.
- Prime wetland waiver ... RSA 482-A:11, IV(b).

# Forestry: Temporary and Permanent Stream Crossings

[Env-Wt 303.04(g)(6) and Env-Wt 902.21]

## ☀ Temporary Crossings

- May cross a perennial stream or intermittent stream of any width.
- May incorporate one or more in-stream piers or posts
  - Maximum of one pier or post per 15 feet of span.
- May incorporate one or more abutments in the bank(s)
- ... Shall be removed within 2 years ...

## ☀ Permanent Crossings

- Allowed only on a perennial stream or intermittent stream having a scoured channel of 8 feet or less.
- The structure may have one or more abutments in the bank(s).



# Trails: Construction or Maintenance of Crossings [Env-Wt 303.05(y)]

**What:** Construction or maintenance of trails, including construction or maintenance of crossings .

## **Conditions:**

- All work is done in accordance with the *Best Management Practices for Erosion Control During Trail Maintenance and Construction*, N.H. 2004.
- Less than 3,000 square feet of jurisdictional area is impacted per crossing.
- The trail width at the crossing does not exceed 20 feet.
- Each new bridge crossing meets Env-Wt 303.05(h) [impacts limited to the banks and other criteria], OR...

# Trails: Construction or Maintenance of Crossings [Env-Wt 303.05(y)] (cont'd)

- Continued from previous page ...
- ... Any other crossing meets all of the following conditions:
  - Fill width, shall not exceed 50 feet; fill for any single wetland crossing shall not exceed 60 feet in length.
  - Swamps or wet meadows crossed shall have no standing water for 10 months of the year.
  - Must meet minimum criteria for resources, unless a waiver has been granted pursuant to RSA 482-A:11, IV(b) (pw).
- ☀ Any new stream crossing shall cross streams having a **scoured channel of 8 feet or less**; and
- Any stream crossing work that qualifies as minimum impact under Env-Wt 903.01(e)



## Access: Non-commercial Recreation, Normal Agriculture [Env-Wt 303.04(z)]

- Installation of a stream crossing and fill for vehicular access
- Total jurisdictional impact < 3,000 square feet
- Roadway width < 20 feet; Fill width < 50 feet
- Fill for a single wetland crossing < 60 feet in length
- ☀ If using a PBN, watershed area must be less than or equal to 25 acres (Env-Wt 506.04)
- ☀ Activities as described in RSA 21:34-a, including the construction or maintenance of farm roads.  
[www.gencourt.state.nh.us/rsa/html/i/21/21-34-a.htm](http://www.gencourt.state.nh.us/rsa/html/i/21/21-34-a.htm)
- ☀ Normal Agricultural Operations - [Env-Wt 902.12]

# Changes: Permit By Notification [Env-Wt 506.01]

- ☀ No new stream crossings allowed under PBN.
- ☀ Wetland crossings eliminated from PBN.
- ☀ Limited to **repair/ replacement** of a culvert or bridge and associated fill for vehicular access for a single family residence or building lot
  - The contributing watershed is less than or equal to 25 acres
  - Upgraded if necessary to meet the General Design considerations specified in Env-Wt 904.01
  - Meet minimum impact criteria in Env-Wt 303.04(z)
- ☀ *DES will issue guidance regarding use of PBN for repair of parts of certain crossing structures that do not impede flows or impact aquatic life passage.*

DEPARTMENT OF ENVIRONMENTAL SERVICES  
WETLANDS BUREAU  
10 Shaw Drive, 3rd Floor  
Chelsea, MA 02156-2000  
Phone: (617) 725-2100 Fax: (617) 725-2100  
Web site: [www.mass.gov/DES](http://www.mass.gov/DES) Email: [permits@des.state.ma.us](mailto:permits@des.state.ma.us)

Permit By Notification (PBN) Form

Please mail this form to the permit section, 10 Shaw Drive, 3rd Floor, Chelsea, MA 02156-2000.

1. Name of Project (Owner, Applicant, Contractor) \_\_\_\_\_ Date of Application \_\_\_\_\_ Date of Review \_\_\_\_\_ Date of Decision \_\_\_\_\_  
 Project Street Number and other address \_\_\_\_\_ Town/City (Owner Mailing Address) \_\_\_\_\_ State \_\_\_\_\_ Zip code \_\_\_\_\_

2. Name of Applicant \_\_\_\_\_ License plate number \_\_\_\_\_ License for vehicle \_\_\_\_\_ Special Permit status \_\_\_\_\_  
 Applicant Street Number and other address \_\_\_\_\_ Town/City (Owner Mailing Address) \_\_\_\_\_ State \_\_\_\_\_ Zip code \_\_\_\_\_

3. Location of the proposed work \_\_\_\_\_  
 (See additional information on reverse.)

4. Description of the proposed work \_\_\_\_\_  
 Type of work \_\_\_\_\_ Project start \_\_\_\_\_ Project end \_\_\_\_\_  
 Estimated cost \_\_\_\_\_ Estimated cost of other work \_\_\_\_\_  
 Total Method \_\_\_\_\_ Other work \_\_\_\_\_ Estimated cost of other work \_\_\_\_\_  
 Total Method \_\_\_\_\_ Other work \_\_\_\_\_ Estimated cost of other work \_\_\_\_\_

5. Provide a brief description of all proposed work, including the size of the project area to be reviewed.

6. Activity List (Check appropriate boxes for each activity to be reviewed for PBN under 506.01, Chapter 910.11, and 910.12. Check appropriate boxes for each activity to be reviewed for PBN under 506.01, Chapter 910.11, and 910.12. Check appropriate boxes for each activity to be reviewed for PBN under 506.01, Chapter 910.11, and 910.12.)

