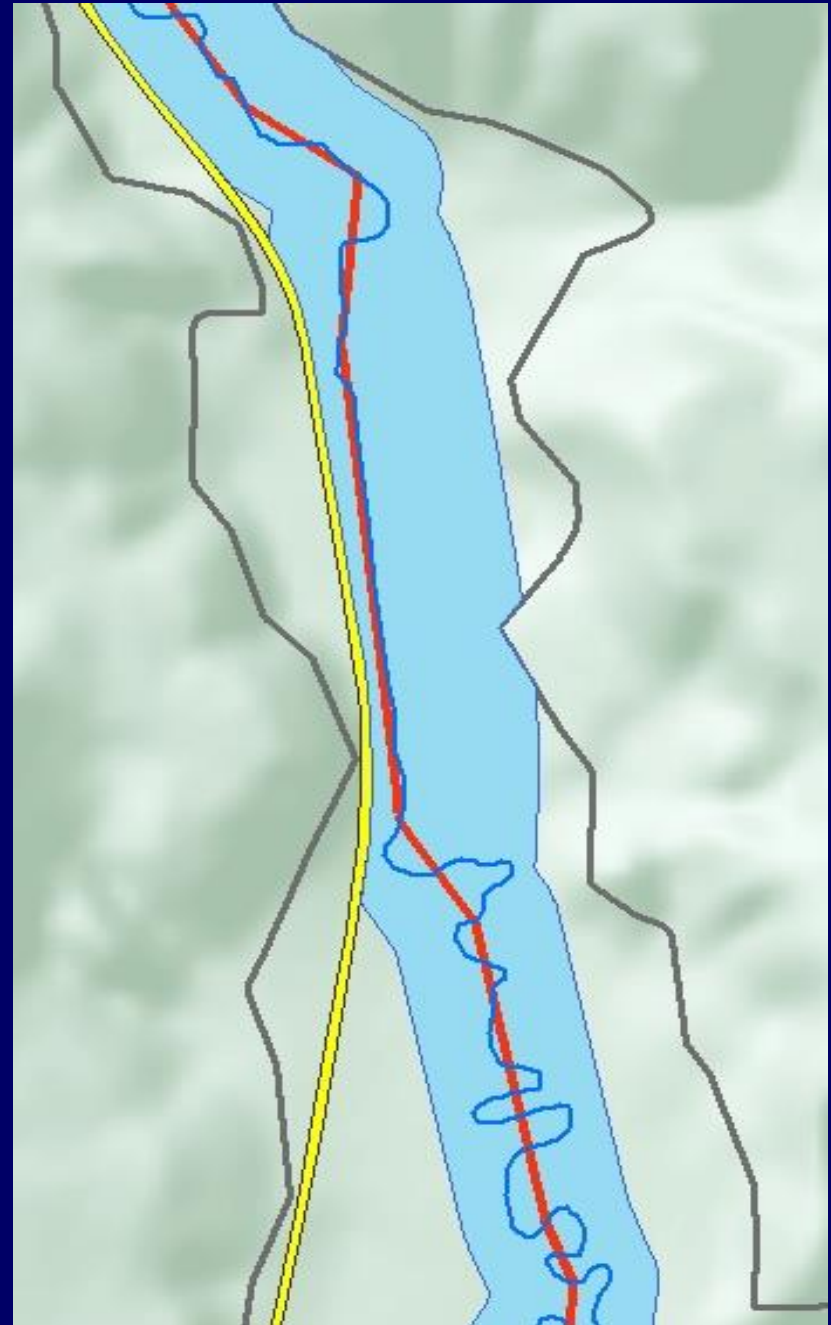


# River Corridor Mapping and Policy

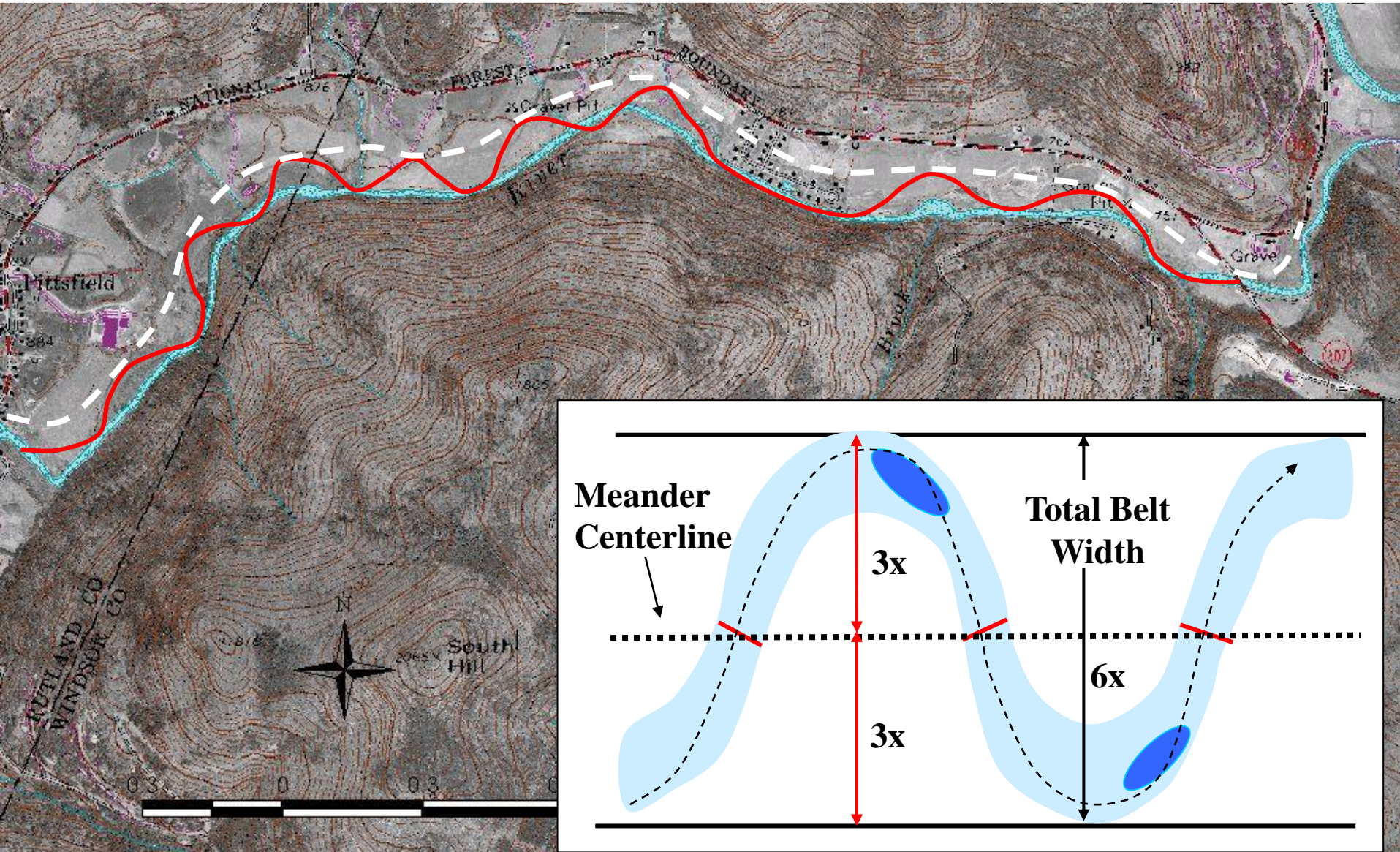
- Purpose of River Corridors
  - Minimize public safety and erosion hazards at adjacent and downstream properties.
- River Corridor Mapping
  - Delineate with mapping standards that are science-based, consistently applied, and periodically revised.
- River Corridor Policy
  - Apply a *No Adverse Impact Standard* with options for technical site reviews, mapping appeals and exceptions for infill / redevelopment

