Flood Frequency on the Winooski:

- Going to zoom in a little bit today:

- Why study floods and why are the important in Goemorph

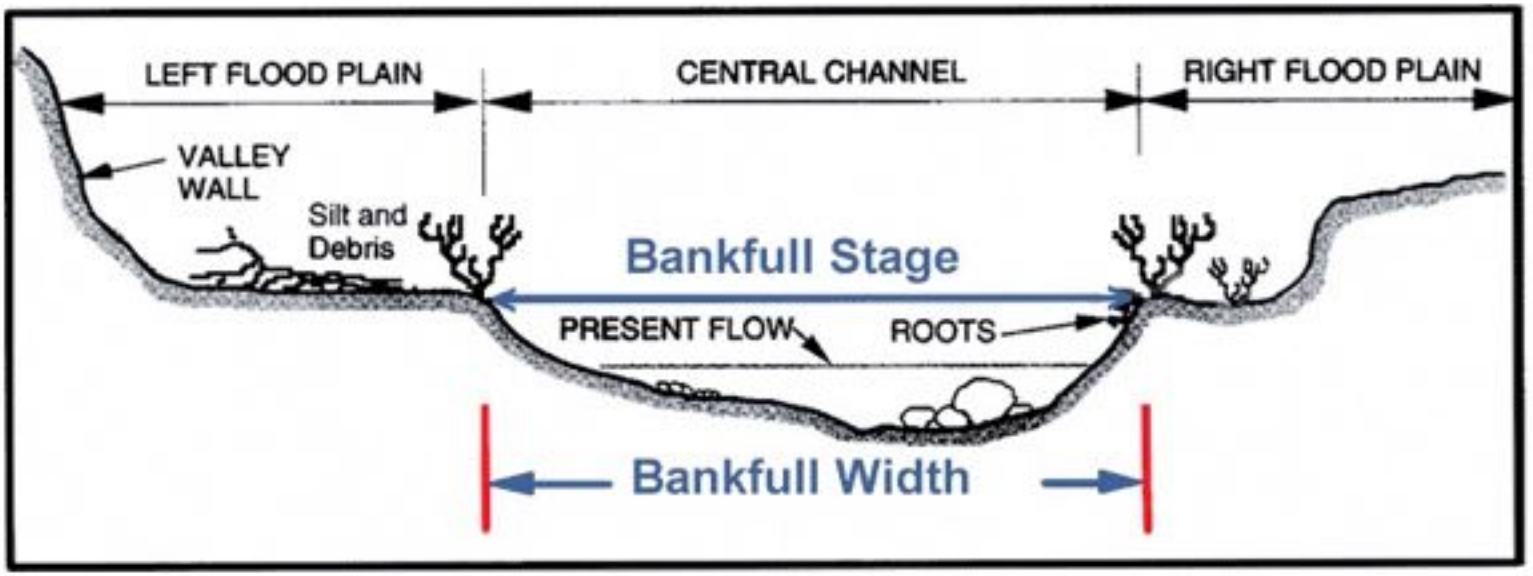
- Get folks comfortable retrieving and working with data Available online. (usgs water site)

- Get folks up to speed with excel, and the much feared MAC computer!

Why Worry About Floods?

New Orleans after Hurricane Katrina, 2005

What is a flood actually?



