

# River Corridors and Floodplains

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&  
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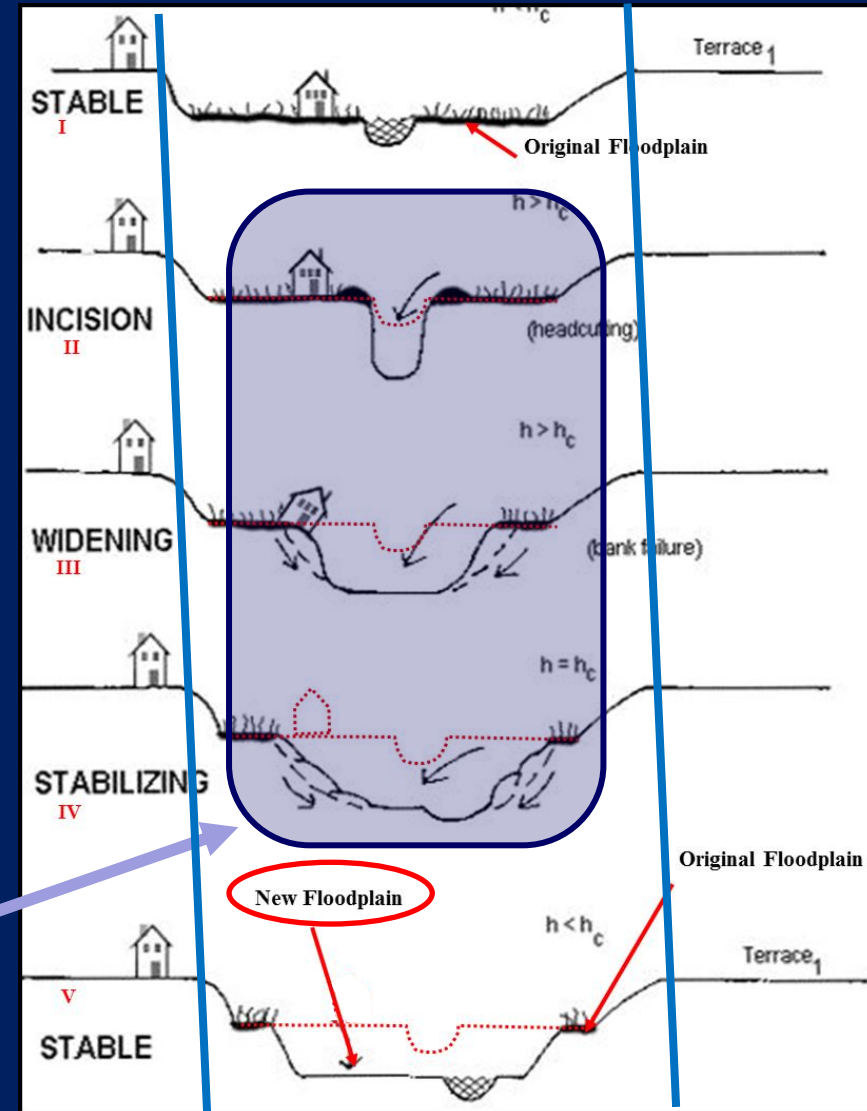


# The loss of flood storage and the increase in fluvial erosion

**200+ years of channel, floodplain and watershed modifications trigger stream channel evolution:**

- Historic deforestation
- Floodplain filling for villages, farms, roads and rails
- Dams and undersized culverts
- Snagging, ditching & diversions
- Gravel removal & berming
- Straightening & armoring