# What is a river corridor?

- Minimum space needed for most stable **dimensions**, meander **pattern** and **slope**.
- Plus 50' on each side for bank stability as provided by riparian vegetation

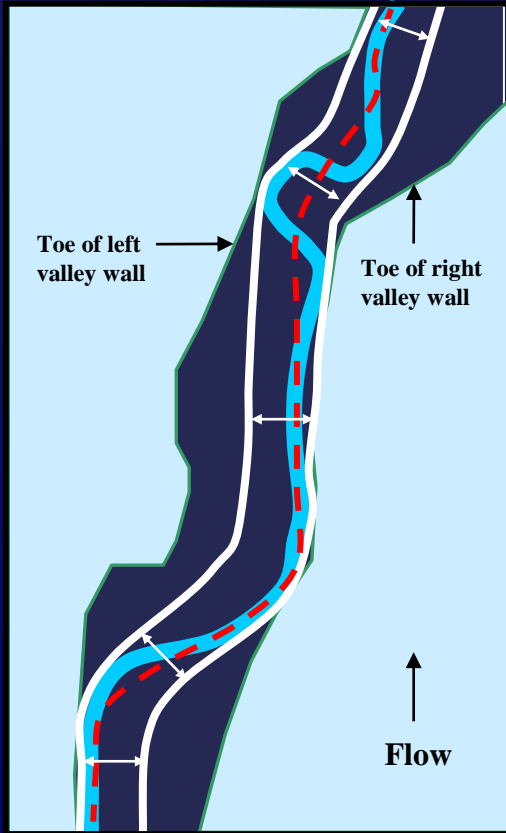


**Meander Belt Width-based corridors are designed to accommodate the slope and pattern of the equilibrium channel at the end of the evolution process. Used to support river corridor planning and protection.**