Activity	Yes	No
1. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
2. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
3. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
4. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
5. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
6. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
7. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
8. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
9. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
10. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
11. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
12. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
13. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
14. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
15. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
16. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
17. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
18. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
19. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
20. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
21. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
22. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
23. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
24. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
25. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
26. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
27. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
28. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
29. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
30. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
31. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
32. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
33. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
34. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
35. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
36. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
37. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
38. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
39. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
40. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
41. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
42. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
43. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
44. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
45. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
46. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
47. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
48. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
49. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>
50. Installation of a new or replacement structure	<input type="checkbox"/>	<input type="checkbox"/>

Page 1 of 2 10-03-2009

# Residential Utility Line Installation

## [Env-Wt 303.04(ae)]

Bring utility services to a single family building lot

- Total jurisdictional impact  $\leq$  3,000 square feet;
- Impact width at the crossing  $\leq$  20 feet;
- ☀ Such projects shall be limited to those that:
  - If crossing a stream, cross channels **< 8 feet wide measured bank to bank**
  - If crossing swamps or wet meadows, cross those that have no standing water for 10 months of the year
- Meet minimum criteria for resources **unless a waiver has been granted pursuant to RSA 482-A:11, IV(b)**

# Significant Sections of Stream Rules

- General Design Considerations  
(Env-Wt 904.01)
- Specific Design Criteria (by Tier)  
(Env-Wt 904.02, 904.03, 904.04)
- Repair/Replacement/Rehab Guidelines (Env-Wt  
904.06, 904.07, 904.08)
- Alternative Designs (Env-Wt 904.09)

*New Hampshire Stream Crossing Guidelines*  
May 2009

# Stream Classification Scheme (gen'l)

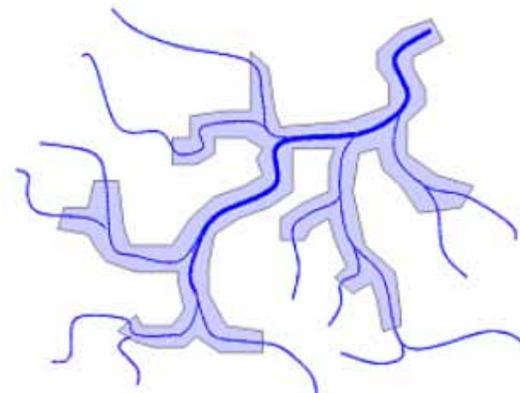
	<b>Minimum</b>	<b>Minor</b>	<b>Major</b>
<b>Tier 1</b> ≤200 ac	Env-Wt 904.02(b); rep/ rehab/repl 904.06(c) or 907.07(c)	Tier 1 alternative design (Env-Wt 904.02(c))	Major under Env-Wt 303.02
<b>Tier 2</b> >200 - <640 ac	Rep/ rehab/repl 904.06(c) or 907.07(c)	New 904.03(b); repl does not meet 904.07; rep or repl under 904.06(d); repl under 904.07(d); minor under 303.03	Major under Env-Wt 303.02
<b>Tier 3</b> ≥640 ac.	May be down- graded per 904.04(b) or (c) for designated river corridor; 305(b); 100-yr floodplain or FEH zone	May be downgraded, per Env-Wt 904.04(b) or (c) for designated river corridor; 305(b); 100-yr floodplain or FEH zone;	New or repl Tier 3, 904.08(b); in desig river corridor; 305(b); pw or pw buffer; NHB; 100-yr floodplain or FEH zone; major under Env-Wt 303.02 <sup>25</sup>

# General Design Considerations (1)

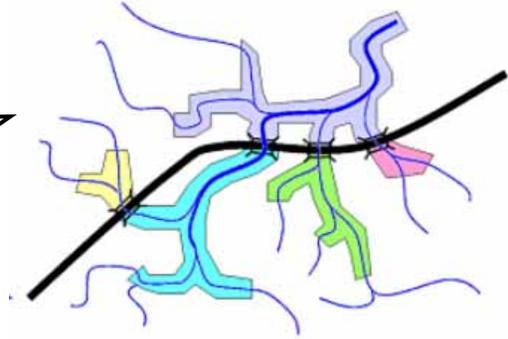
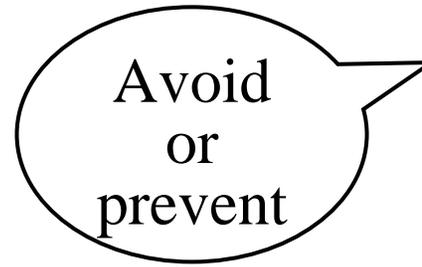
## [Env-Wt 904.01]

Design and construct all stream crossings to:

- Preserve watercourse connectivity where it currently exists
- Restore watercourse connectivity where:
  - Connectivity previously was disrupted as a result of human activity(ies); and
  - Restoration of connectivity will benefit aquatic life upstream and downstream or downstream or both.



# General Design Considerations (2)



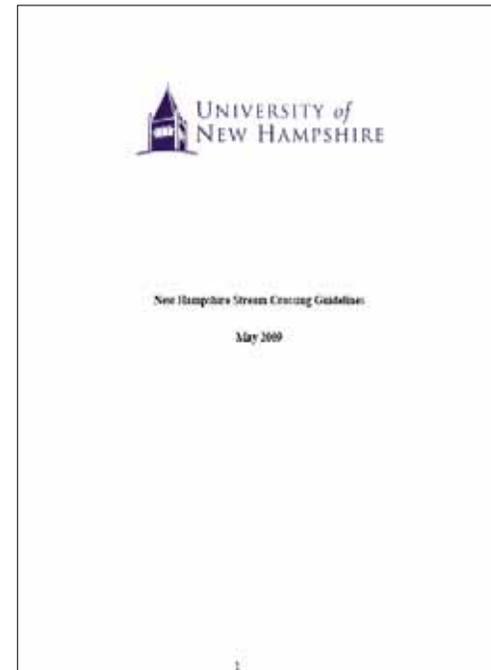
Stream crossings shall:

- Not be a barrier to sediment transport
- Prevent the restriction of high flows and maintain existing low flows
- Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction
- Not cause an increase in the frequency of flooding or overtopping of banks
- Not cause erosion, aggradation or scouring upstream or downstream of the crossing
- Not cause water quality degradation

# NH Stream Crossing Guidelines

## May 2009

- Describes a methodology for designing stream crossings (and crossing replacement).
- Crossing designs are based on engineering analyses and assessments of stream morphology and channel stability.