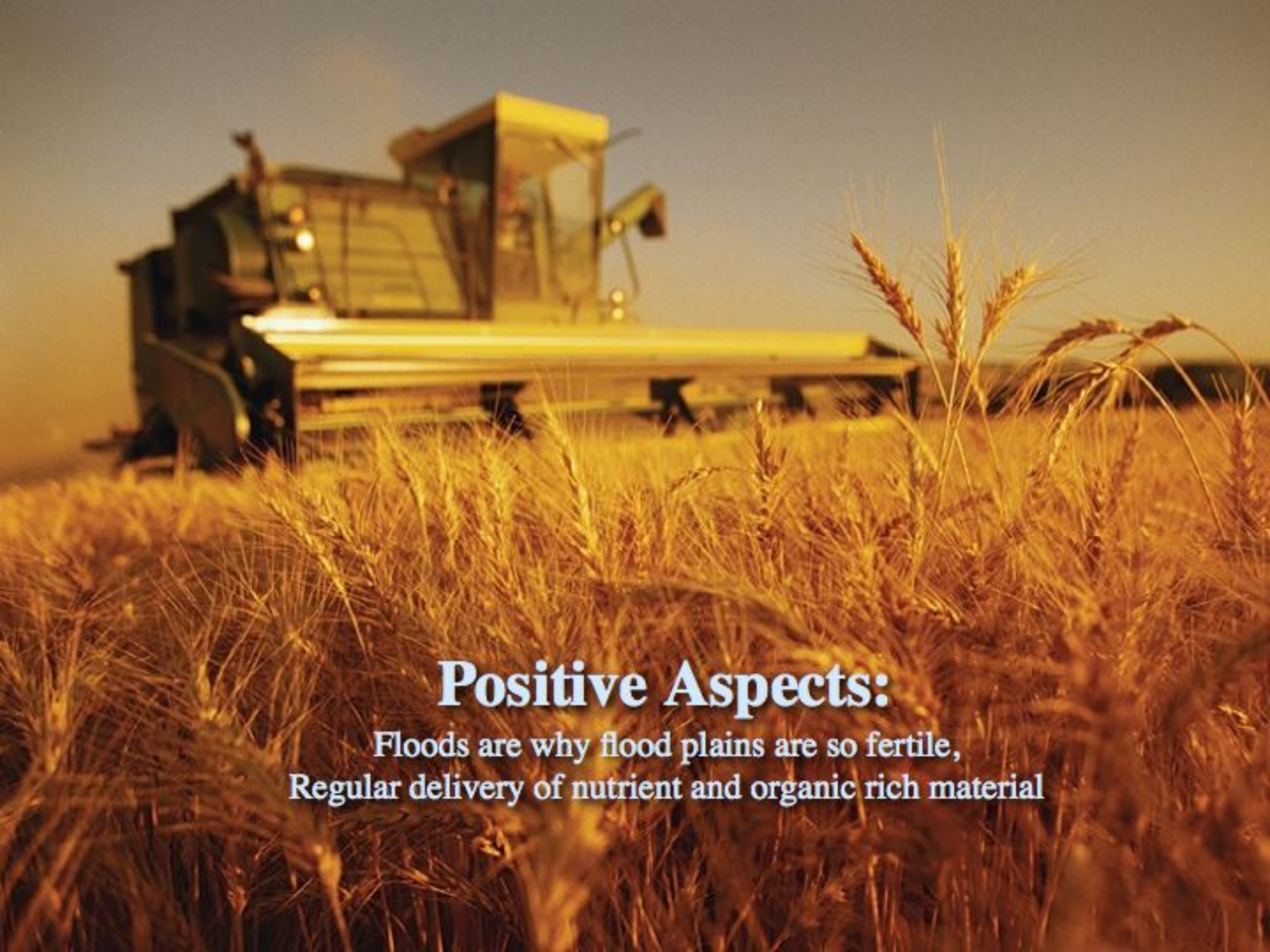
Any time the volume of water exceeds the capacity of the body containing it.

For rivers, when the discharge exceeds the capacity of the Active channel, and spills into the flood plain.


Negative Aspects:
Erosion!!

