

# Beaver Benefits: Biodiversity Water Quality and Flood Resilience



Vermont Fish and Wildlife Department

# Beaver and Biodiversity



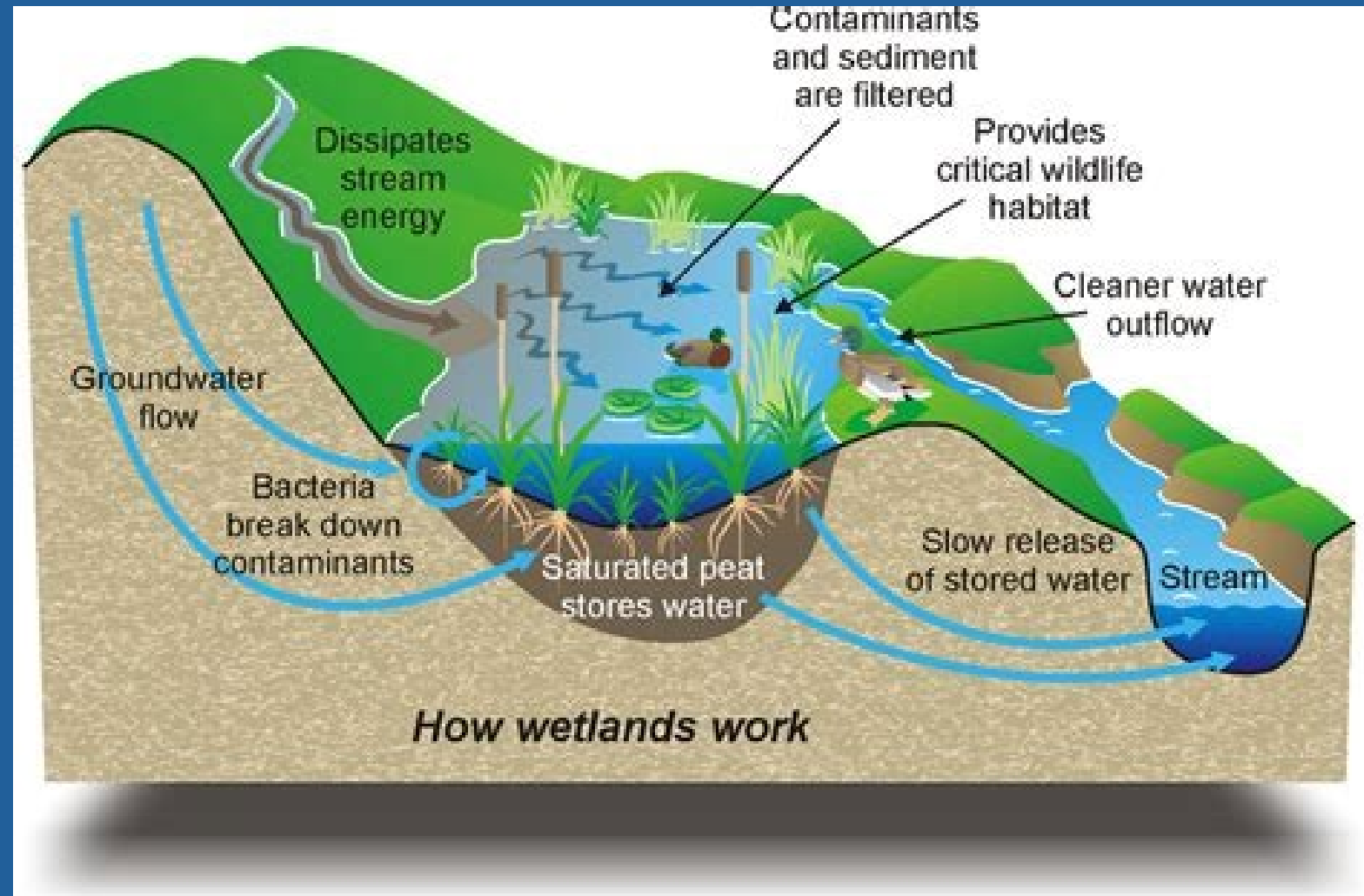
The Beaver Institute

# Beaver and Biodiversity



Vermont Association of Conservation Commissions

# Beaver and Water Quality

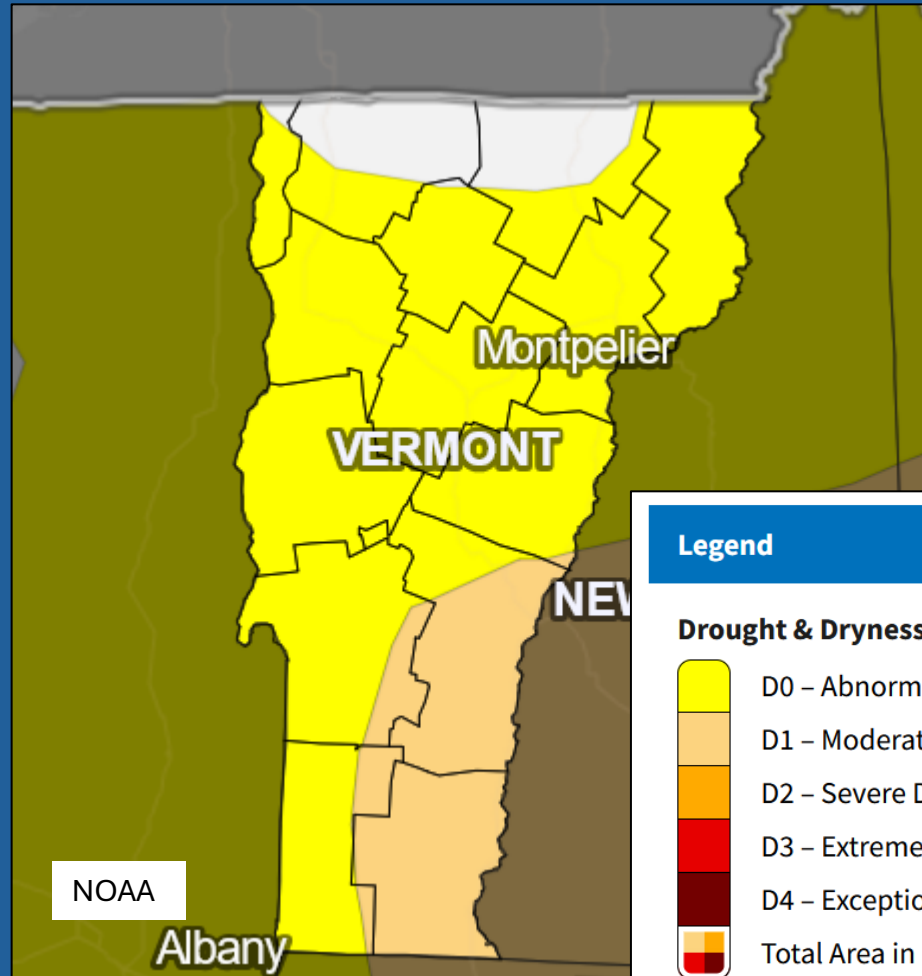


# Beaver and Climate Change: Drought and Wildfire







**Vermont** is seeing natural hazards of increased intensity, duration, and frequency due to **climate change**. Severe storms, winter storms, **drought**, **flooding**, **wildfires**, temperature extremes, localized wind, and public health impacts are a few of the hazards that we are **already experiencing**.

(State of Vermont Climate Action Office)

# Beaver and Climate Change: Drought and Wildfire



In 2000, 2016, 2020, and 2022, New York and New England experienced historic drought conditions not seen since the 1960s

Legend	
Drought & Dryness Categories	
	D0 – Abnormally Dry
	D1 – Moderate Drought
	D2 – Severe Drought
	D3 – Extreme Drought
	D4 – Exceptional Drought