# NH Stream Crossing Guidelines (cont'd)

May 2009

- Guidelines for New Stream Crossings
  - General Considerations
  - Field Survey Data Collection
  - Data Analysis and Review
  - Applying Geomorphic Characteristics to Structure Designs
  - Special Considerations by Channel Type
- Guidelines for Stream Crossing Structure Replacement
  - General Considerations
  - Field Survey Data Collection Analysis and Review
- Construction
- References
- Definitions

# What is a Tier 1 Crossing?

[Env-Wt 904.02]



- Does not qualify for any non-tier criteria
- Contributing watershed  $\leq 200$  acres
- Does not have any of the resource characteristics in Env-Wt 904.04(a)(2)-(6)

# What is a Tier 2 Crossing?

[Env-Wt 904.03]



- Does not qualify for any non-tier criteria
- Contributing watershed > 200 acres and < 640 acres
- Does not have any of the resource characteristics in Env-Wt 904.04(a)(2)-(6)

# What is a Tier 3 Crossing?

[Env-Wt 904.04]

- Contributing watershed  $\geq 640$  acres, OR
- Special resource [Env-Wt 904.04(a)(2)-(6)]:
  - Impaired water per 305(b) report \*
    - Not attaining surface water quality standards for aquatic life (Benthic macroinvertebrate index of biological integrity (IBI); Fish assemblage index of biological integrity; Habitat assessment; Stream channel stability
  - Within 100-year flood plain or fluvial erosion hazard zone \*
  - Threatened or endangered species or exemplary natural community \*
  - Prime wetland
  - Designated river corridor
  - Otherwise classified as major (Env-Wt 300)



# New Tier 1 Crossings - Design Criteria

## **General design considerations** in Env-Wt 904.01, **plus:**

- Accommodate the greater of the 50-year frequency flood, or applicable federal, state or local requirements
- Closed or open-bottomed structures
- Alternative design must be submitted for approval by DES (see Env-Wt 904.09); **changes classification to minor project**
- **No** PE Stamp is required

# New Tier 2 Crossings - Design Criteria

## [Env-Wt 904.05]

- In accordance with NH Stream Crossing Guidelines
- Crossings must:
  - Carry water depths and velocities comparable to natural channel upstream and downstream of crossing.
  - Provide vegetated bank on both sides of watercourse for wildlife passage
  - Preserve alignment and gradient of channel and accommodate functioning of natural floodplain
  - Accommodate 100-year flood
  - Not alter stream's ability to carry sediment (sediment transport competence)
- Span or open-bottomed culvert with stream simulation
- PE stamp required

# Tier 3 Crossings - New (and Replacement) Design Criteria [Env-Wt 904.05]

- In accordance with NH Stream Crossing Guidelines
- Crossings must:
  - Carry water depths and velocities comparable to the natural channel upstream and downstream of the crossing
  - Provide vegetated bank on both sides of the watercourse for wildlife passage
  - Preserve alignment and gradient of channel and accommodate functioning of natural floodplain
  - Accommodate 100-year flood
  - Not alter stream's capacity to carry sediment (sediment transport competence)
- Span or open-bottomed culvert with stream simulation
- PE stamp required

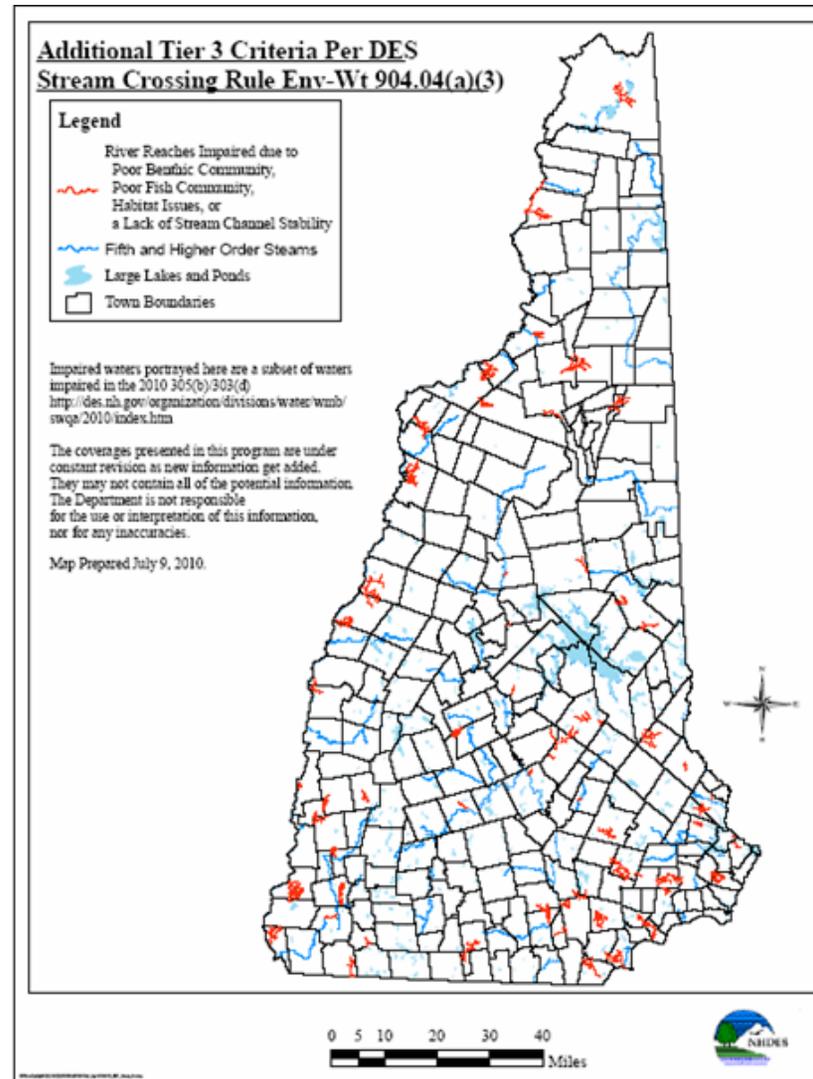
# Alternative Designs [Env-Wt-904.09]

- The applicant shall propose an alternative design if installing the structure specified in the applicable rule is not ***practicable***.
  - Applies to existing AND new crossings
  - Submit a written request
  - Submit a technical report prepared by an environmental scientist or PE
  - Report explains how the proposed alternative meets the criteria for approval.
- **Practicable:**