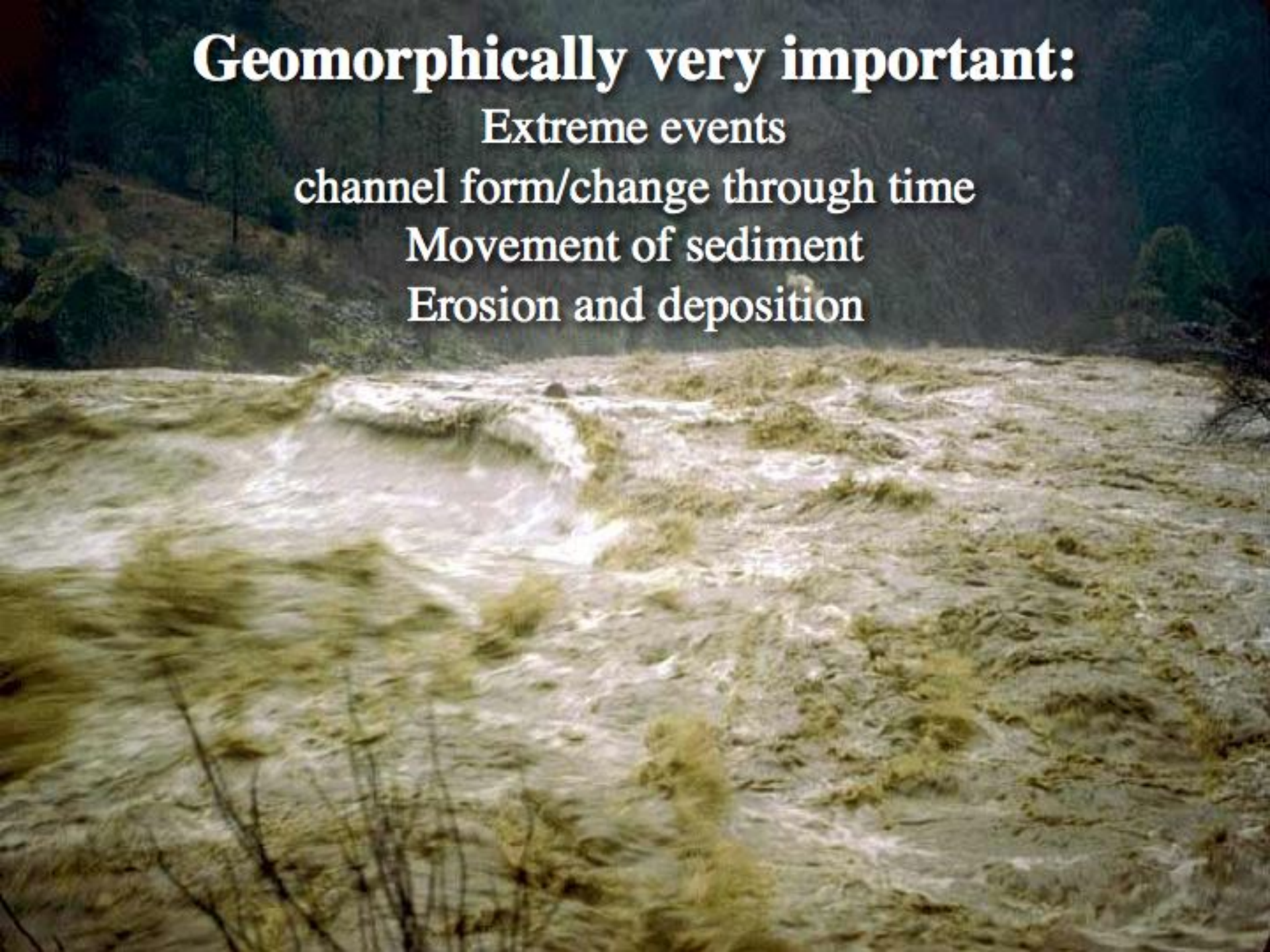
Negative Aspects:

Deposition!