	Total Area in Drought (D1–D4)
	<b>% of VT</b>
	<b>71.9%</b>
	<b>18.9%</b>
	<b>0.0%</b>
	<b>0.0%</b>
	<b>0.0%</b>
	<b>18.9%</b>



# Beaver and Climate Change: Drought and Wildfire



The Beaver Institute



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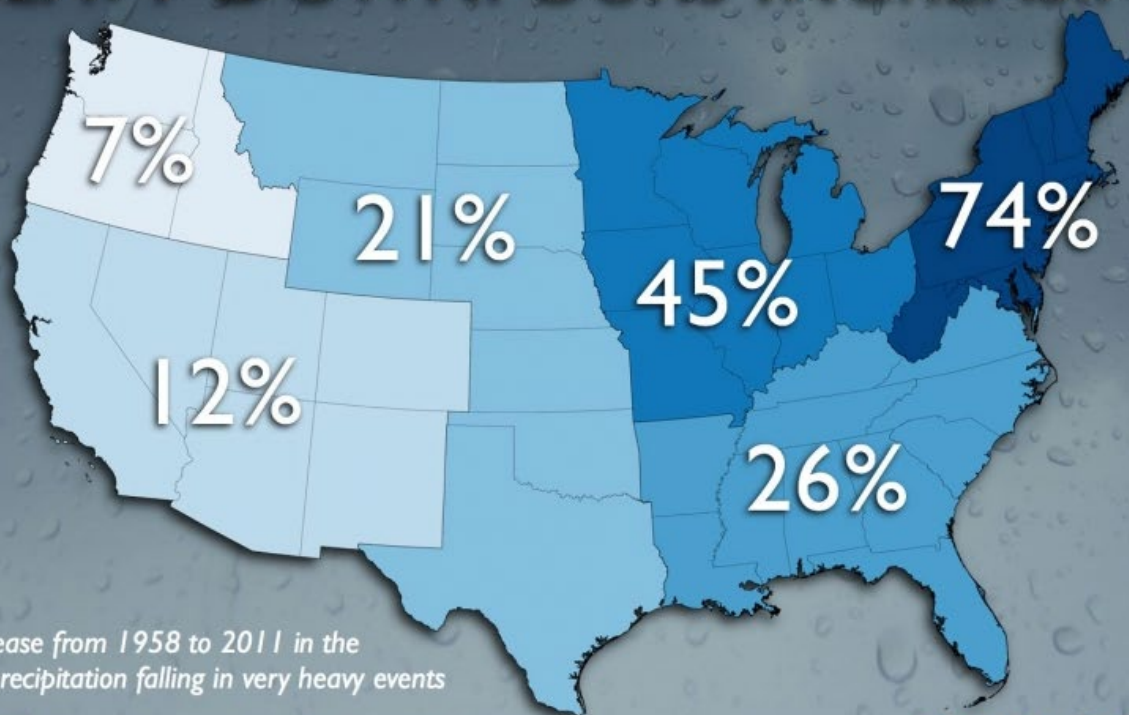
MORE VIDEOS





# Beaver and Climate Change: Flooding

## HEAVY DOWNPOURS INCREASING



Percent increase from 1958 to 2011 in the amount of precipitation falling in very heavy events

Source: Kenneth Kunkel, Cooperative Institute for Climate and Satellites, North Carolina State University and NOAA NCDC

CLIMATE CENTRAL

### Science News

from research organizations

Extreme precipitation in Northeast US to increase 52% by the end of the century

Date: May 30, 2023

Source: Dartmouth College

Summary: With a warmer climate creating more humid conditions in the Northeast, extreme precipitation events -- defined as about 1.5 or more inches of heavy rainfall or melted snowfall in a day -- are projected to increase in the Northeast by 52% by the end of the century, according to a new study.