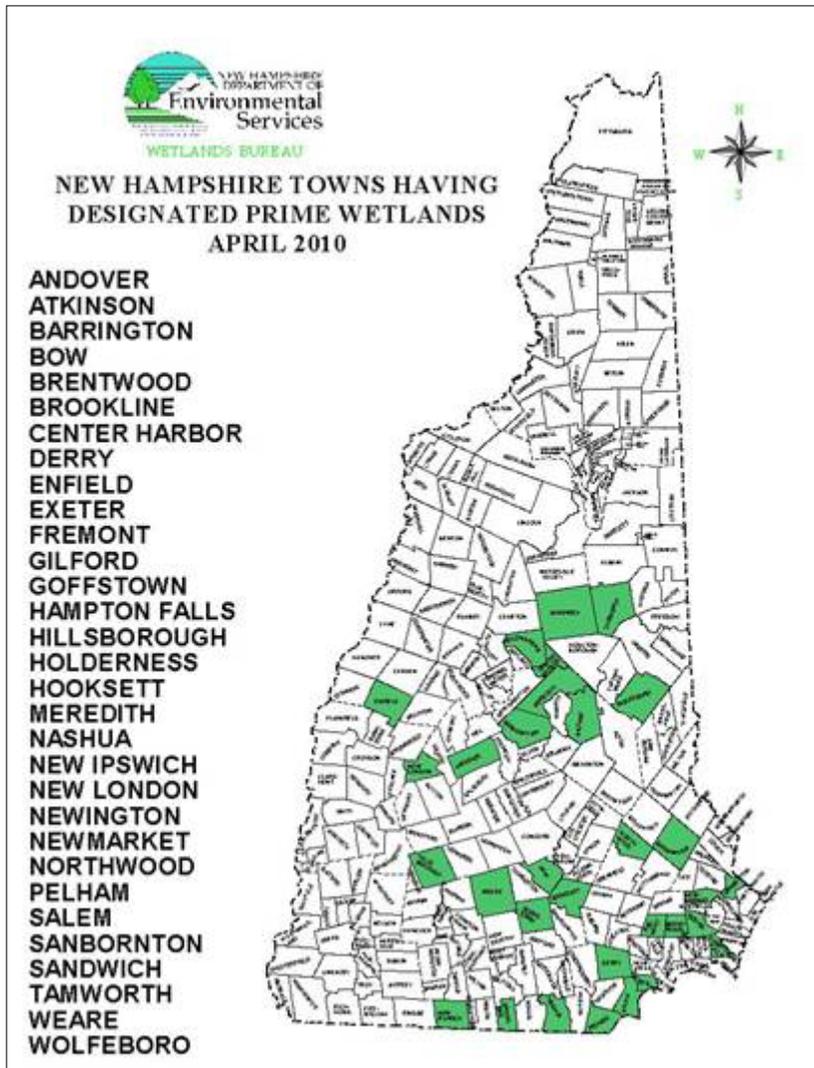
“available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.”

# Additional Criteria in Env-Wt 904.04(a)(3) for Classifying as Tier 3 Stream Crossing

- Watercourse that is listed on the surface water assessment 305(b) report in effect at the time of application as not attaining surface water quality standards for aquatic life based on one or more of the following:
  - a. Benthic macroinvertebrate index of biological integrity;
  - b. Fish assemblage index of biological integrity;
  - c. Habitat assessment; or
  - d. Stream channel stability



# Municipally Designated Prime Wetlands



- Communities with designated prime wetlands: 31
- 100 ft. prime wetland buffer



# NHB review for rare, threatened or endangered species and exemplary natural communities documented near your proposed project

an official **NEW HAMPSHIRE** government website

## Natural Heritage Bureau

Public | Government | Private Industry | Search

### ■ NHB DataCheck Tool: Sign In

#### New to NHB DataCheck?

Using this Tool, a project planner may:

1. Locate and Draw a project on an interactive map
2. Check the project area for NHB records.
3. Depending on the results of the data check:
  1. Save or print a NHB letter (no records found nearby); or
  2. Request a further check by NHB (records found nearby).

#### Need Help?

[Click here](#) to view the help document. The help document may also be viewed by clicking on the wildflower in the upper left corner of any page in the NHB DataCheck Tool.

Enter as Guest\*

OR

#### Existing Users

Please enter your Email Address, User Name and Password to sign in.

**NHB DataCheck Tool: Map Project**

On Click: Map Project Boundary

**MAP PROJECT BOUNDARY**

Drawing project area boundary . . .  
Vertices added: 8

Use <SHIFT>-click to automatically close and complete the boundary.

Click on **Cancel** to cancel and stop drawing and start over.

Cancel

Map X: 1030843.605 Map Y: 260444.4233 Map Scale = 1:12,237  
Image X: 359 Image Y: 5

# Designated River Corridor

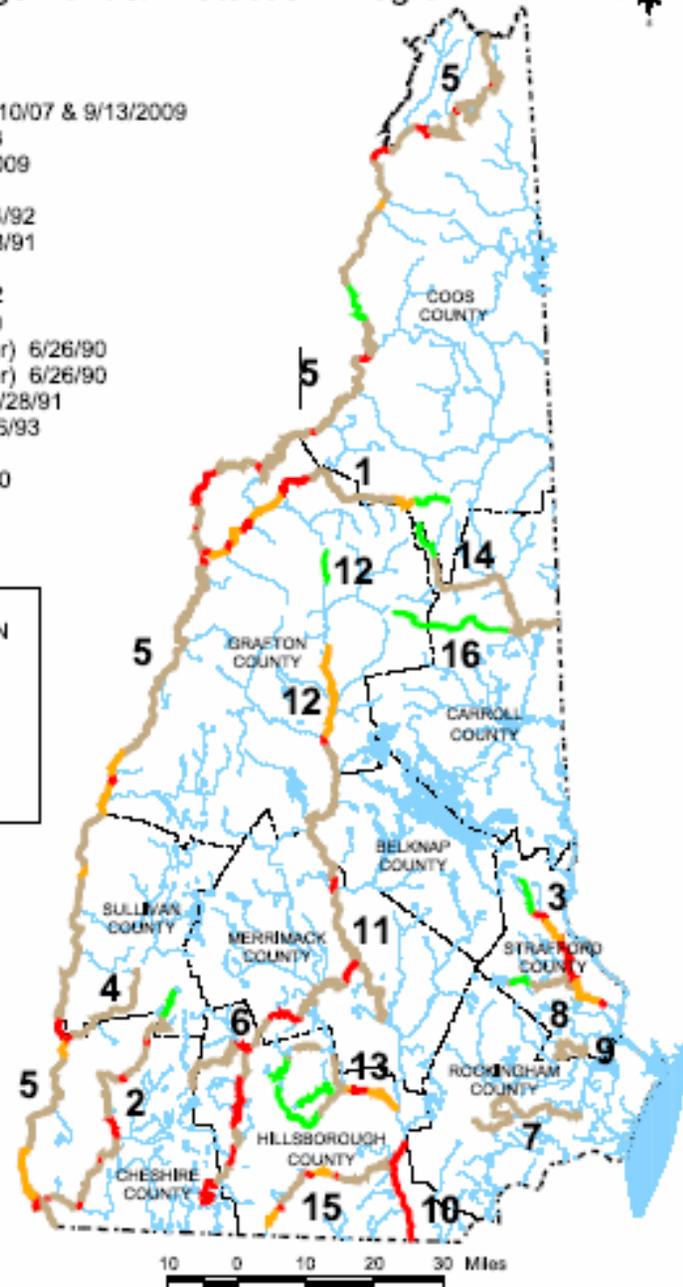
The river and the land area located within a distance of 1,320 feet of the normal high water mark or to the landward extent of the 100-year floodplain as designated by the FEMA, whichever distance is larger.  
(See RSA 483:4, XVIII)