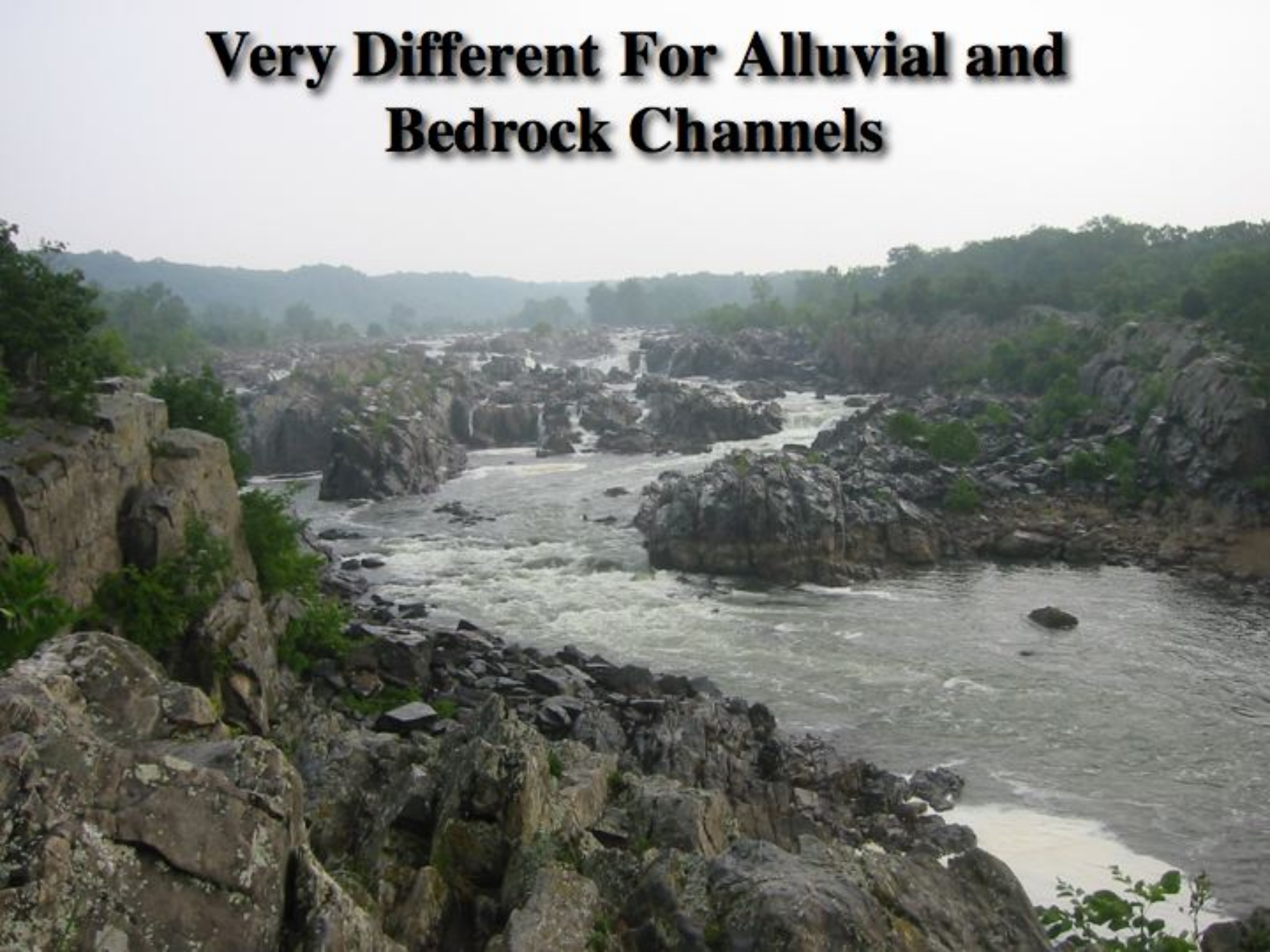


Positive Aspects:

Floods are why flood plains are so fertile,
Regular delivery of nutrient and organic rich material

