

Oneida County

Area: 1260 sq mi

County Population: ~234,000

Industries: Dairy, STEM, Tourism

46 municipalities

Major watersheds

Mohawk

Great Lakes

Black River

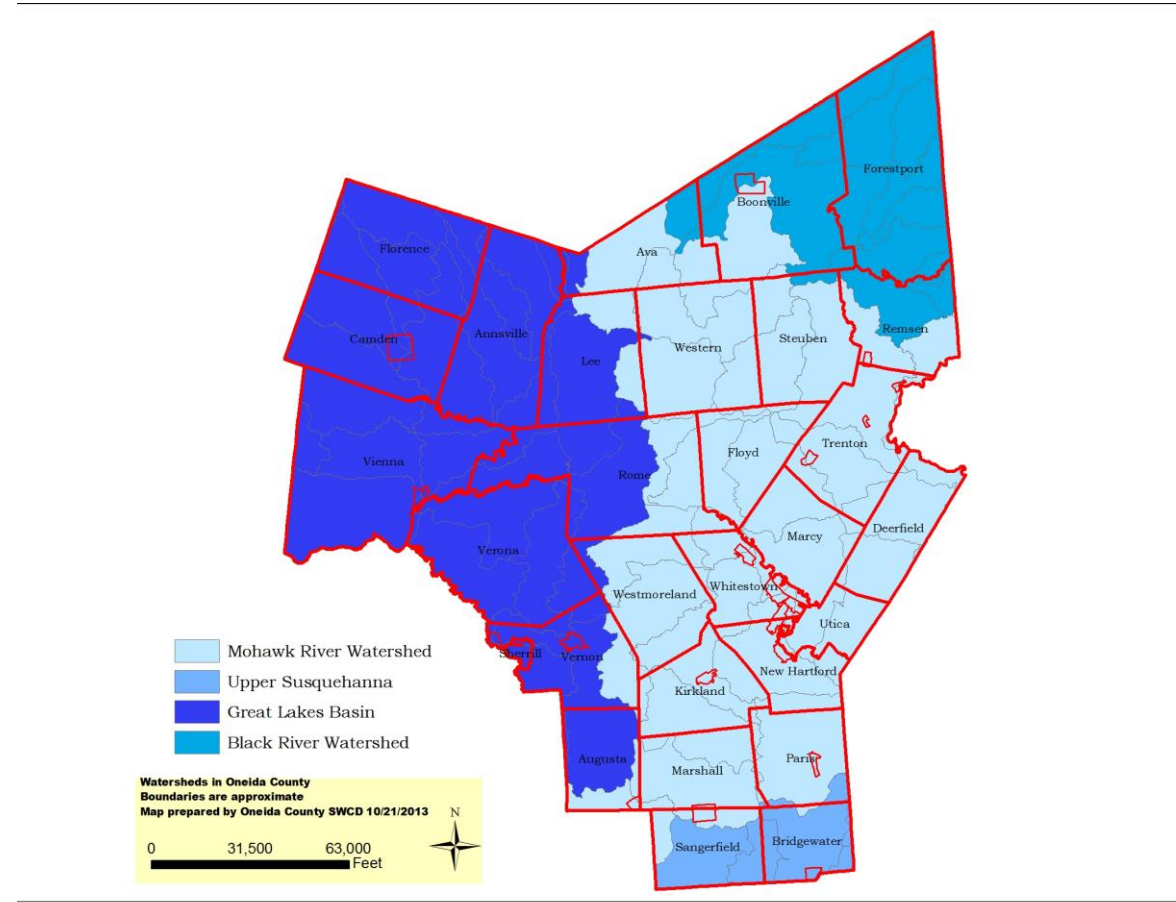
Upper Susquehanna

Oneida County SWCD

Founded in 1940

SWCD program areas

- AEM & CAFO Planning
- Forestry
- Wetlands Restoration
- Community Env. Mgmt
 - Hazard Mitigation
 - Stormwater Mgmt
 - Stream Restoration