# Belt Width

$$B = 3.7W^{1.12} \quad \text{Williams, 1986}$$



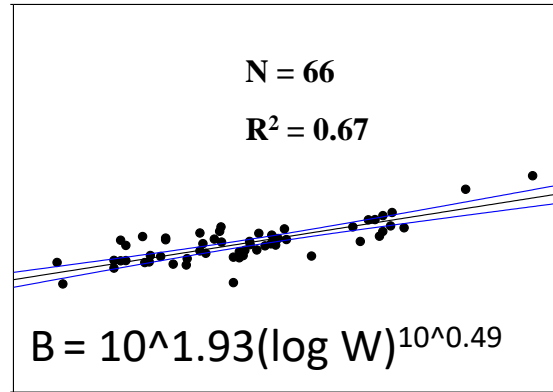
Using Williams Regression

Meander width ratio

$B/W = 5$  to  $6$  channel widths

# Vermont Meander Width Ratios

Low gradient, unconfined alluvial streams



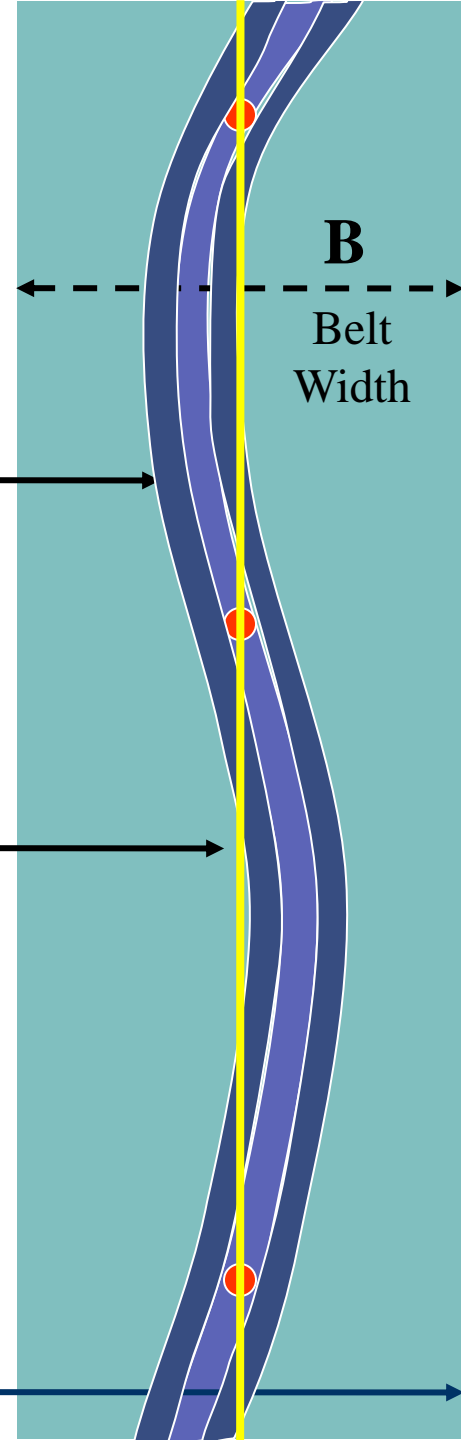
$$B/W = 6 \text{ to } 8.5$$

For a 50 foot wide stream

$$B/W = 6.7$$

Belt Widths are a function of

- drainage area = D
- stream width = W
- valley slope & width
- stream sensitivity