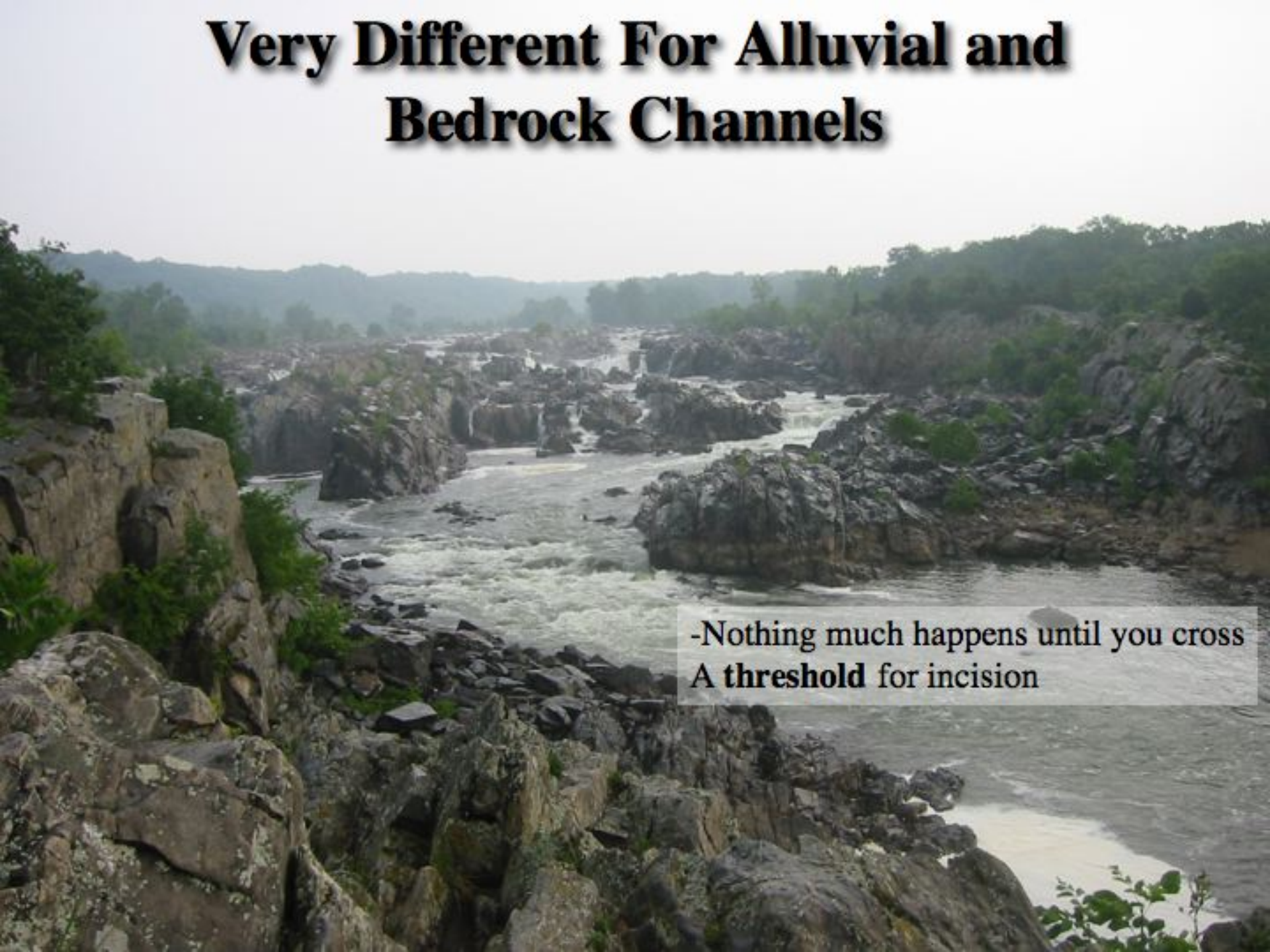

Geomorphically very important:
Extreme events
channel form/change through time
Movement of sediment
Erosion and deposition

Very Different For Alluvial and Bedrock Channels



160,000 cfs….same view

Very Different For Alluvial and Bedrock Channels



-Nothing much happens until you cross
A **threshold** for incision

Alluvial Channels

-Bed and bank erosion during flooding,

-Floodplain deposition,

-Channel deposition as flood wanes,

-If large enough, major channel change,

-Alluvial channels are dynamic features

What We Are Doing Today.

http://water.usgs.gov/

Flood Frequency Analysis
For Our Favorite Watershed….
The Winooski

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- Annual Water Data Reports

WaterWatch — *Current Streamflow Conditions*
- Floods and High Flow
- Drought
- Monthly Streamflow
- Ground Water
- Water Quality

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Science Topics

The USGS mission is to provide water information that benefits the Nation's citizens: Publications, data, maps, and applications software. USGS Water-Resources offices are located in every State.

Of Current Interest...

Release of Several New and Updated Programs for MODFLOW — The Office of Ground Water is pleased to announce the release of several new and updated programs for the MODFLOW ground-water model, including the new Conduit Flow Process for MODFLOW-2005.

Climate Change and Water Availability

Recent climate change publications addressing water availability issues.

Water for America Initiative

It is time for a comprehensive examination of water availability in the United States using what we have learned during the past thirty years and with up-to-date capabilities. Learn more...

NWISWeb Water Data

Access to water-resources data collected at approximately 1.5 million sites throughout the Nation.

- Real-Time
- Surface Water
- Ground Water
- Water Quality
- Site Inventory

Water Information By Topic

- Ground Water
- Surface Water
- Water Quality

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National Water Information System: Web Interface

USGS Water Resources

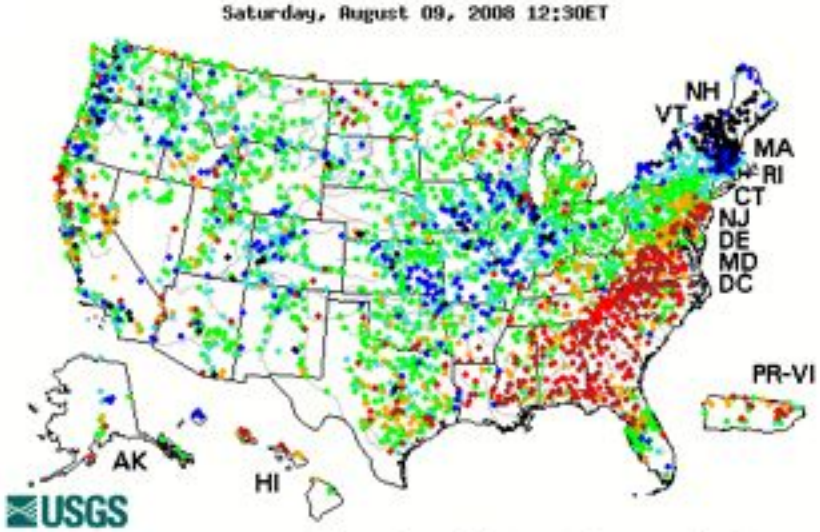
Data Category: Real-time | Geographic Area: Vermont | GO

News: Recent changes

USGS Real-Time Water Data for the Nation

--- Predefined displays --- Introduction | Group table by -- no grouping -- | Select sites by number or name | go