Stream Restoration in Oneida County



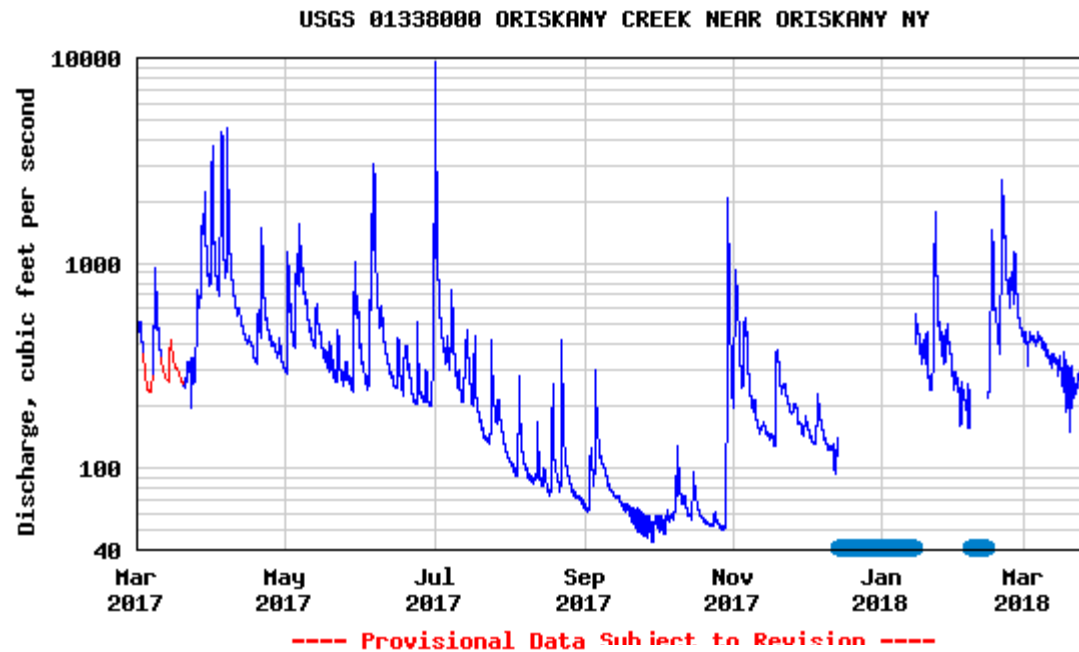
Funding

- MVEDGE: Offsite mitigation projects
- NYSDOS LWRP with Mohawk River WS Coalition of Cons. Districts
- NYSDEC
- USFWS
- FL-LOWPA
- Oneida County

Background

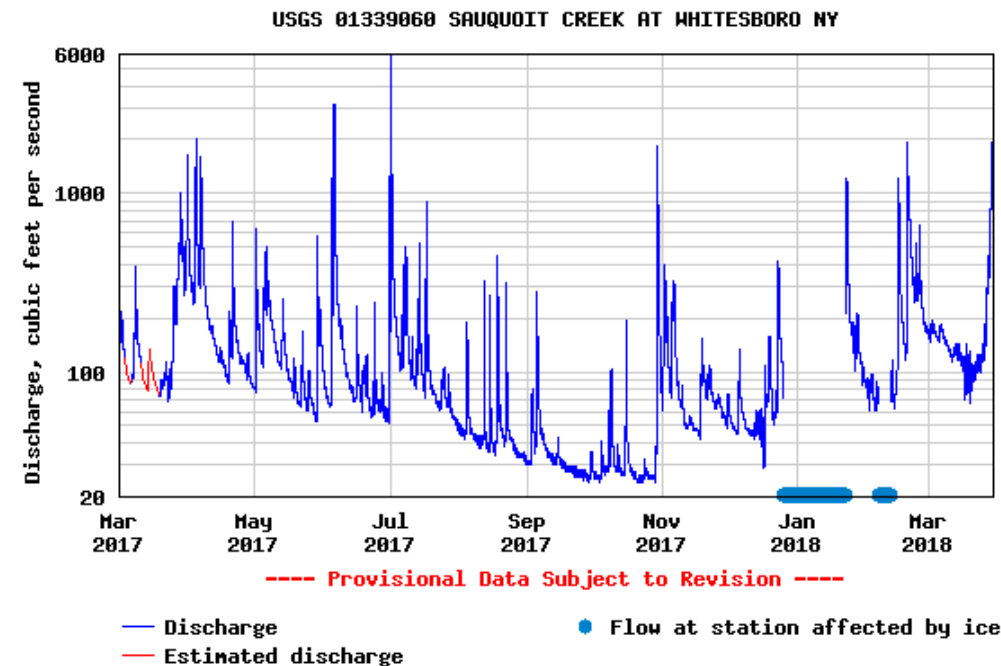
- Watershed management
 - LAND USE!
 - REPLACE GREEN SPACE WITH PAVEMENT
 - DRAIN WETLANDS
 - DITCHING PRACTICES
 - MORE WATER REACHING THE STREAMS FASTER!
 - Floodplain encroachment
 - Undersized infrastructure
 - Result: More flooding, more erosion, co\$tlly solutions
 - **SOMETIMES THE SAME COMMUNITY LOOKING FOR STREAM HELP IS THE SAME COMMUNITY APPROVING FLOODPLAIN DEVELOPMENT!**
 - **NEED TO FIND A BALANCE BETWEEN ECONOMIC GAIN FROM DEVELOPMENT WITH ECONOMIC LOSS FROM FLOOD DAMAGES!**
 - **Municipal Comprehensive plans need to take stream stability into consideration**
 - **Is the plan accounting for the \$\$ impacts on the watershed?**
- Widespread stream instability
 - **Entrenched, channelized**
 - **Minimal floodplain connection**
 - **Bed Scour,**
 - **Bank Failure**
 - **Exposed sewer lines**
- Frequent and Intense Storms
 - Irene and Lee, 2011
 - June/July 2013 events
 - July 2017 storm of record
- Traditional Recovery efforts & repairs: Channelization, rip rap, dredging, berming, repeat