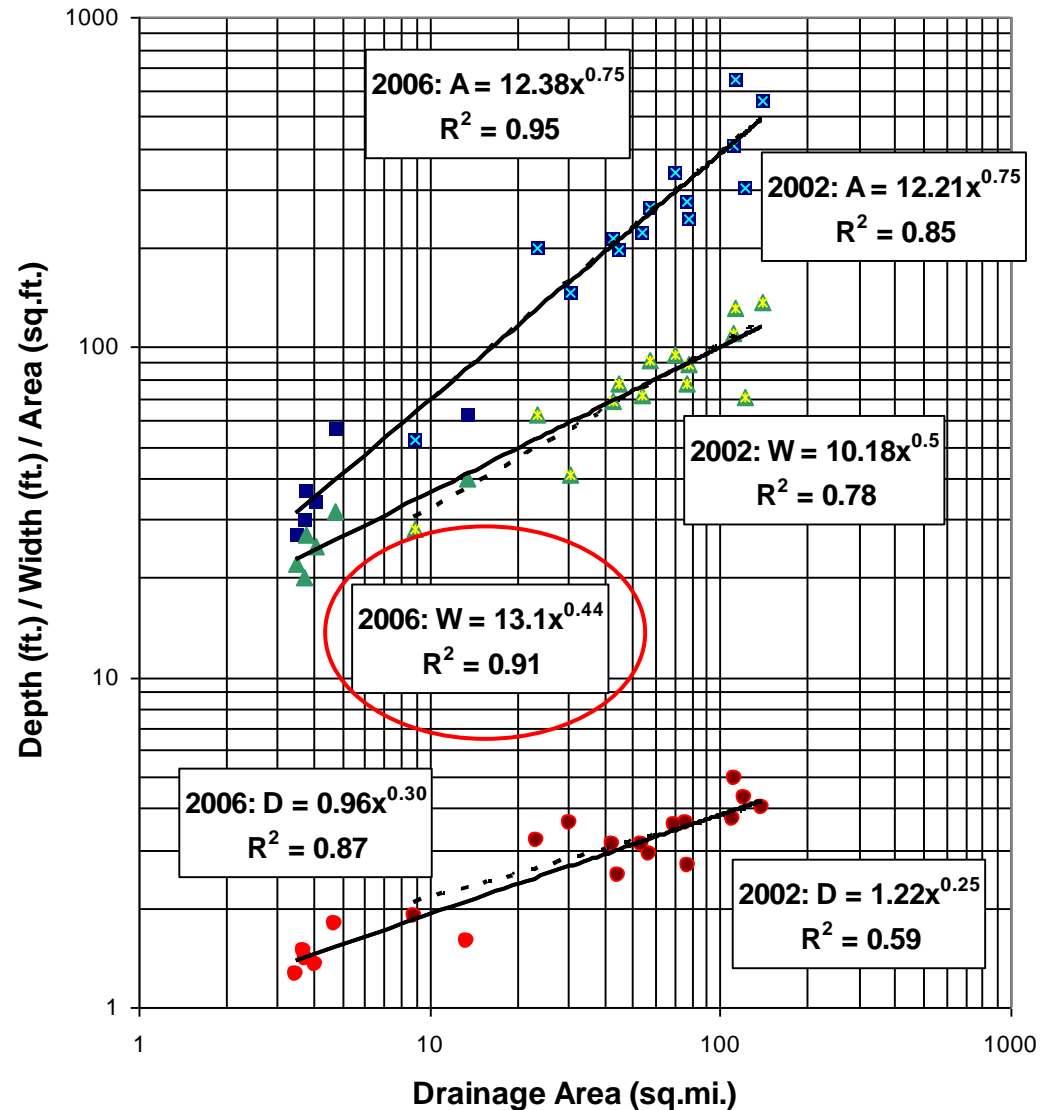
Vegetated Buffer

Meander Centerline MCL

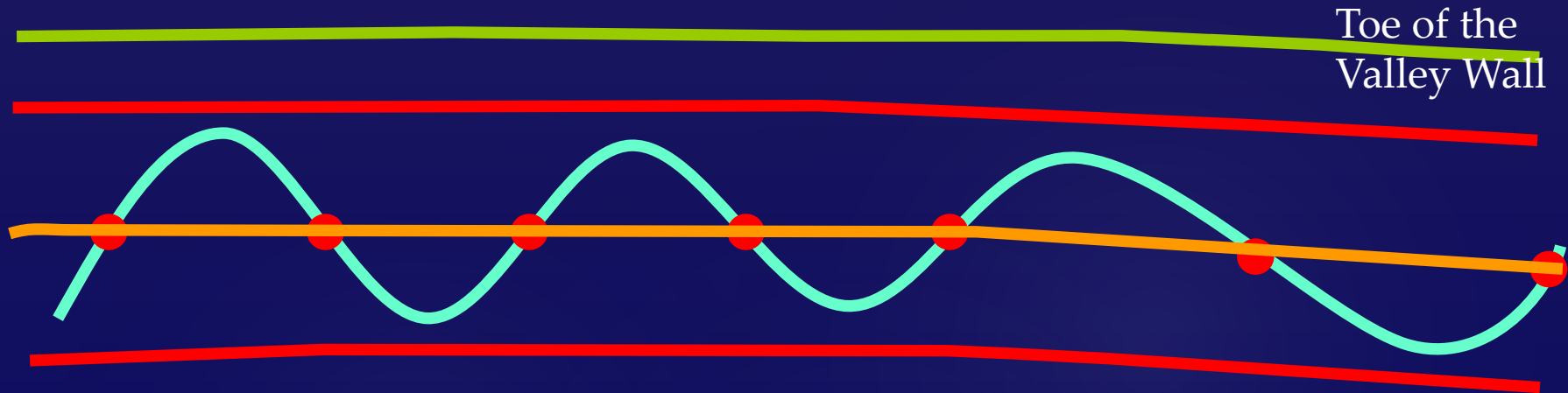
Valley Toes

# Vermont Hydraulic Geometry Curves

Used to determine the bankful width of a stream based on the size of the watershed



# How River Corridor Map is Made



**Channel width dependent on watershed size**  
**Meander Belt based on stream sensitivity**  
**(function of stream type and condition)**

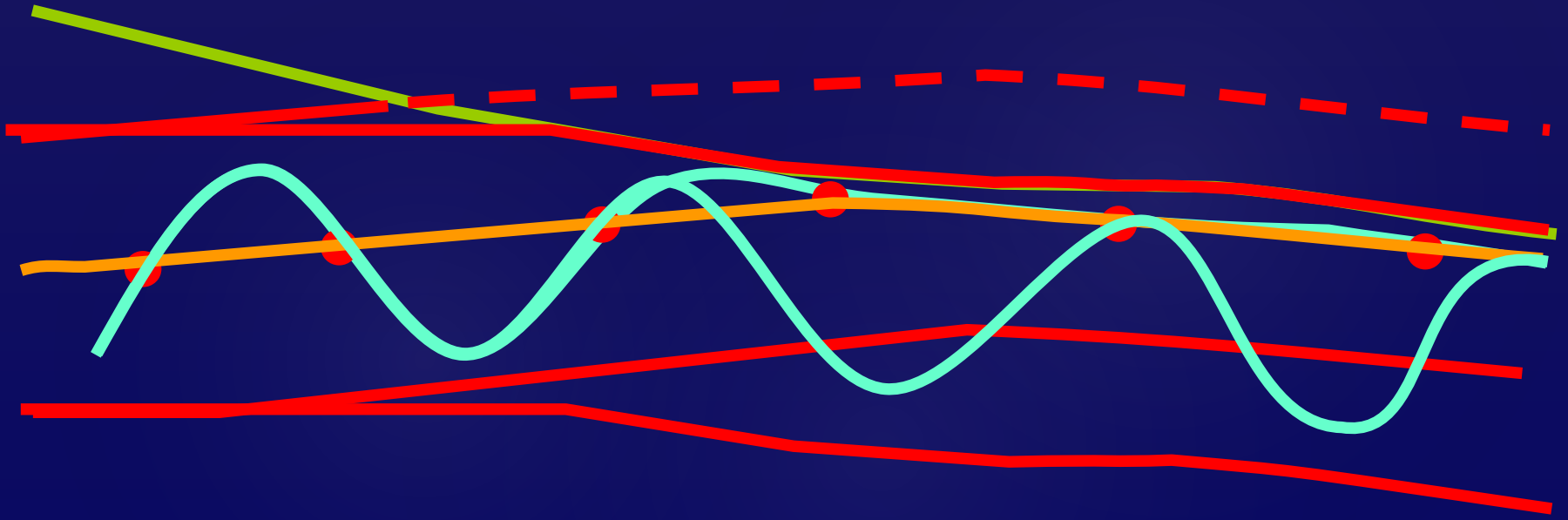
Table 1. Vermont ANR Stream Sensitivity Ratings based on geomorphic stream type and condition.

Stream Type Group	Existing Geomorphic Stream Type <sup>1</sup>	Sensitivity		
		Reference or Good Condition	Fair-Poor Condition in Major Adjustment	Poor Condition, Represents a Stream Type Departure
1	A1, A2, B1, B2	Very Low	Very Low	Low
2	C1, C2	Very Low	Low	Moderate
3	G1, G2	Low	Moderate	High
4	F1, F2	Low	Moderate	High
5	B3, B4, B5	Moderate	High	High
6	B3c, C3, E3	Moderate	High	High
7	C4, C5, B4c, B5c	High	Very High	Very High
8	A3, A4, A5, G3, F3	High	Very High	Extreme
9	G4, G5, F4, F5	Very High	Very High	Extreme
10	D3, D4, D5	Extreme	Extreme	Extreme
11	C6, E4, E5, E6	High	Extreme	Extreme



Sensitivity	Belt Widths
Very Low (VL)	Reference channel width
Low (LW)	Reference channel width
Moderate (MD)	4 channel widths
High (HI)	6 channel widths
Very High (VH)	6 channel widths 8+ channel widths – E streams
Extreme (EX)	6 channel widths 8+ channel widths – D&E streams