Daily Streamflow Conditions



The colored dots on this map depict

Select a state from the map to access real-time data

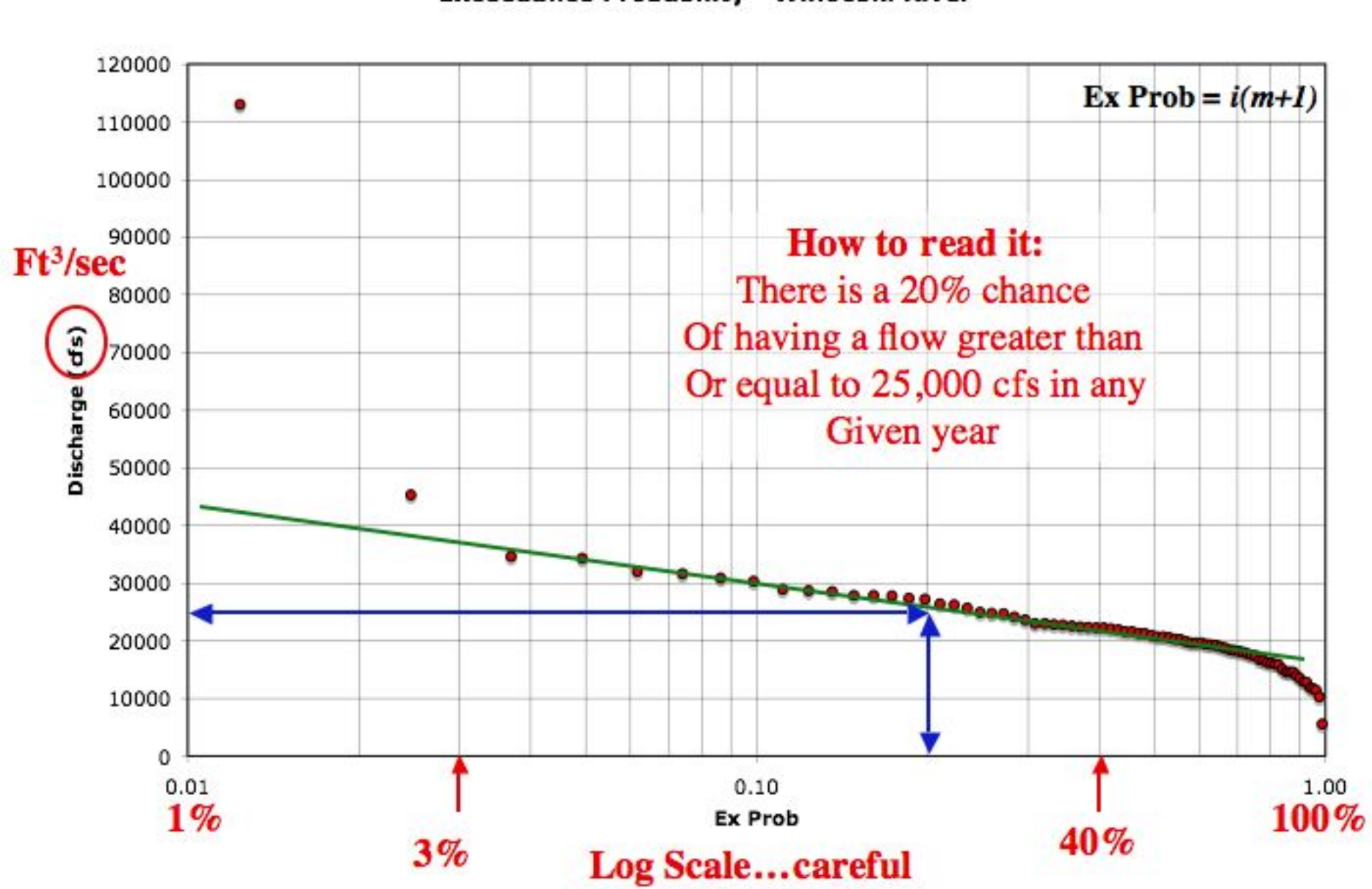
Real-time data typically are recorded at 15-60 minute intervals, stored onsite, and then transmitted to USGS offices every 1 to 4 hours, depending on the data relay technique used. Recording and transmission times may be more frequent during critical events. Data from real-time sites are relayed to USGS offices via satellite, telephone, and/or radio and are available for viewing within minutes of arrival.

All real-time data are **provisional and subject to revision**.

Build Table	Build a custom summary table of the most recent data for one or more sites, states, or hydrologic regions.