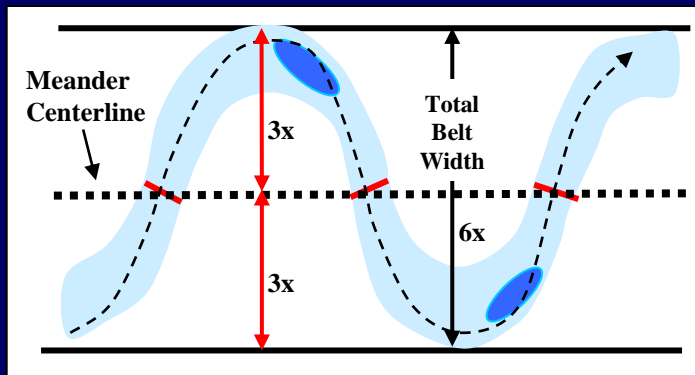
**73.5%** Streams moderately to severely incised and lacking floodplain connectivity  
**(more erosion -- less storage)**



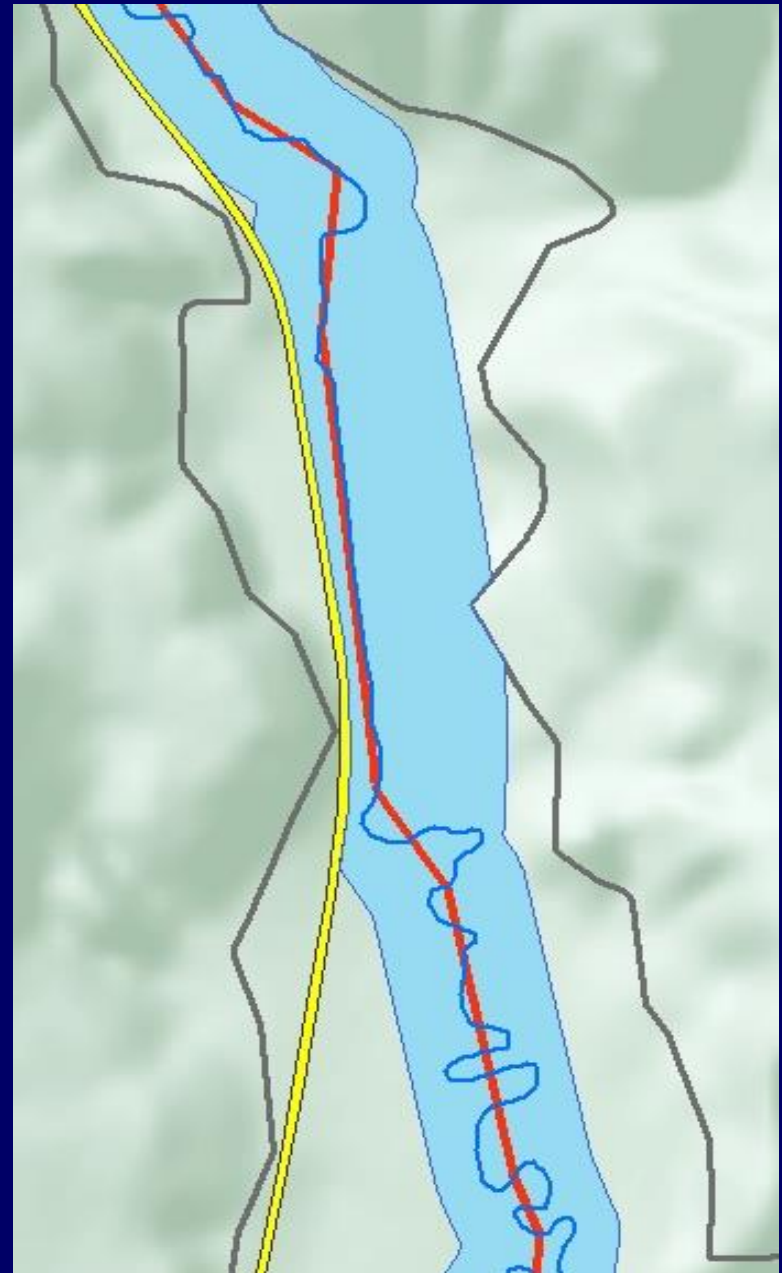
**River Corridor Delineation**

# What is a river corridor?

- Minimal area required for the meander geometry, slope, and active erosion / depositional features of a river's least erosive, vertically stable form.
  - per 10 V.S.A. §1422(12)



- Plus 50' on each side for bank stability as provided by riparian vegetation.