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Property damages from flooding in Vermont are calculated to exceed \$5.2 billion over the next 100 years.

-UVM Gund Institute



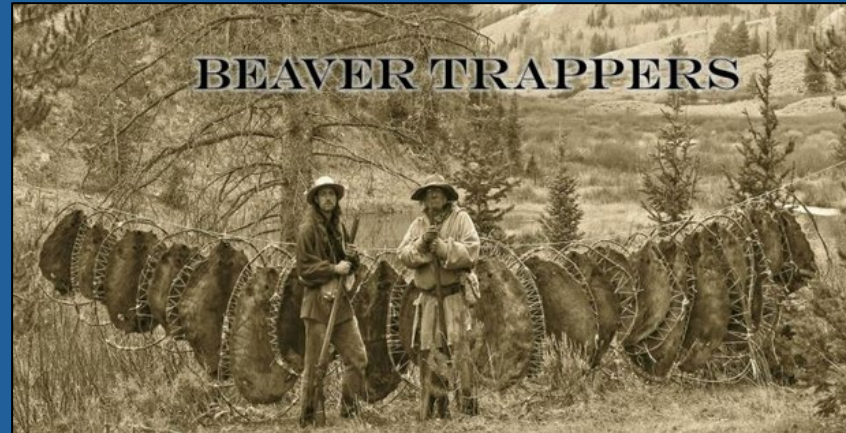
# A history of Settlement and River Management



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Machias River, ME (2023 Main Sustainability and Water conference)



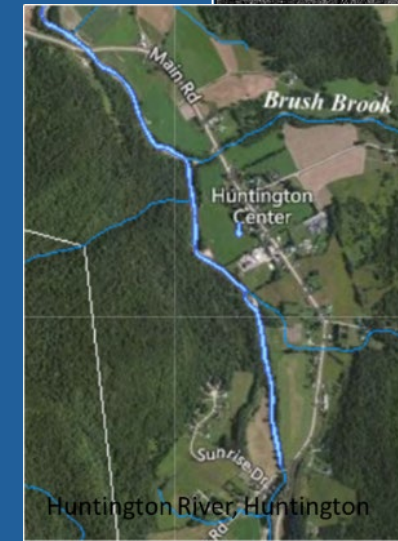
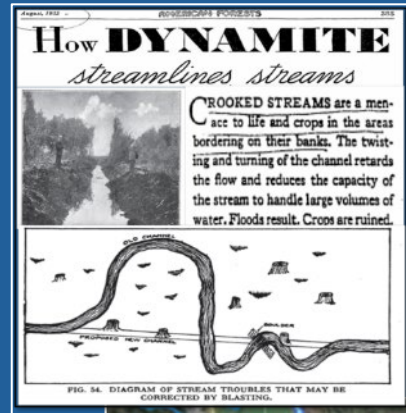
Splash dam (Forest History Society)



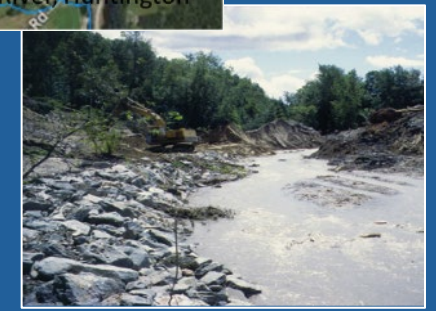
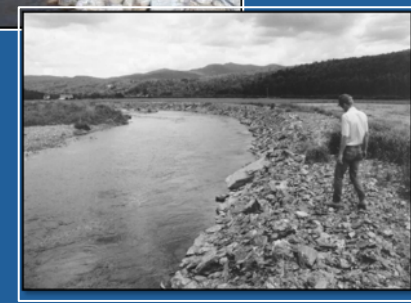
White River, VT (VT Digger)