## DESIGNATED RIVERS

NH Rivers Management & Protection Program

### Designated Rivers

1. Ammonoosuc River 8/10/07 & 9/13/2009
2. Ashuelot River 6/07/93
3. Cochecho River 7/21/2009
4. Cold River 7/20/99
5. Connecticut River 7/14/92
6. Contoocook River 6/28/91
7. Exeter River 8/11/95
8. Isinglass River 6/30/02
9. Lamprey River 6/26/90
10. Merrimack River (Lower) 6/26/90
11. Merrimack River (Upper) 6/26/90
12. Pemigewasset River 6/28/91
13. Piscataquog River 7/16/93
14. Saco River 6/26/90
15. Souhegan River 5/28/00
16. Swift River 6/26/90



# Repair/Replacement/Rehab Guidelines (Env-Wt 904.06, 904.07, 904.08)



# Existing Crossing: Key Information that Affects Project Classification

- Is there any history of the existing crossing causing or contributing to flooding that has damaged the crossing or other infrastructure?
  - Note presence or absence of flooding that meets this criterion



# Existing Stream Crossings - Tier 1 In-Kind Replacement [Env-Wt 904.07]

- Consider as **minimum impact** if:
  - **No** history of culvert causing or contributing to flooding that damages the crossing or other infrastructure.
  - Crossing shall be:
    - Same size and type of existing crossing, or
    - Upgrade (such as replace closed-bottom culvert with a crossing that has stream simulation)
  - Must meet General Design Considerations (Env-Wt 904.01)
  - Not diminish hydraulic capacity of crossing
  - Not diminish capacity of the crossing to accommodate aquatic life passage

# Existing Stream Crossings - Tier 1 Repair or Rehabilitation [Env-Wt 904.06] (1)

- Consider as minimum impact if:
  - **No** history of culvert causing or contributing to flooding that damages the crossing or other infrastructure.
  - Must meet General Design Considerations (Env-Wt 904.01)
  - Cannot diminish hydraulic capacity of crossing
  - Cannot diminish capacity of the crossing to accommodate aquatic life passage

# Existing Stream Crossings - Tier 1

## Repair or Rehabilitation [Env-Wt 904.06] (2)

- If history of culvert causing or contributing to flooding that damages the crossing or other infrastructure.
  - Crossing will be classified as minor project (and meet other standards), if:
    - Repaired or rehabilitated crossing will:
      - Not adversely impact stability of stream banks or bed
      - Not cause increase in frequency of flooding or overtopping of banks

# Existing Stream Crossings - Tier 2 In-Kind **Replacement** or **Repair/Rehab** [Env-Wt 904.06 and .07]

- Consider as **minimum** impact if:
  - No history of culvert causing or contributing to flooding that damages the crossing or other infrastructure.
  - Crossing shall be:
    - Same size and type of existing crossing, or
    - Upgrade (such as, replace closed-bottom culvert with a crossing that has stream simulation)
  - Must meet general criteria (Env-Wt 904.01)
  - Not diminish hydraulic capacity of crossing
  - Not diminish capacity of the crossing to accommodate aquatic life passage
  - PE stamp required

# Existing Stream Crossings - Tier 2

## Repair or Rehabilitation [Env-Wt 904.06] (2)

- If history of flooding that has damaged culvert or other infrastructure
  - Crossing will be classified as **minor** project (and meet other standards), if:
    - Repaired or rehabilitated crossing will
      - Not adversely impact stability of stream banks or bed
      - Not cause increase in frequency of flooding or overtopping of banks
  - PE Stamp required

# Existing Stream Crossings - Tier 3 **Replacement** [Env-Wt 904.08]

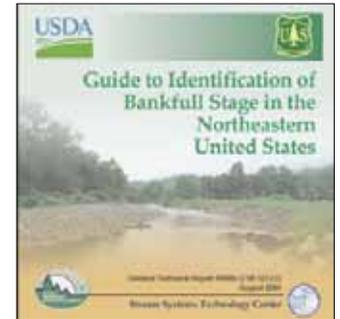
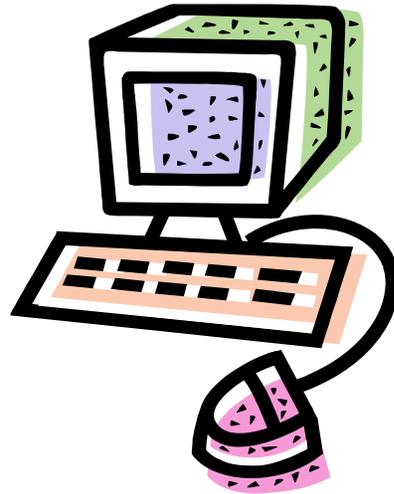
- Provide an assessment of the geomorphic compatibility of the existing stream crossing
- Comply with Specific Design Criteria in Env-Wt 904.05
- PE Stamp required
- *Alternative design* (Env-Wt 904.09)

# Application Information For Stream Crossing Projects [Env-Wt 903.03]

Includes ...