# River Corridor Mapping and Policy

## ➤ *Purpose of River Corridors*

Minimize erosion hazards and risks to public safety at adjacent and downstream properties.

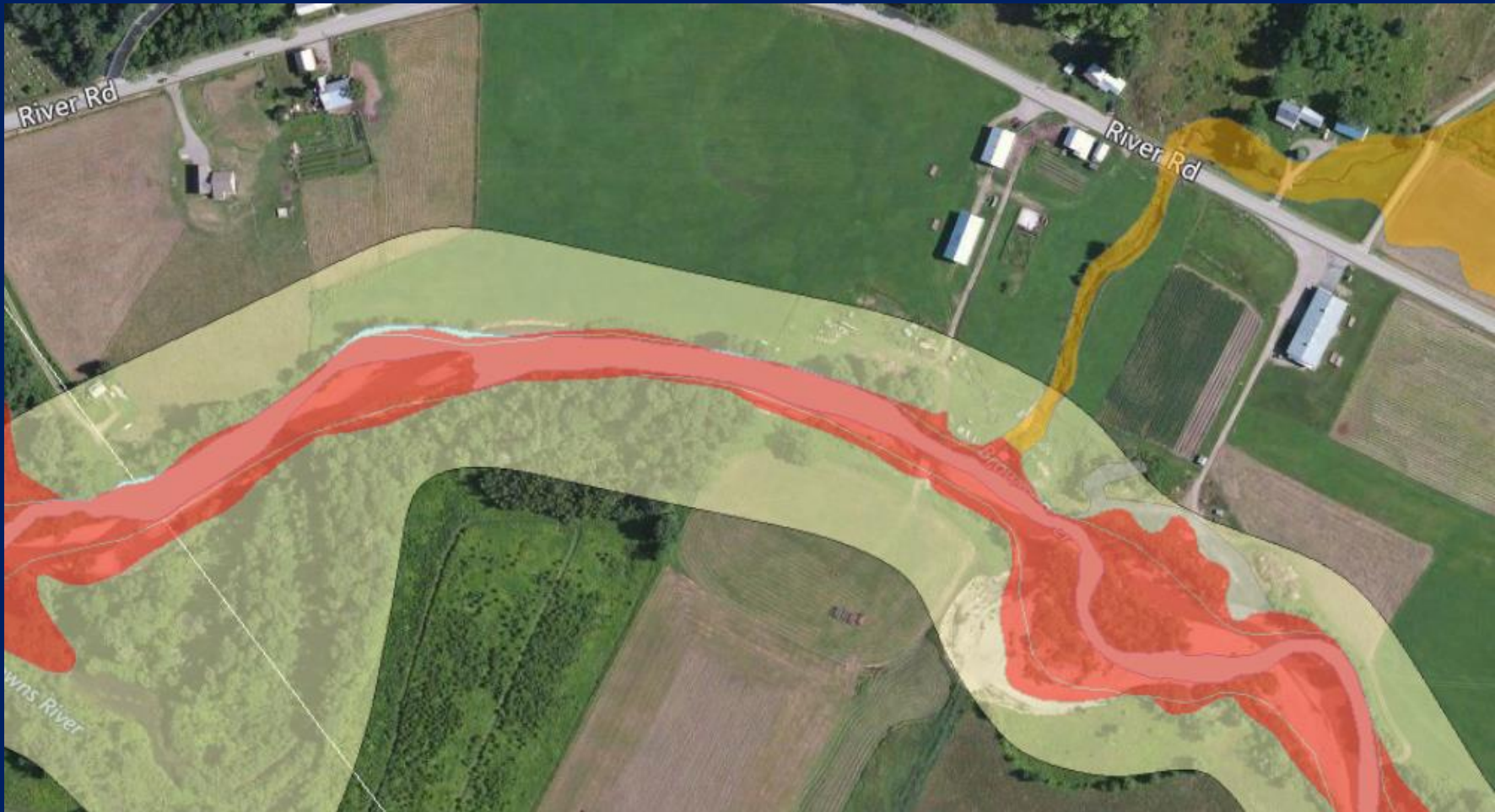
## ➤ *River Corridor Mapping*

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 / functionally dependent uses (e.g., crossings)