# A Long History of River Management



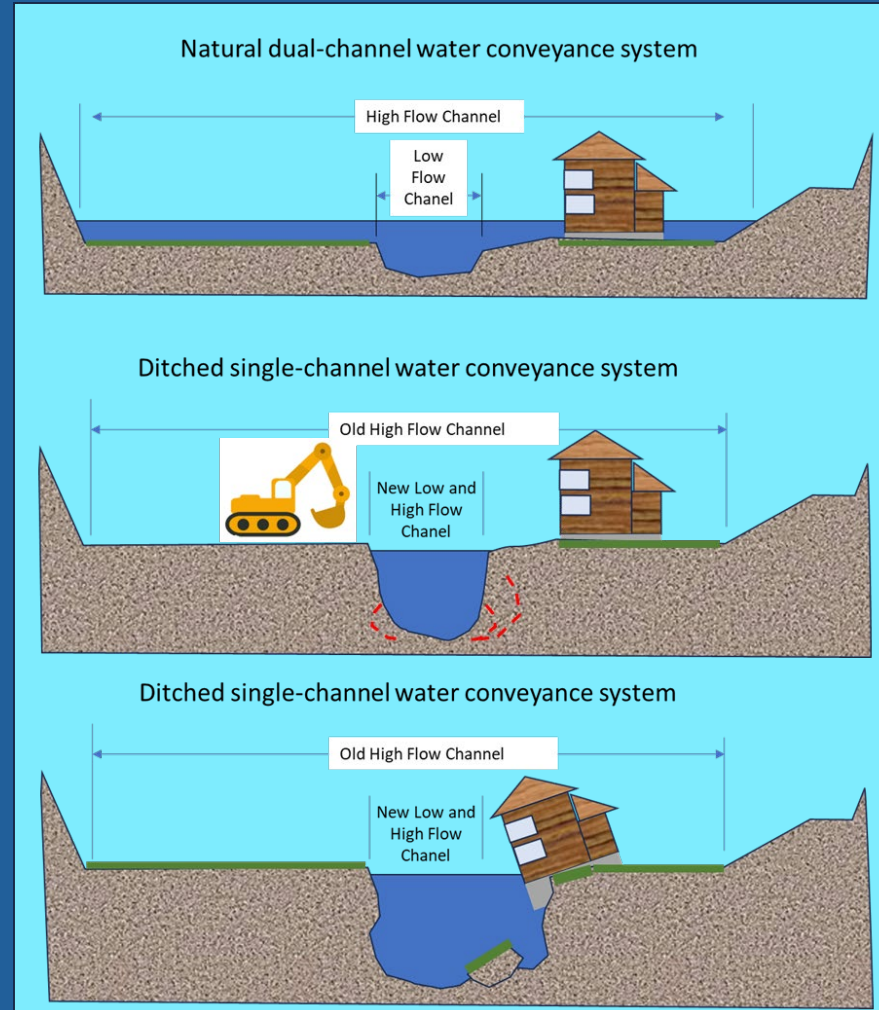
White River, Granville



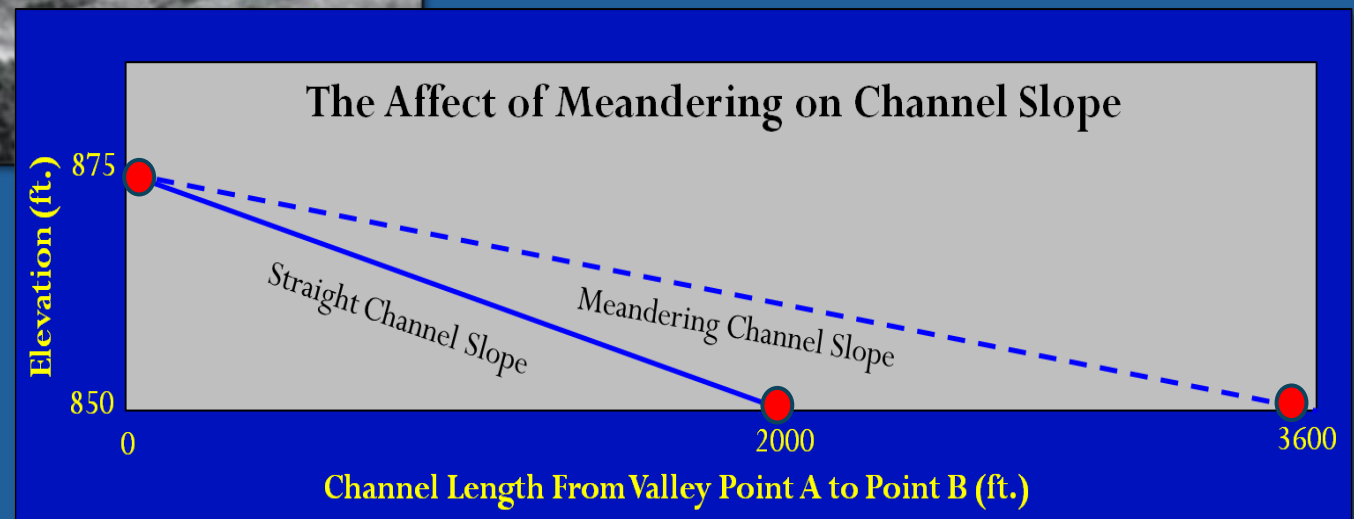
# Flood Hazards: Inundation and Erosion



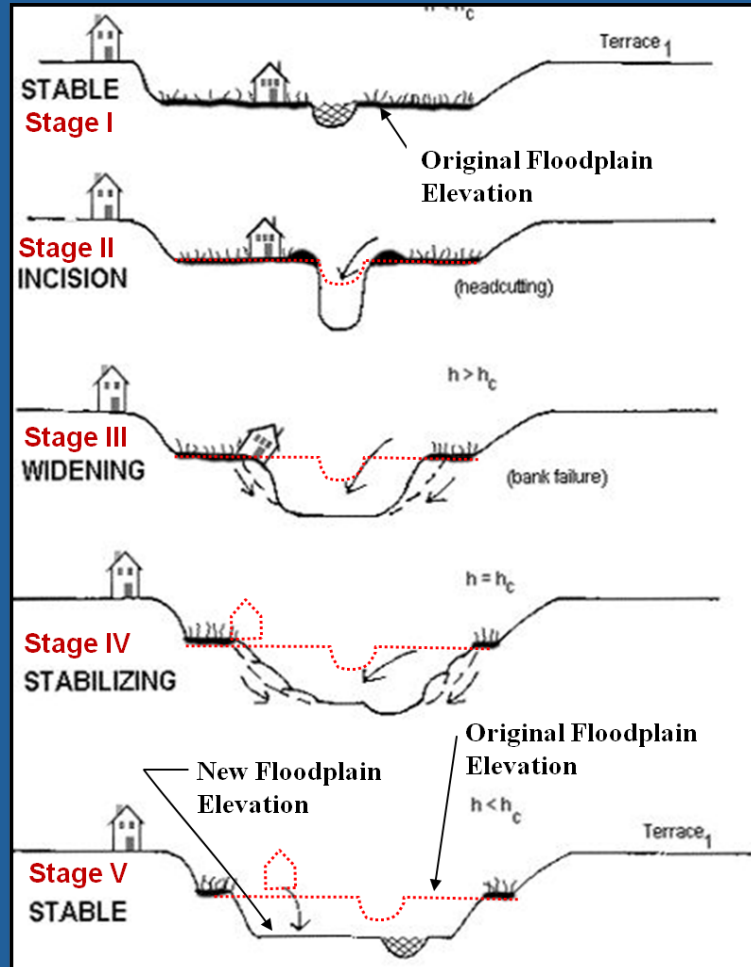
# Increasing Channel Depth to Prevent Flooding: Trading in a Flooding Problem for an Erosion Problem