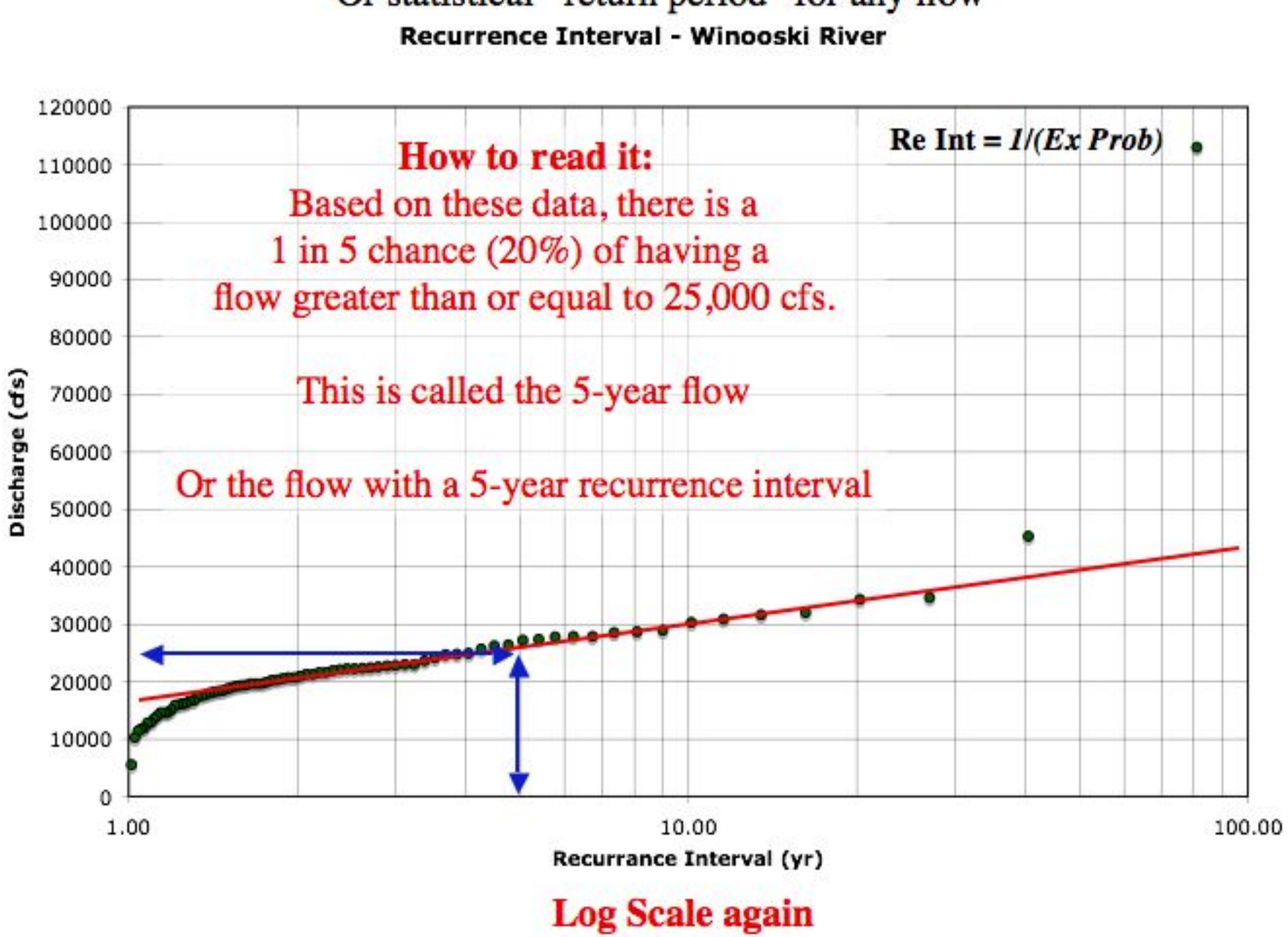
Exceedance Probability:

The probability of exceeding a certain sized flow in any given year



Recurrence Interval:

Or statistical "return period" for any flow



Log Scale again

USGS 04290500 WINOOSKI RIVER NEAR ESSEX JUNCTION, VT

Annual Peak Streamflow, in cubic feet per second

140000

120000

100000

Flood of 1927:

Flood of record for the Winooski River

Why is it so much larger than any other flow?

Major Channel Change and Realignment - Proctor, VT

Major damage at constrictions

So, why was this flood so big?

- Most rainfall in Vermont during the summer (July and August)
- Highest discharges usually in April and May due to snow melt.