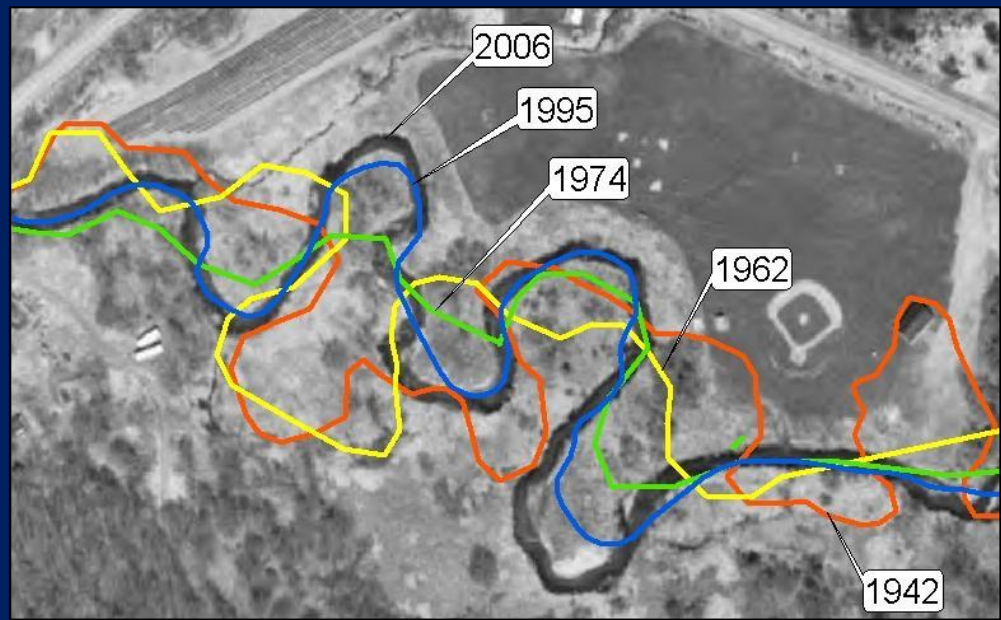
# Inundation Maps produced at the height of channel incision