- Approximate boundaries and size of the contributing watershed
- Plans
- Streambed details with figures
- Existing crossing information
- Footings
- Structural details
- Construction sequence including dewatering system and erosion and pollution controls
- Tier 3 - Major projects: stream bed materials, channel information, pebble count, hydraulic calculation for bypass pipe or channel

# Informational Resources for Stream Crossing Projects



# USGS's StreamStats for New Hampshire

[water.usgs.gov/osw/streamstats/new\\_hampshire.html](http://water.usgs.gov/osw/streamstats/new_hampshire.html)

- Identify the contributing watershed boundary and size
- Estimate the long-term flood discharges at recurrence intervals of 2, 5, 10, 25, 50, 100 and 500 years for ungaged, unregulated, rural streams.
- Limitations on discharge estimates

**USGS**  
science for a changing world

USGS Home  
Contact USGS  
Search USGS

Best viewed in Internet Explorer 5 or above  
Screen resolution of 1152x864 or greater, with pop-up blocker disabled

## Welcome to StreamStats

[Home](#)  
[News](#)  
[StreamStats Description](#)  
[Ungaged Sites](#)  
[Data Collection Stations](#)  
[StreamStats Limitations](#)  
[State Applications](#)  
[USGS Station Statistics](#)  
[User Instructions](#)  
[Definitions](#)  
[Basin Characteristics](#)  
[Streamflow Statistics](#)  
[StreamStats Fact Sheet](#)  
[Frequently Asked Questions](#)  
[Talks and Other Info](#)  
[Contact StreamStats Team](#)  
[Current Streamflow Conditions](#)

### New Hampshire

**Attention!**

The application for this State is based on StreamStats version 2. Please read the new [User Instructions](#) for this application before attempting to use it. The new network navigation and estimating flows based on similar pages, have not yet been implemented in this state. These processes will be added in the near future.

Please help us conserve our server system resources and **close** the Interactive Map window when you are finished using it. Doing so will help ensure system availability for all users. Thank you.

Also, please [bookmark this page](#), rather than the Interactive Map page, since the URL for the interactive map may change in the future.

**We want your feedback!** Please send any comments or questions that you have on StreamStats to the StreamStats development team at [GS-W\\_StreamStats@usgs.gov](mailto:GS-W_StreamStats@usgs.gov).

StreamStats for New Hampshire can be used to estimate the long-term flood discharges at recurrence intervals of 2-, 5-, 10-, 25-, 50-, 100-, and 500-years for ungaged, unregulated, rural streams. The report below presents the equations used to estimate the flow statistics, describes the errors associated with the estimates, and describes the methods used to develop the equations and to measure the basin characteristics used in the equations. Users should familiarize themselves with the report before using StreamStats to obtain estimates of streamflow statistics for ungaged sites.

- [Olson, S.A., 2009, Estimation of flood discharges at selected recurrence intervals for streams in New Hampshire, U.S. Geological Survey Scientific Investigations Report 2009-5206, 57 p.](#)

The above report describes a technique for estimating flood discharges at selected recurrence intervals for an ungaged site upstream or downstream from a streamgauge using a drainage-area adjustment that is not implemented in StreamStats. Interested users should refer to the report for information on use of the method. StreamStats includes a different method for making such adjustments.

StreamStats reports the uncertainty of the estimates for ungaged basins with drainage areas between 0.70 and 1,290 mi<sup>2</sup>; mean April precipitation between 2.79 and 6.23 inches, percentages of wetlands between zero and 21.8, and main channel slopes between 5.43 and 543 feet per mile. Errors for basins with basin characteristics that are beyond these bounds are unknown.

[Interactive Map](#)

StreamStats for New Hampshire was developed in cooperation with the [New Hampshire Department of Transportation](#).

[Contact Us](#) if you experience any problems with this application.

Accessibility FOIA Privacy Policies and Notices  
U.S. Department of the Interior | U.S. Geological Survey  
URL: <http://streamstats.usgs.gov/>  
Page Contact Information: [GS-W\\_Streamstats@usgs.gov](mailto:GS-W_Streamstats@usgs.gov)  
Page Last Modified: Wednesday, 23-Dec-2009 13:29:23 EST