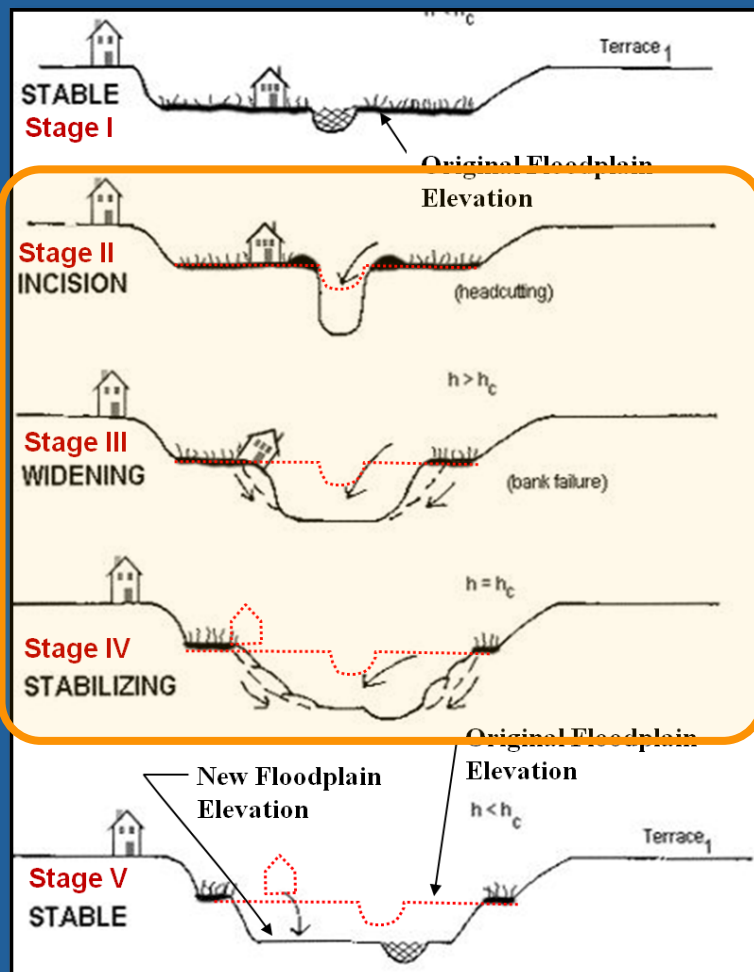
# Straightening Rivers: Increasing Erosive Power