# How River Corridor Map is Made



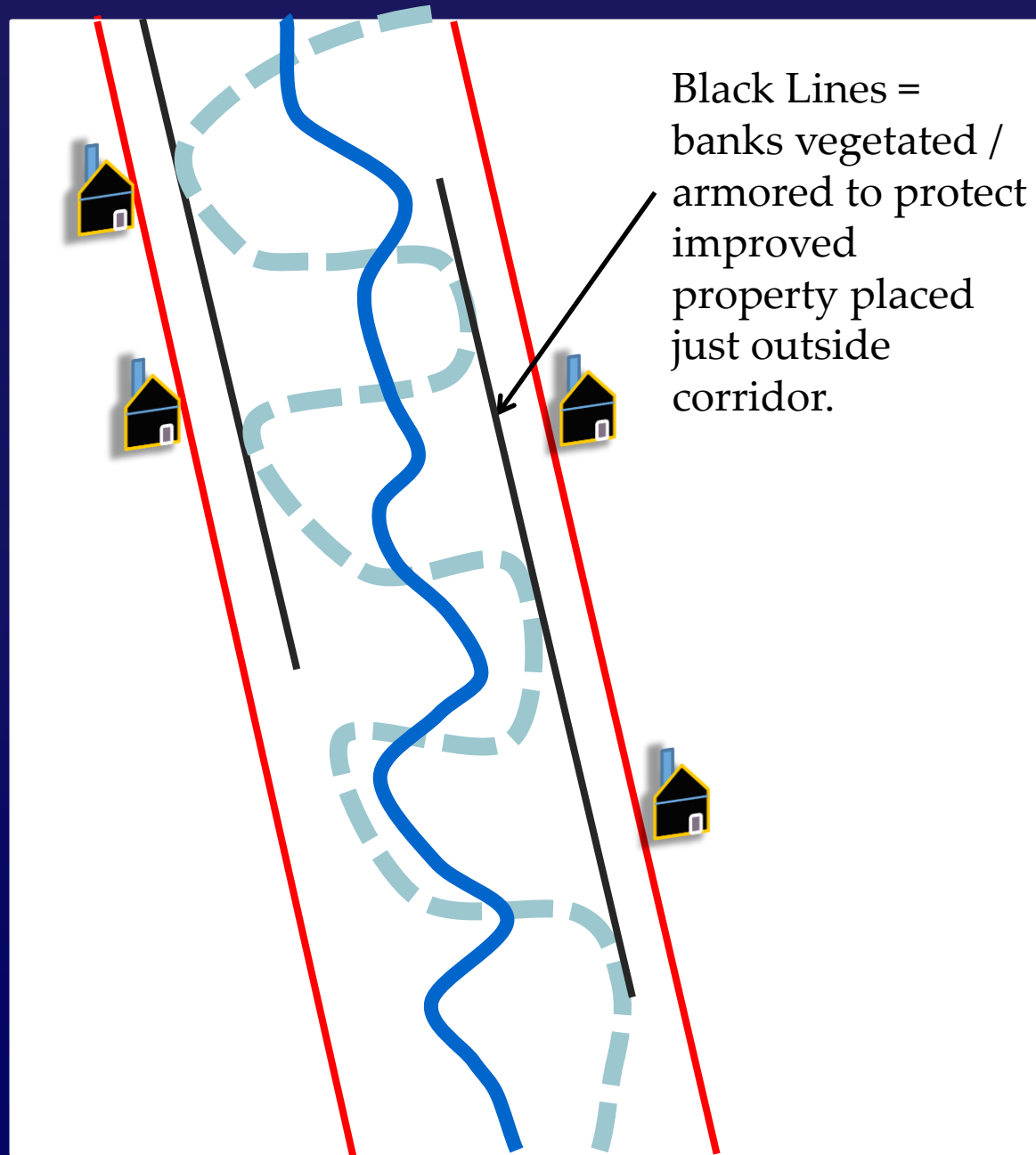
Sometimes the river is straightened against the **valley wall**

Where possible, the corridor is shifted

# River Corridor

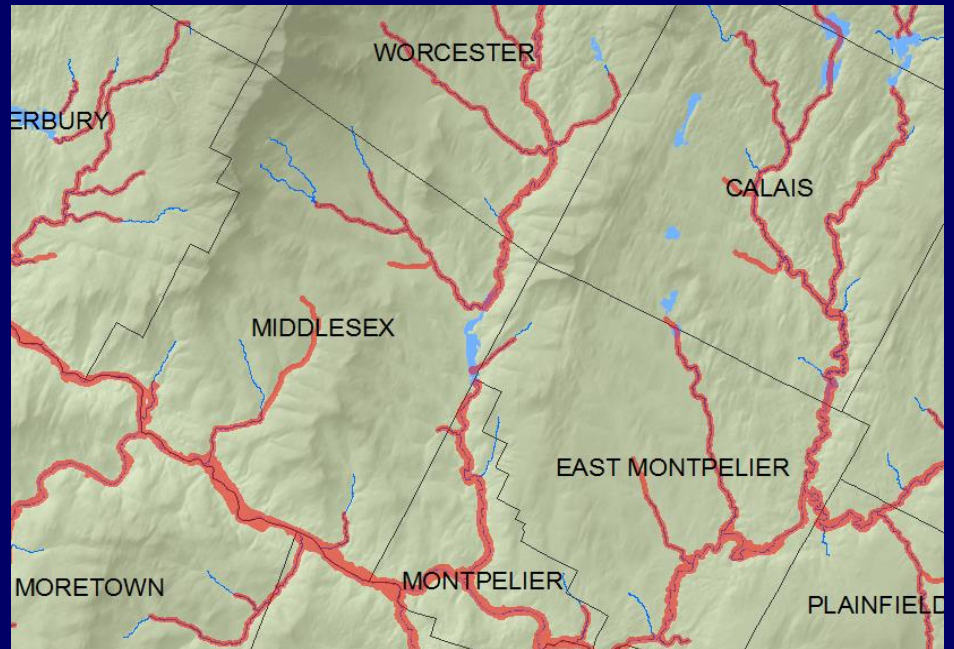
**Meander Belt indicates the space needed by the river to achieve a vertically stable, least erosive pattern & slope.**

**Corridor includes a buffer to allow that channel management will limit meander migration before river gets out to edge of the corridor where improved property may be sited.**





# Statewide River Corridor Map



*[tinyurl.com/floodreadyatlas](https://tinyurl.com/floodreadyatlas)*

# Flood Hazard Area and River Corridor Protection Procedures

## River Corridor Standard No Adverse Impact

Except as provided in Section 7(a)(2), projects shall not include new fill, new structures, substantial excavations, and other above and below ground improvements within the river corridor.