USA.gov

**USGS**  
New Hampshire Streamstats



Zoom To: 1:69,441

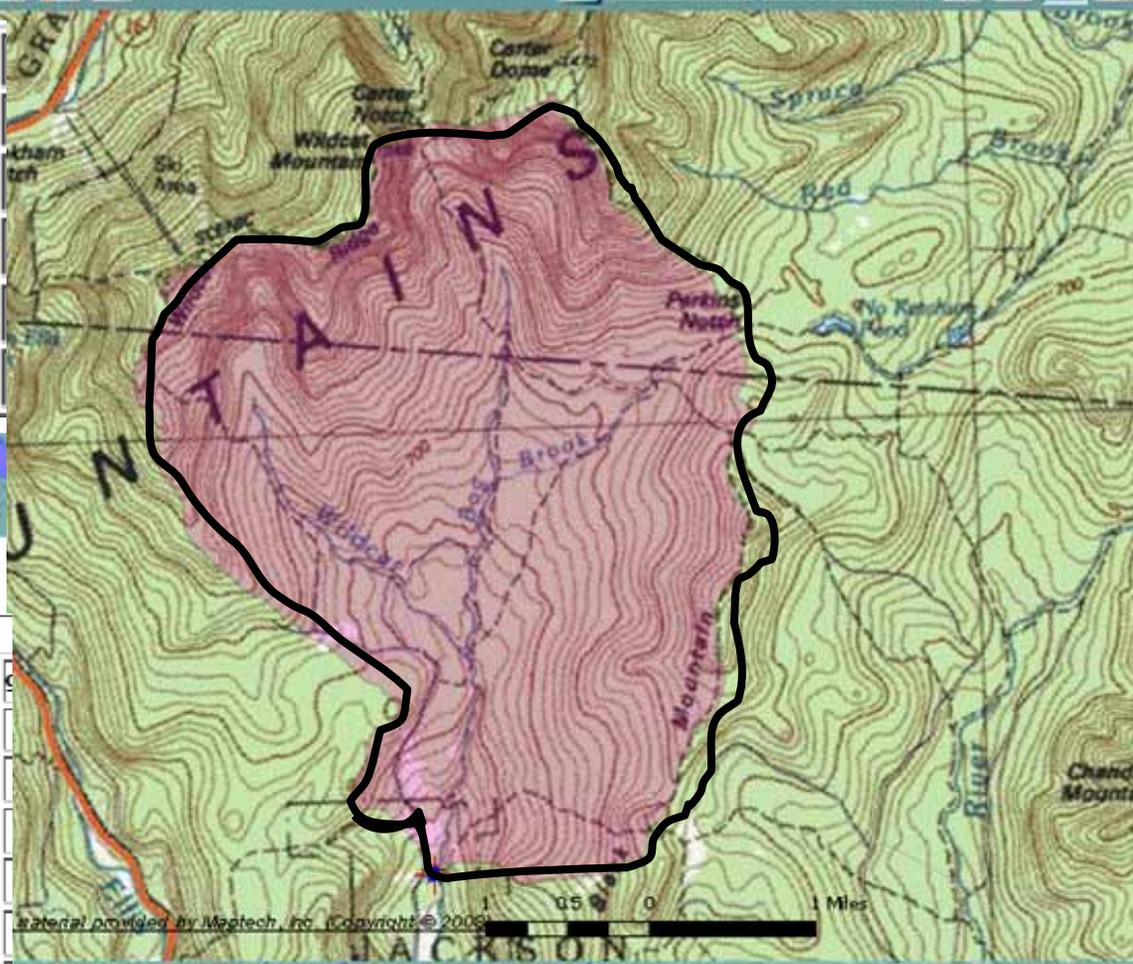
Parameter	Value
Drainage Area (square miles)	12
Mean April Precipitation (inches)	5.334
Percent Wetlands (dimensionless)	0.0340
Stream Slope 10 and 85 Method (feet per mi)	351

**USGS**  
New Hampshire StreamStats

Streamstats Ungaged Site Report

Peak Flows Region Grid Streamflow Statistics

Statistic	Flow (ft <sup>3</sup> /s)	Prediction Error (percent)	Equivalent years of record
PK2	1150	30	3.2
PK5	2020	31	4.7
PK10	2740	32	6.2
PK25	3690	34	8
PK50	4460	36	9
PK100	5370	39	9.8
PK500	7460	44	11



and Notices

# Information Resources: Flood Maps

- New Hampshire GRANIT Flood Insurance Study (FIS) and Digital Flood Insurance Rate Maps (DFIRMs) repository

[www.granit.unh.edu/dfirms/](http://www.granit.unh.edu/dfirms/)

- National Flood Insurance Program Community Status Book (Determine the date of the currently effective map for the community)

<http://www.fema.gov/cis/NH.pdf>

- Mapping Information Platform

[hazards.fema.gov/femaportal/wps/portal](http://hazards.fema.gov/femaportal/wps/portal)

- FIRMette -Web or Desktop based “Map Service Center”

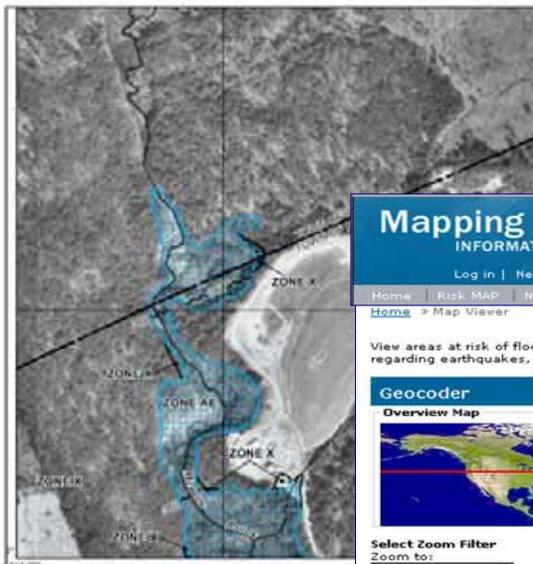


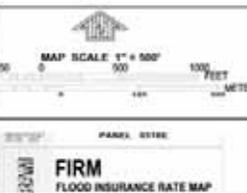
# FEMA FIRMette as Created Online or Flood map “Data Mapper”


MSC Viewer

Save your FIRMette

Back





**Mapping INFORMATION PLATFORM**

Log in | Need an Account? | FEMA Dictionary | MIP Help?

Home | Risk MAP | News & Events | Tools & Links | **Map Viewer** | MIP User Care

Home > Map Viewer

View areas at risk of floods in the United States and territories. Search by address, state or zip code or use advanced search options such as coordinates and map scales. [View data from 2002 and earlier](#) regarding earthquakes, hurricanes and other hazards.

**Geocoder**

Overview Map



Select Zoom Filter

Zoom to:

Street Address

Street:

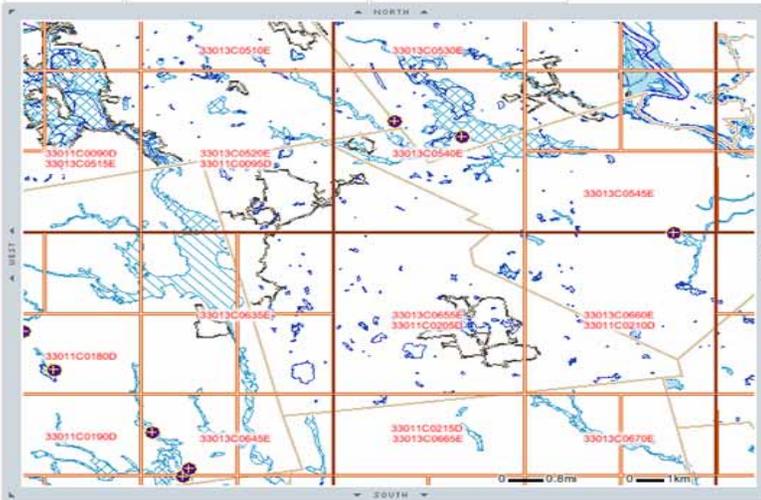
City:

State: ZIP Code:

Zoom Map

**Flood Map Viewer**

File Navigation Quick Zoom



Road data from 1984-2008 TeleAtlas, Rel. 05/2007

To show DEFAULT view, click here [Default View](#)

**Map Legend**

Click "+" button to see a list of map layers that can be displayed

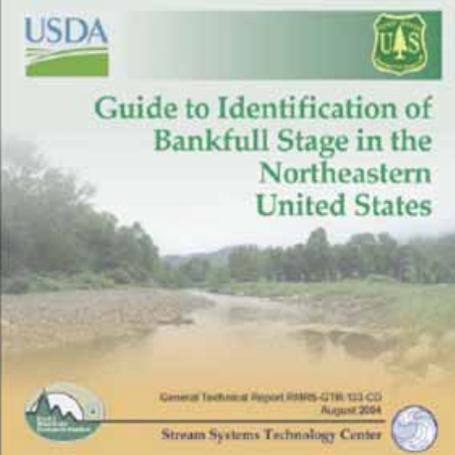
Click on a check box to add or remove a layer

Click "Refresh Map" button to update the map

Refresh Map

Legend Identify

- Flood Data
  - DFIRM Data Availability
- FEMA Boundaries
- National Flood Hazard Layer
  - Political Jurisdictions
  - Water Body
  - PLSS Sections
  - PLSS Township Range Lines
  - Floodways
  - Flood Hazard Zone Boundaries
  - Flood Hazard Zones
    -  Zone A
    -  Zone AE
    -  Zone AH
    -  Zone AO
    -  Zone AR
    -  Zone AM
    -  Zone V
    -  Zone VE
    -  Zone D
    -  0.2% Annual Chance Flood Hazard Zone



# A Guide to Identification of Bankfull Stage in the Northeastern U.S.

- USDA Forest Service  
Stream Systems Technology Center  
[www.stream.fs.fed.us/publications/videos.html](http://www.stream.fs.fed.us/publications/videos.html)

OR

- The 4-disc NE Bankfull Training CDs (or single DVD) are now available from the Stream Systems Technology Center.  
[rmrs\\_stream@fs.fed.us](mailto:rmrs_stream@fs.fed.us)



- DES Home
- About DES
- Media Center
- Public
- Government
- Business
- Programs
- Rules/Regulatory
- Contact Us
- Site Map

[Divisions](#) > [Water Division](#) > [Programs/Bureaus/Units](#) > [Wetlands Bureau](#) >

## Streams and Stream Crossings



Streams are important homes to fish and other aquatic animals that travel the flowing waters to obtain food, spawn, and reach high quality habitat. These flowing waters carry, nutrients, sediment, and organic materials to reaches downstream – ultimately the Atlantic Ocean. Across the state, there are at least 17,000 road-stream crossings, some of which have created obstructions to the adequate passage of flow, sediment, and wildlife.

New Hampshire is undertaking a variety of efforts to address the impacts of culverts on river systems and habitat and public safety. DES is proposing changes to rules for the permitting of structures for stream crossings, providing guidance for the design of such crossings, and offering training to those designing, constructing, and maintaining such crossings. The goals of the program are to provide for aquatic organism passage during high and low flow conditions and to maximize the passage of high flows, particularly floodwaters, so that losses to infrastructure and adjacent property and public safety are minimized.

[New Hampshire Stream Crossing Guidelines](#)

### Rulemaking

- Recently adopted stream crossing rules

### Education/Outreach

DES will post upcoming training events related to the new Stream Crossing Rules. If you are interested in sponsoring or attending an event, send an email request to: [netmail@des.nh.gov](mailto:netmail@des.nh.gov).

### Resources

#### Determining Watershed Boundaries

- USGS's StreamStats for NH

#### Fluvial Erosion Hazards

- Fluvial Erosion Hazards and River Geomorphic Assessment Program (Fact Sheet CO-GEO-10)
- Fluvial Erosion Hazards and Geomorphic Assessments in New Hampshire (7.7MB)
- RSA 674:56 Flood Hazards - Authorizing fluvial erosion hazard ordinances

#### Fluvial Geomorphology

- Fluvial Geomorphology Training Module - State University of New York College of Environmental Science and Forestry
- EPA Watershed Academy - Fundamentals of the Rogen Stream Classification System
- Identification of Barical Stage: Videos, CDs, and DVDs
- U.S. Forest Service Stream Systems Technology Center
- Vermont Geomorphic Assessment
- Guidelines for Naturalized River Channel Design and Bank Stabilization (Publication R-WD-06-37)

#### New Hampshire Studies

- Scientific Basis of Road-Stream Crossings Assessments in the Ayuhewok River Watershed
- River connectivity restoration priorities in High Quality Subwatersheds in Southwest New Hampshire
- Fluvial Geomorphology Assessment of Northern Connecticut River Tributaries - Final Report
- Exeter River Geomorphic Assessment and Watershed-based Plan - Fordway Brook, Upper Exeter River, Dudley-Bloody Brook, and Lower Exeter River
- Exeter River Geomorphic Assessment and Watershed-based Plan - Middle Exeter River

#### Stream Simulation

- Design and Construction of Aquatic Organism Passage at Road-Stream Crossings: Construction Challenges and Case Studies of Stream Simulation Structures for Aquatic Organism Passage
- Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings
- Water-Road Interaction Technology Series Documents

#### Aquatic Organism Passage

- The Vermont Stream Aquatic Organism Passage Program - Trail

search DES

#### Wetlands Bureau

- Program Home
- HAT Topics
- Publications
- Rules/Regulatory
- Education/Outreach
- Technical Assistance
- Forms/Applications
- Permits
- Related Programs
- Partnerships
- Resources/Links
- Contact Us

#### Water Division

- Water Home
- Division Overview
- Programs/Bureaus/Units
- Rules/Regulatory
- Publications

#### The Department

- Commissioner's Office
- Air Resources Division
- Waste Management Div.
- Water Division
- Councils and Boards

July 2010						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31



[Beach Advisory](#)  
[Drinking Water Advisory](#)



# For More Information



Sandy Crystall  
(603) 271-2147

[wetmail@des.nh.gov](mailto:wetmail@des.nh.gov)

---

---