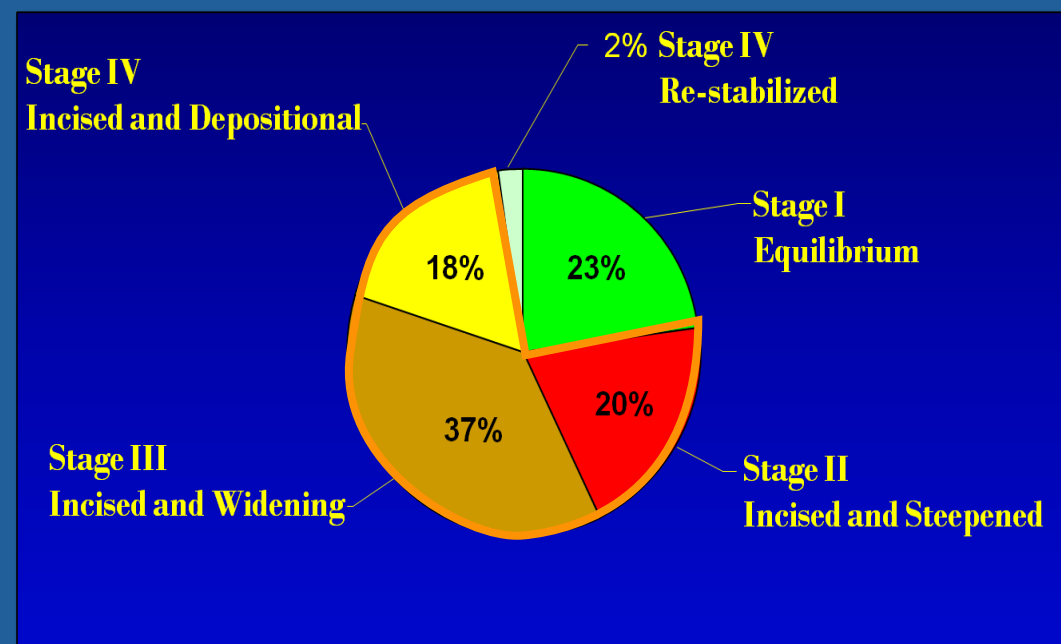
# Widespread Channel Instability



# Widespread Channel Instability



Vermont DEC



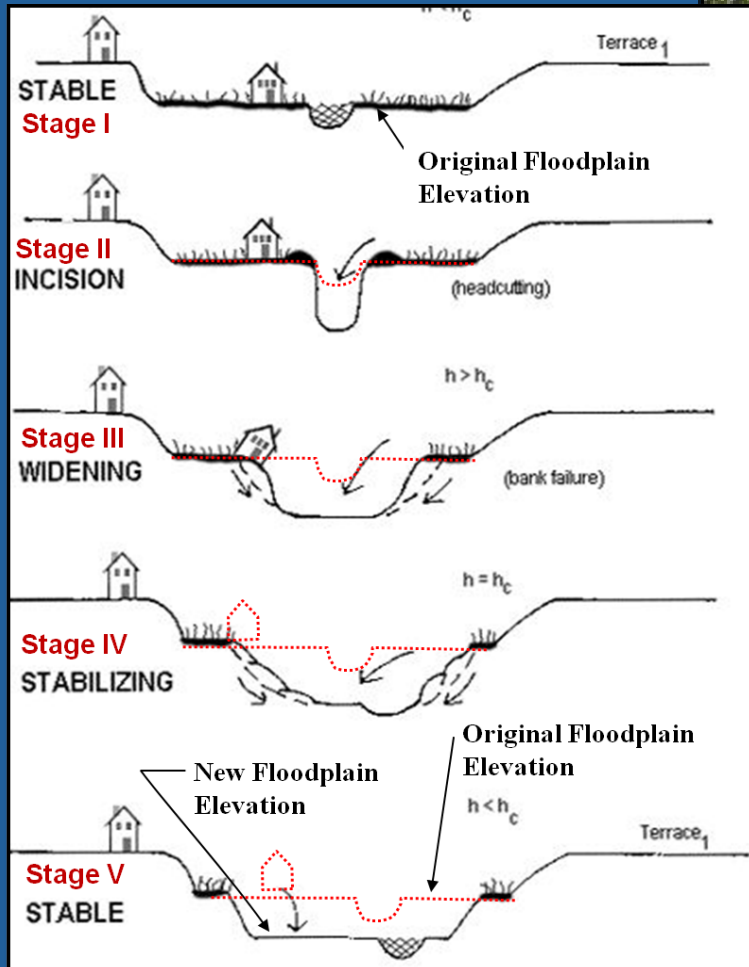
- 5,000 river miles assessed.
- 75% undergoing channel evolution.