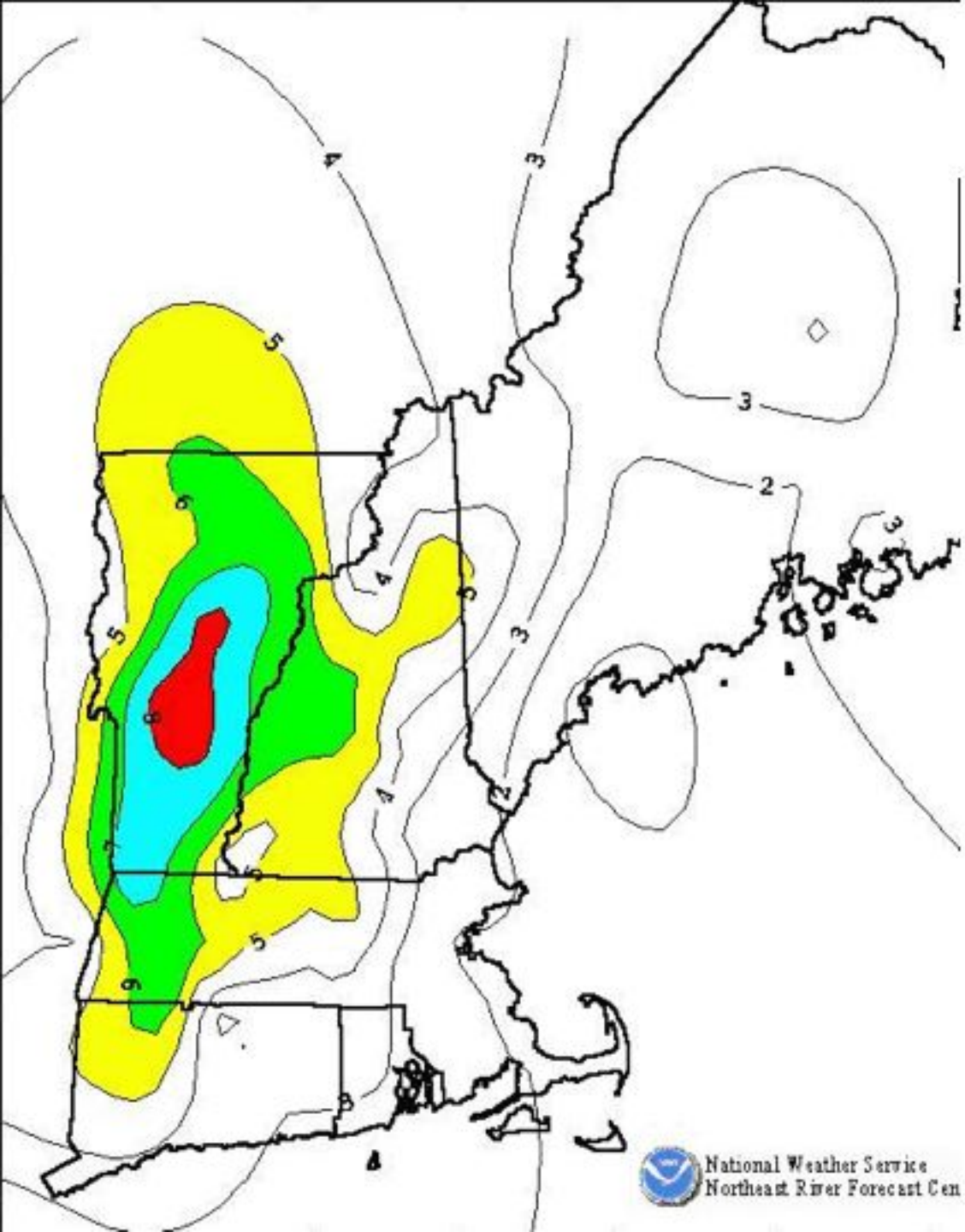
Check out:
http://www.erh.noaa.gov/btv/events/27flood.shtml

Things to consider:
- Weather patterns in October and November
- Saturated soils and runoff - antecedence
- Evapotranspiration - what do trees usually look like in November?

Quick Mac/Excel Review/ Crash course:

- Data Download from USGS water site **http://water.usgs.gov**
- Wrestling real data into excel.
- Saving to your zoo account on MACs
- Excel basics:
  - Sorting
  - Ploting
  - Log axes
  - Etc.

1927 Flood



- ***Antecedence*** -- Rainfall during the month of October averaged about 150 percent of normal across the state. In northern and central sections, some stations received 200-300 percent of normal.

Cause of the 1927 Flood

Mositure-laden air was forced to rise as it encountered the Green Mountains, resulting in torrential downpours. Rainfall in Northfield totaled 1.65 inches from 4:00 am to 11:00 am on the 3rd, with 4.24 inches falling from 11:00 am to 8:00 pm. The total from late evening of the 2nd to late morning on the 4th was 8.71 inches.