## Exceptions (in Section 7(a)(2))

- ❖ Redevelopment and infill development in designated centers
- ❖ Replacement of functionally dependent uses that must be placed in or over rivers
- ❖ Proposed development, where the Secretary determines that, because of other existing and adjacent development within the corridor, the proposed development will not be highly susceptible to fluvial erosion hazards, and shall not:
  - cause the river to depart from or further depart from natural stream processes and equilibrium conditions.
  - cause, as a result of the development, an immediate need or anticipated future need for stream channelization.

# Flood Hazard Area and River Corridor Protection Procedures

## Procedure for Delineating the Meander Belt and Buffer Components of the River Corridor

- Streams with a Drainage of Less than or Equal to Two Square Miles (50' setback)
- Streams with a drainage greater than 2 square miles (MB + 50' based on sensitivity)
- Natural or Human-Imposed Confining Features
- Streams Subject to Bank or Slope Failure
- Natural or Manmade Depressions Adjacent to Streams.

## River Corridor Map Update Procedures (Site Reviews, Appeals, and Municipal Requests)

- Watershed Hydrologic Modifications
- Slope Modifications Related to Sediment Transport and Sediment Regime Changes
- Boundary Conditions
- Bank and Valley Side-Slope Failure / River-Associated Landslide Hazard
- Municipally Requested Administrative Revisions (consistent w/ NAI and exceptions)

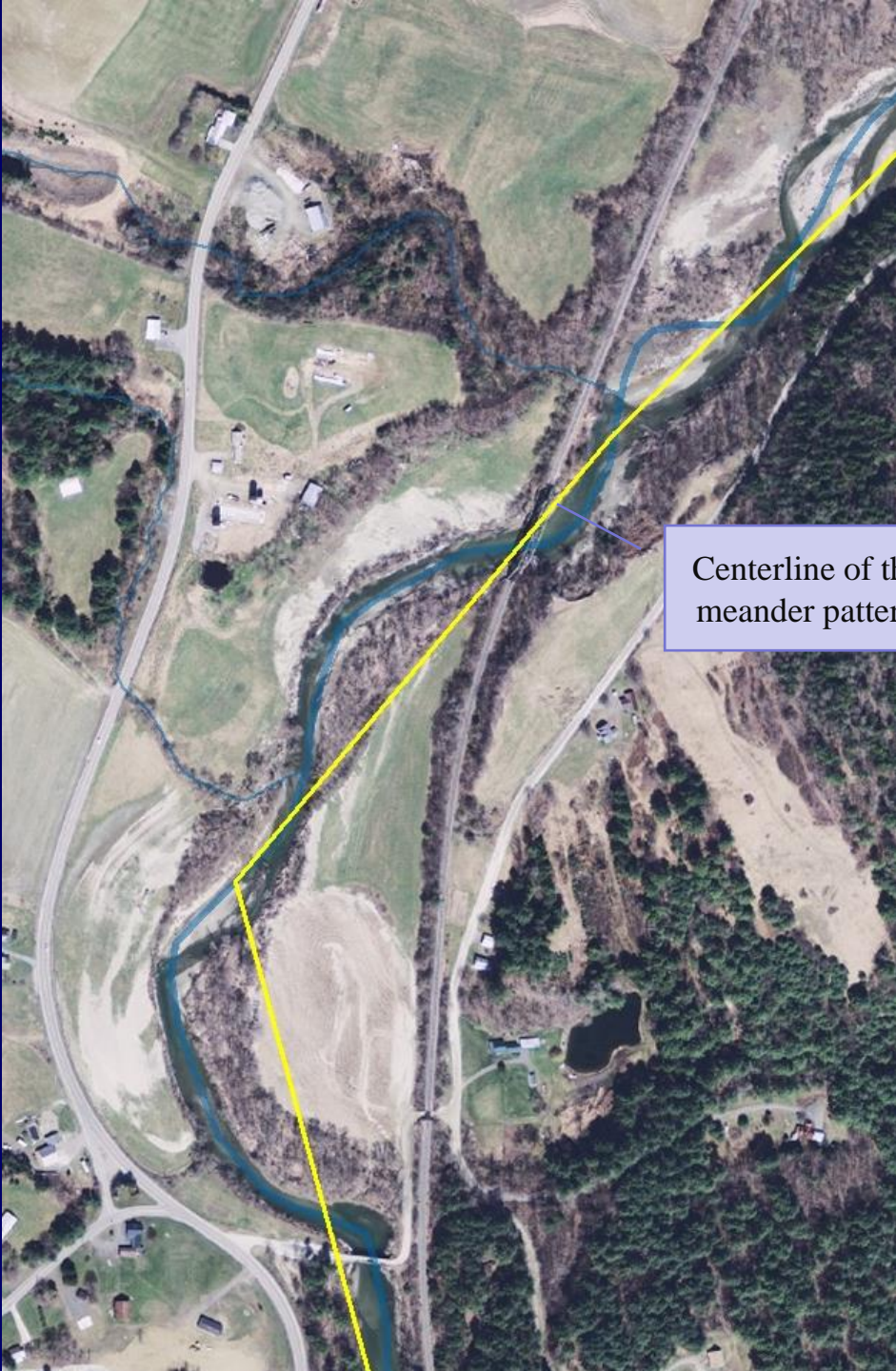
## Map Update Process (DEC initiated watershed-scale map updates)