# Escalating Costs of Channelization and Encroachment



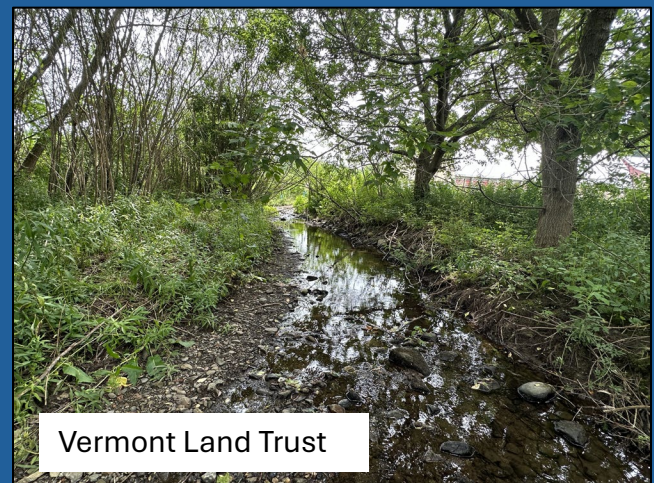
# Solutions



Vermont Land Trust



# Mechanized River-Floodplain Reconnection



Vermont Land Trust

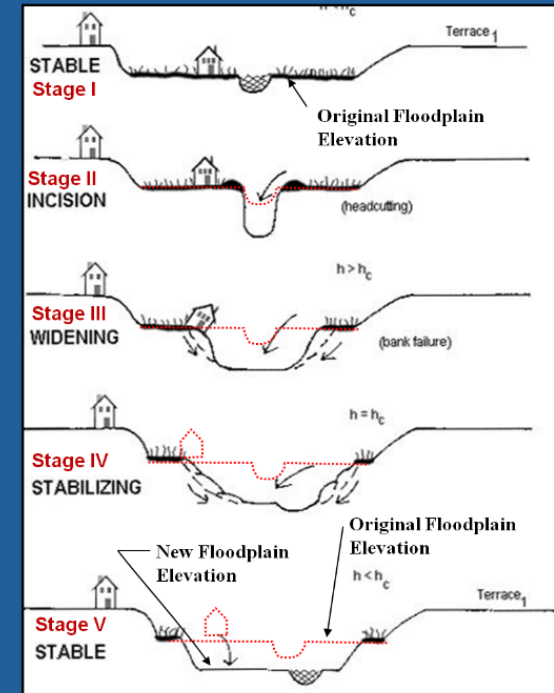
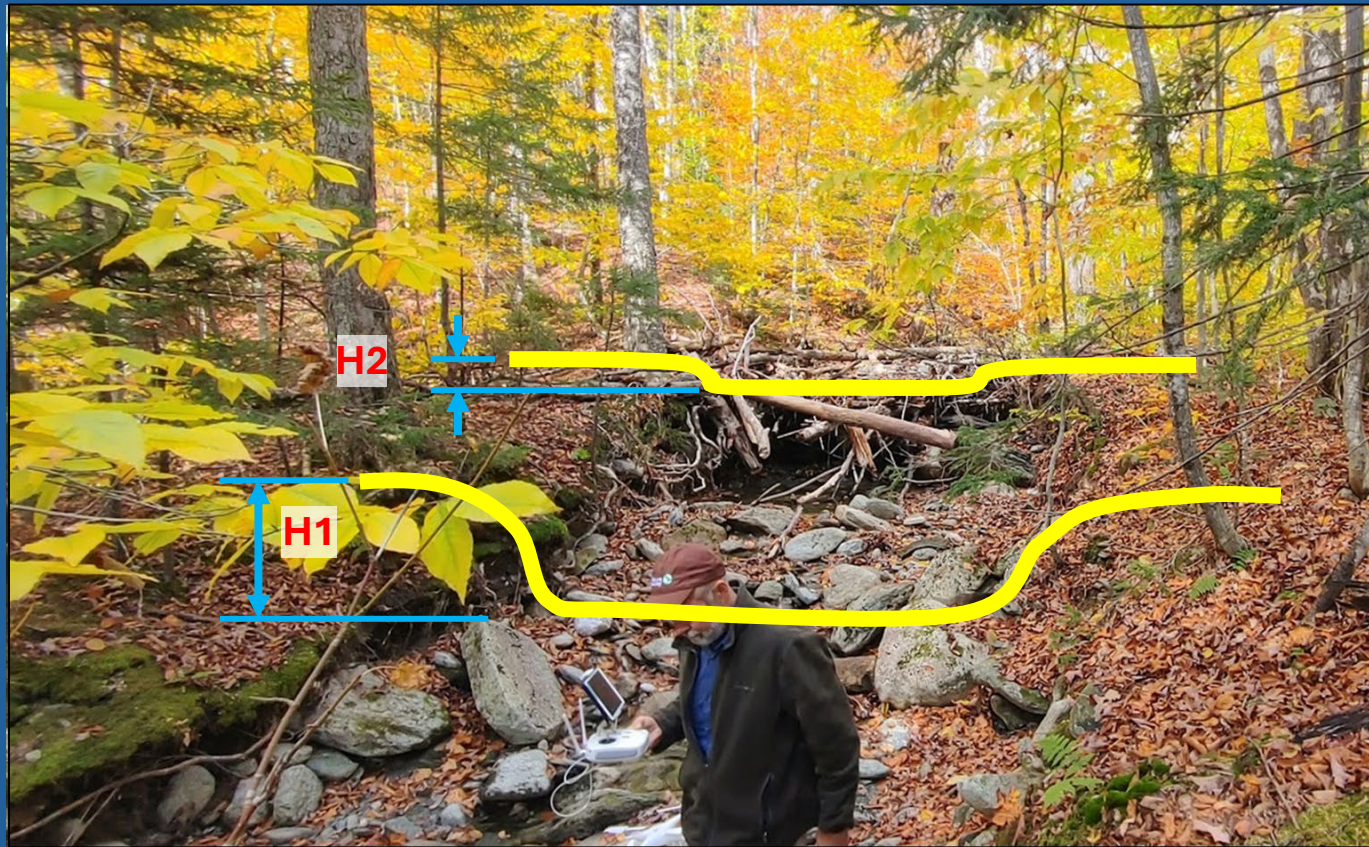