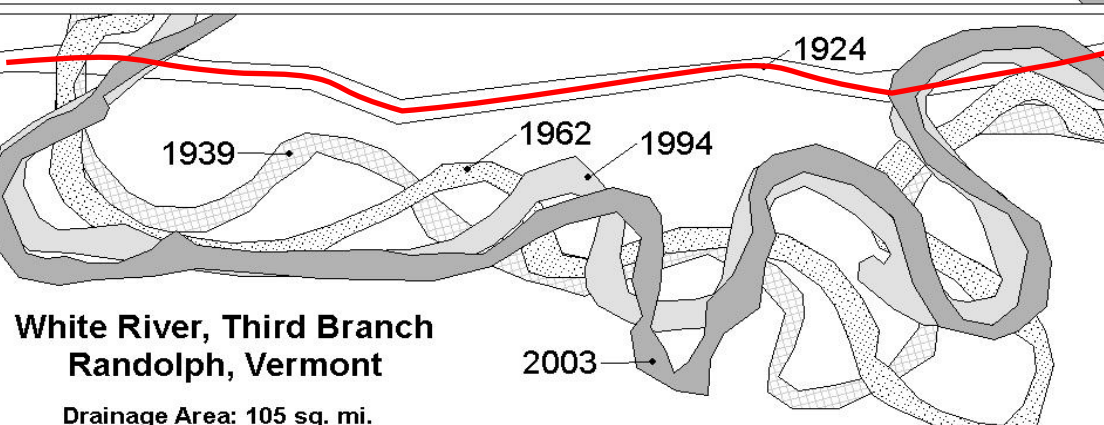
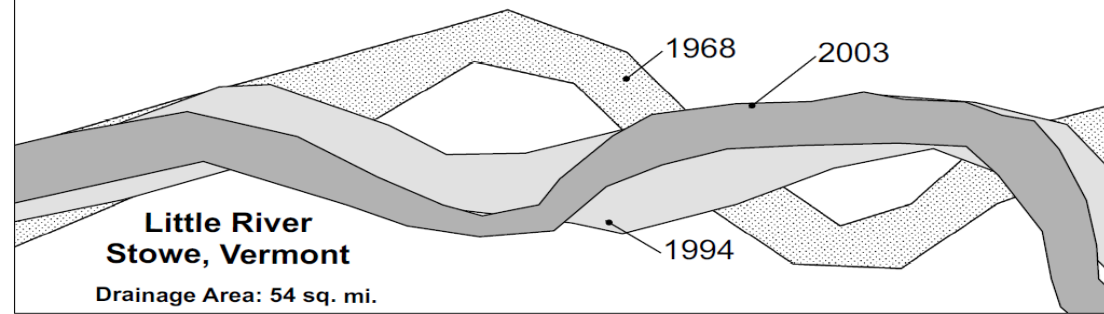
Signal that it's okay to build up to the edge of the river.

# Data and maps inform Vermont Policy

## Where is Vermont siting its investments?

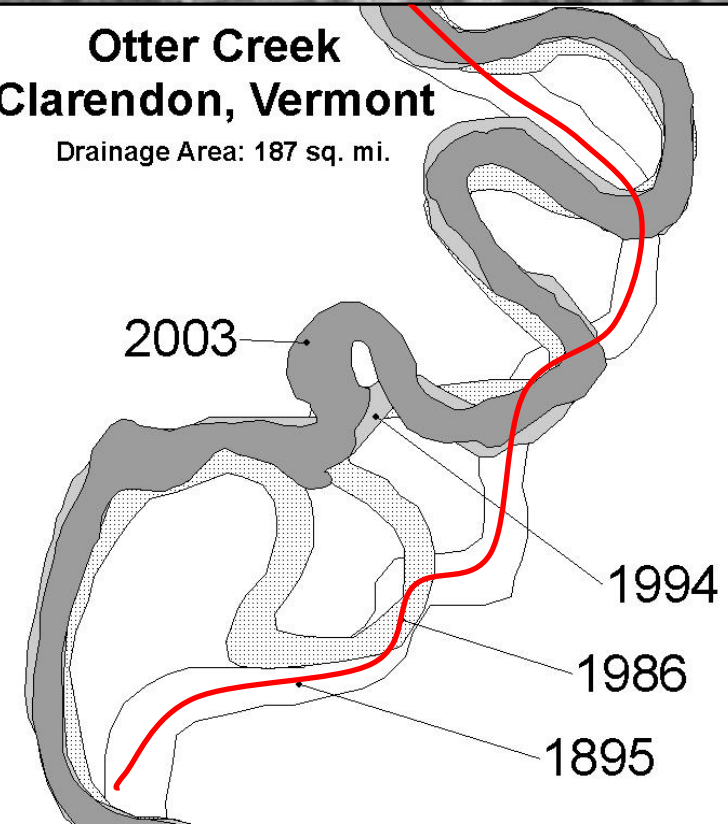


### Stream Channel Meander Pattern Adjustment Over Time



### Otter Creek Clarendon, Vermont

Drainage Area: 187 sq. mi.



Erosion along historically channelized streams is the predominate form of road damage in VT



Preserve new river-formed floodplains as much as possible, and the next flood will result in less erosion and downstream flooding.