## Best Management Practices in River Corridors

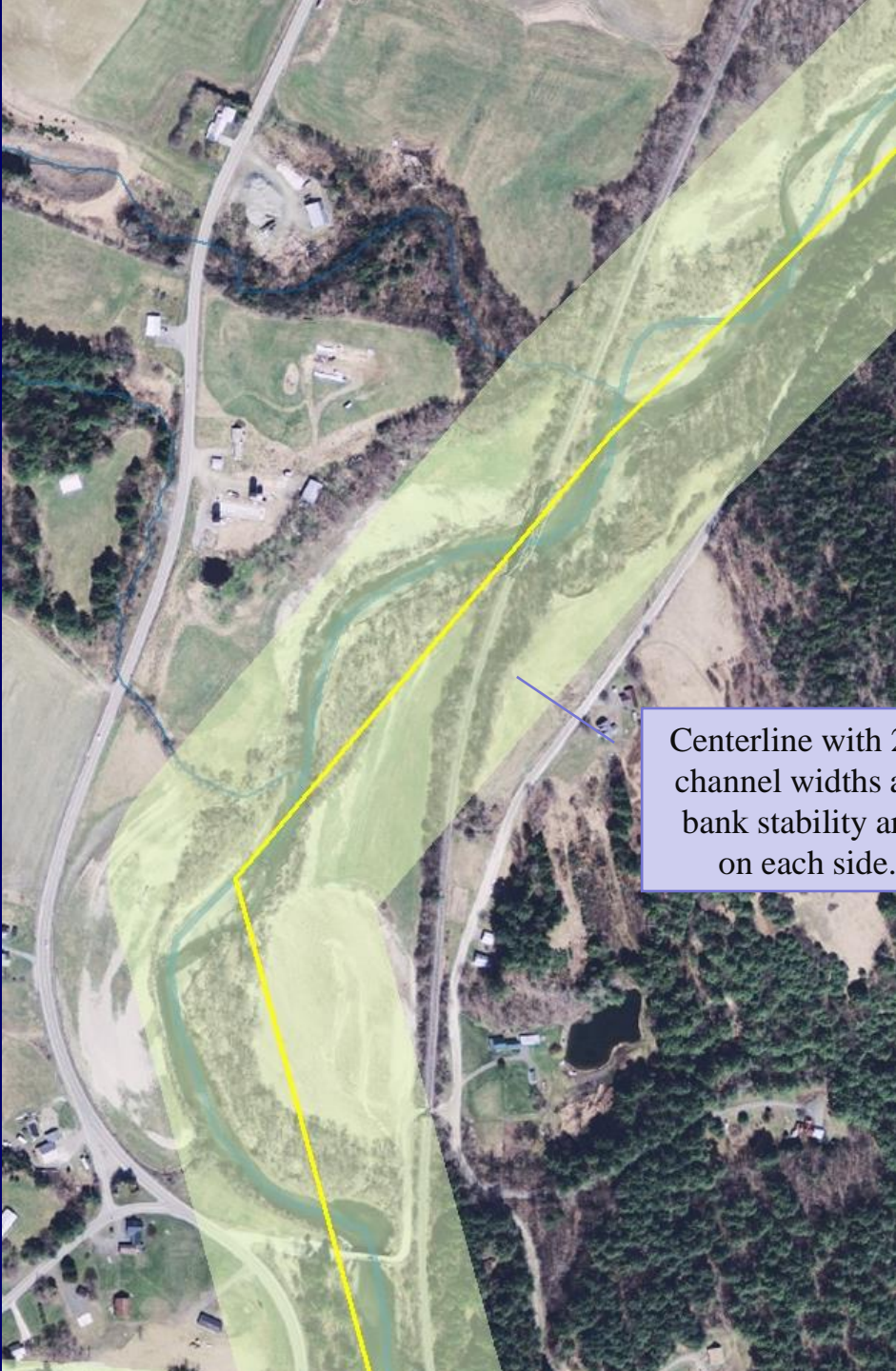


River channel  
on aerial photo

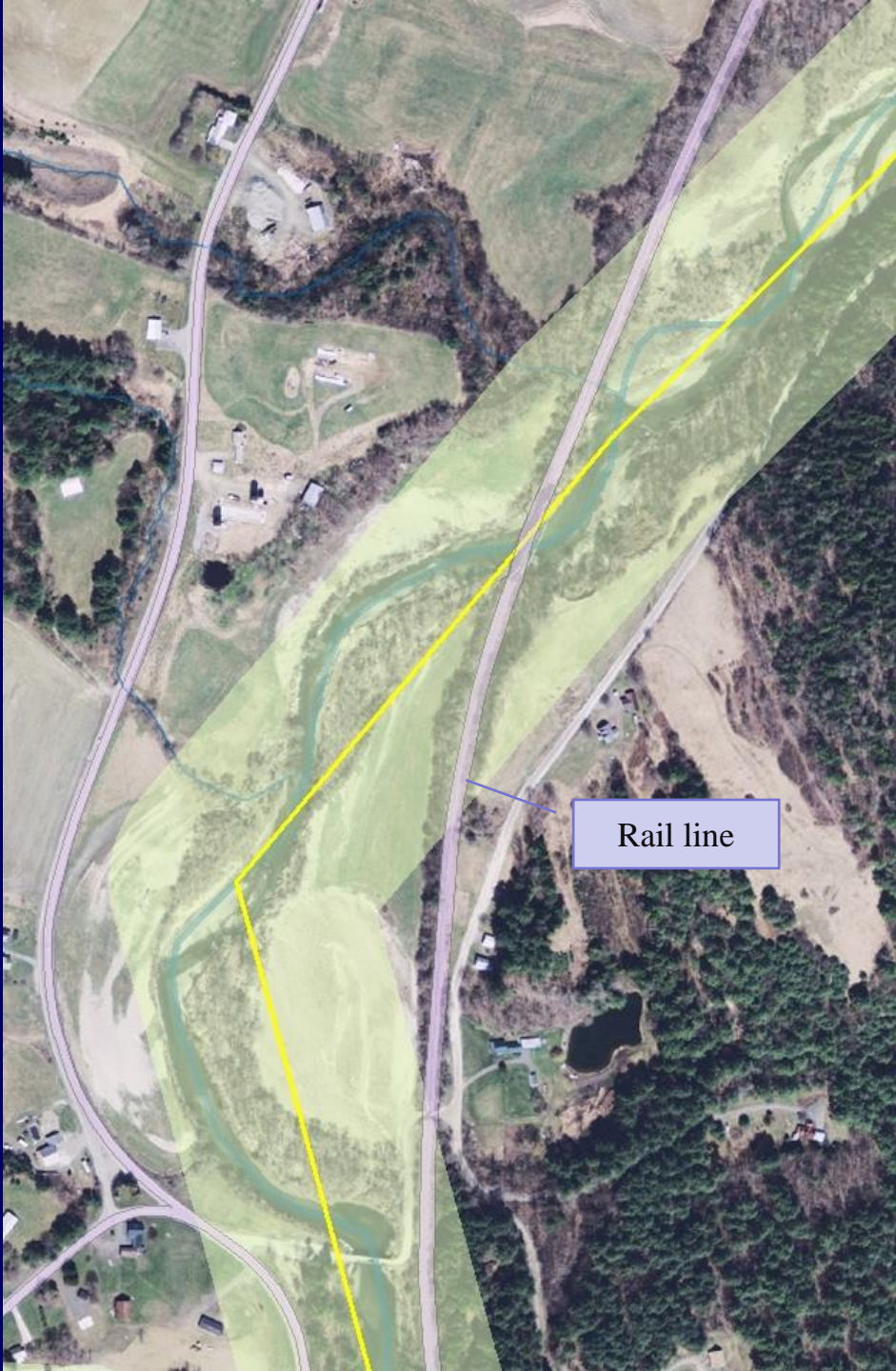
Floodplain  
deposit after  
Irene



Centerline of the  
meander pattern

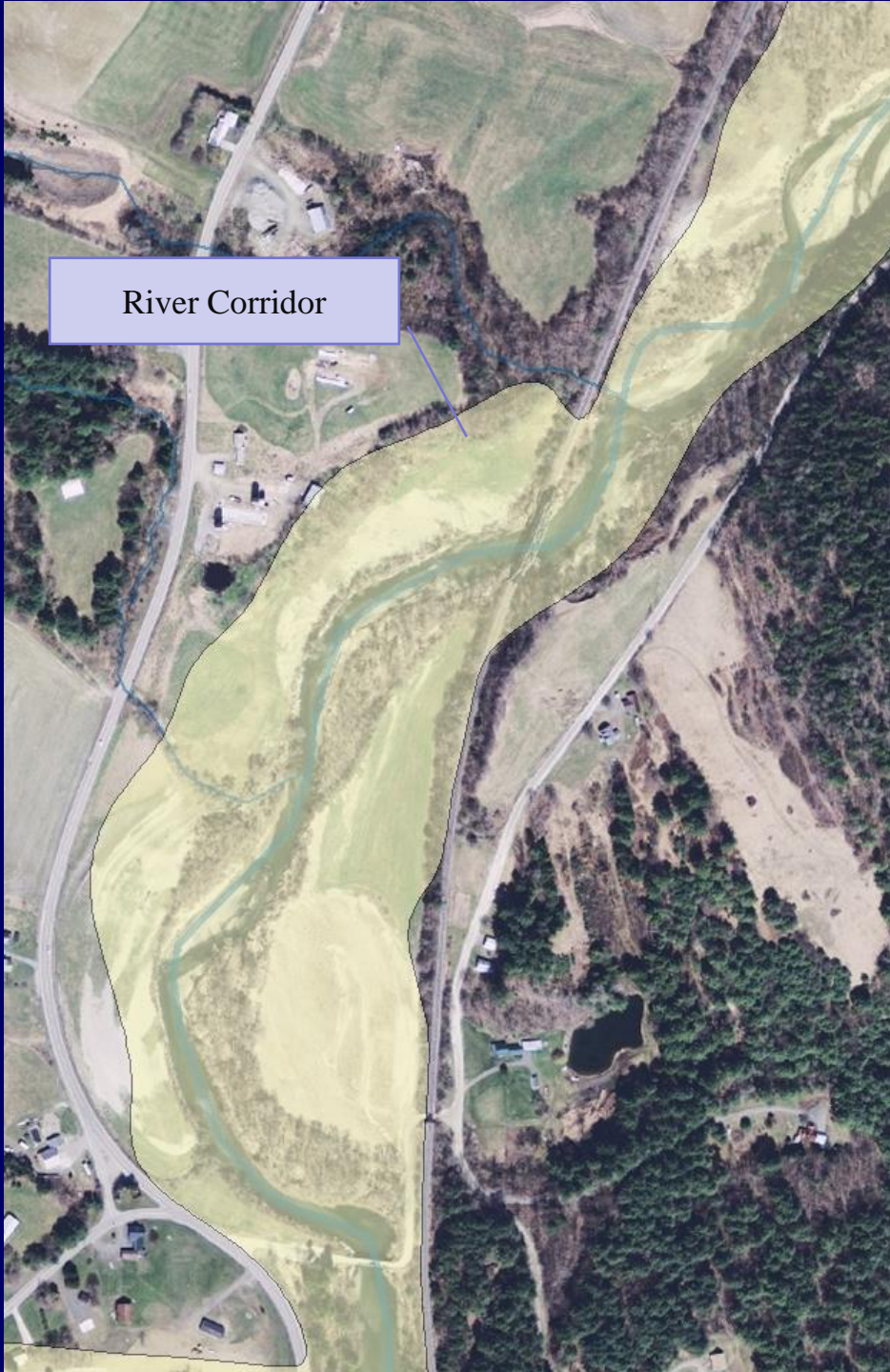


Centerline with 2- 4  
channel widths and  
bank stability area  
on each side.



Rail line

River Corridor







River Corridor  
stops at rail line

River Corridor (yellow)  
Flood Hazard Area (red)





River Corridor (yellow)  
Flood Hazard Area (red)

Past channel positions  
from aerial photos

The image is an aerial photograph of a river valley. A river flows from the top right towards the bottom left. The river is surrounded by a yellow-shaded area representing the River Corridor. A red-shaded area, representing the Flood Hazard Area, follows the river's path and extends slightly beyond the yellow corridor. Several thin, light-colored lines are drawn across the landscape, indicating the historical positions of the river channel. The surrounding terrain includes green fields, some buildings, and a road that runs parallel to the river on the left side.

Past channel positions  
from aerial photos