Vermont Land Trust

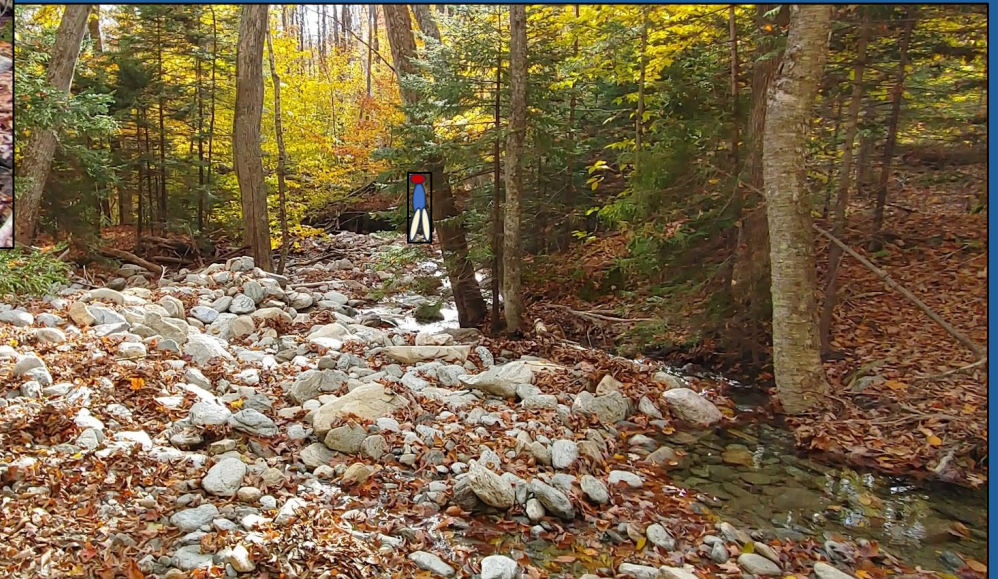
# Strategic Wood Addition



# Reversing Channel Evolution Storing Sediment and Reconnecting the Channel to the Floodplain



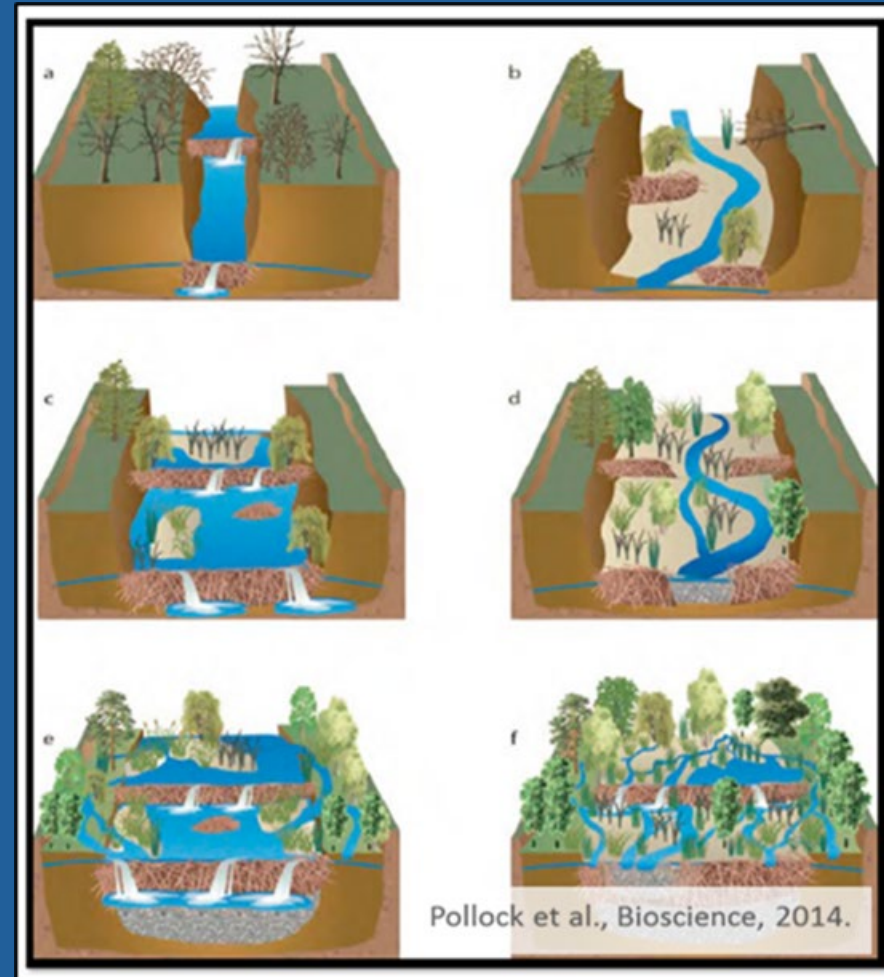
# Reversing Channel Evolution Storing Sediment and Reconnecting the Channel to the Floodplain



# Store Sediment in Headwaters Not Houses



# Beaver-Based Restoration





# Beaver Dam Analogues



# Leave it to Beaver



# Managing Conflicts: Flow Devices

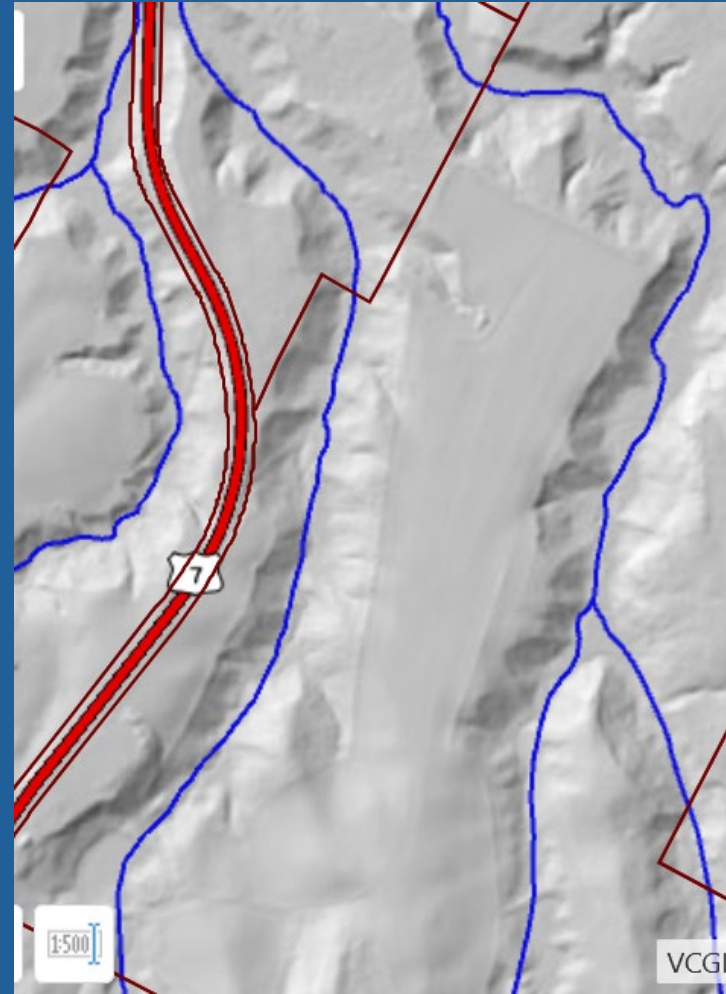


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Beaver Solutions LLC

# Low Conflict-Potential Areas



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