# Technical Assistance to **Avoid** New Encroachments is Paramount

## Vermont DEC Rivers Program

River Engineers, Floodplain Managers, and River Scientists

		2015	2016	2017	2018	2019	AVE
Technical Assistance / Project Review		2,418	2,487	3,634	2,905	2,491	2,787
Permits / Authorizations Issued		824	823	1,053	1,010	981	938
Easements TA / Review		18	21	25	20	13	19
<b>Increase River Corridor Protections</b>							
Easements Completed		6	12	13	12	5	10
TA / Review		1,679	1,845	2,769	1,985	1,768	2,009
<b>Avoid/Limit New Encroachments</b>							
Permits		477	474	643	506	588	538
TA / Review		258	182	241	273	118	214
<b>Improve Flows and River Stability</b>							
Permits		125	106	129	207	86	131
TA / Review		463	439	599	627	592	544
<b>Restore Flows and Nat. River Stability</b>							
Permits		279	231	268	285	302	273



# Reconnecting Vermont Rivers 2015 to 2019

## Longitudinal

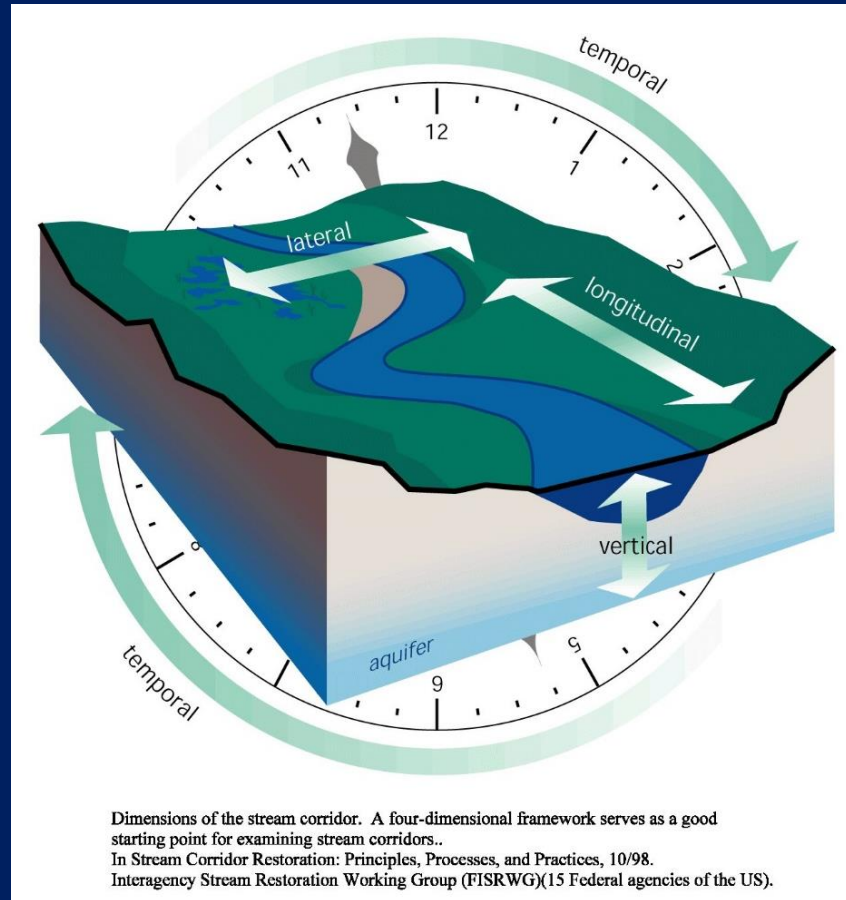
632

Replacing undersized culverts and removing derelict dams

## Vertical

154

Berm removals and channel bed restoration to restore floodplain and groundwater connections



## Lateral

536

Corridor protections, riparian and floodplain restoration projects

## Temporal

676

Flow restoration and enhancements at dams and diversions

Thank You

Mike Kline

Questions?