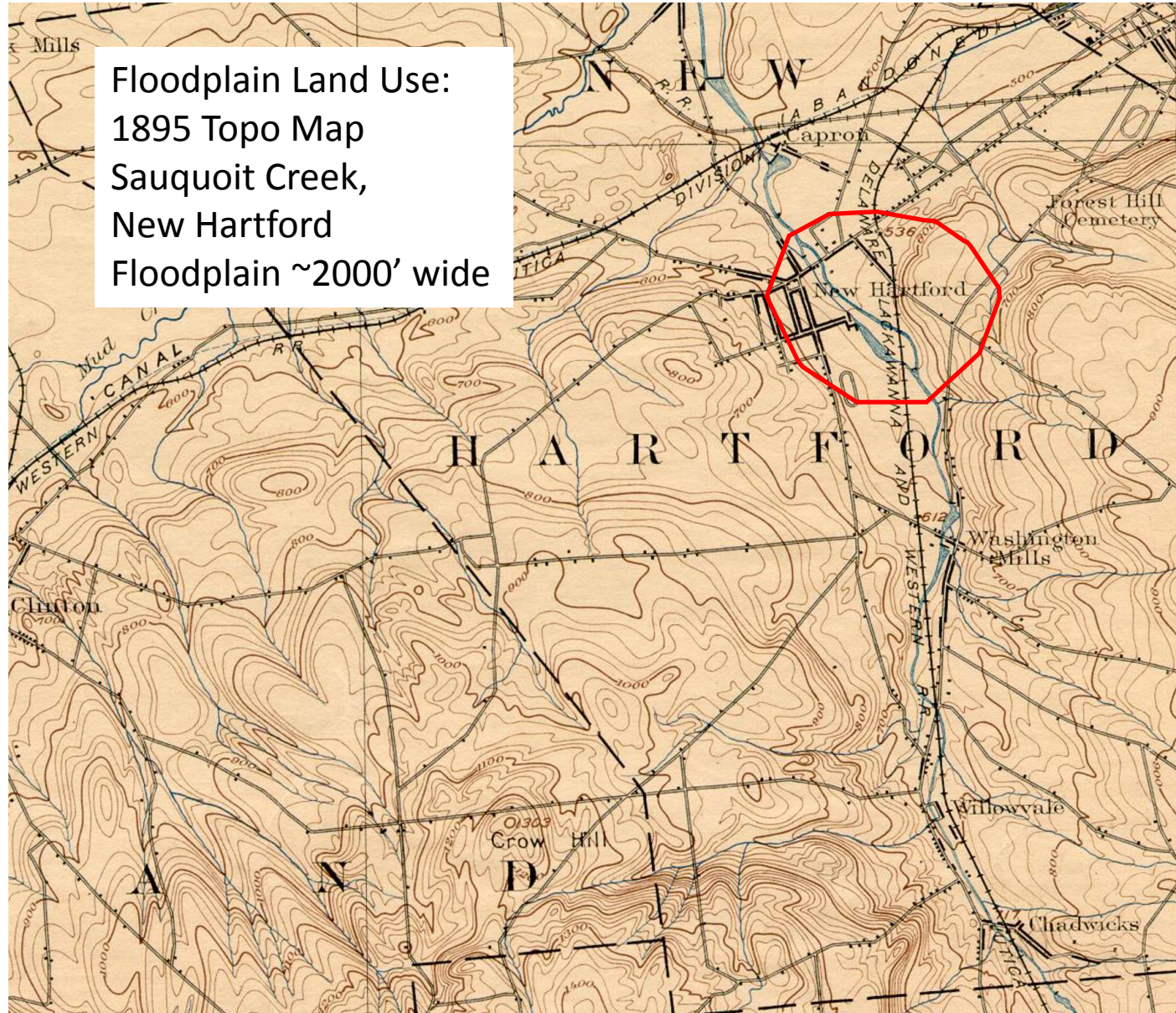


Storms...

June 30 – July 1:
50 cfs to 6000 cfs!
That flow can't fit
through a pipe and
won't stay in a
stream...Need
Floodplains!



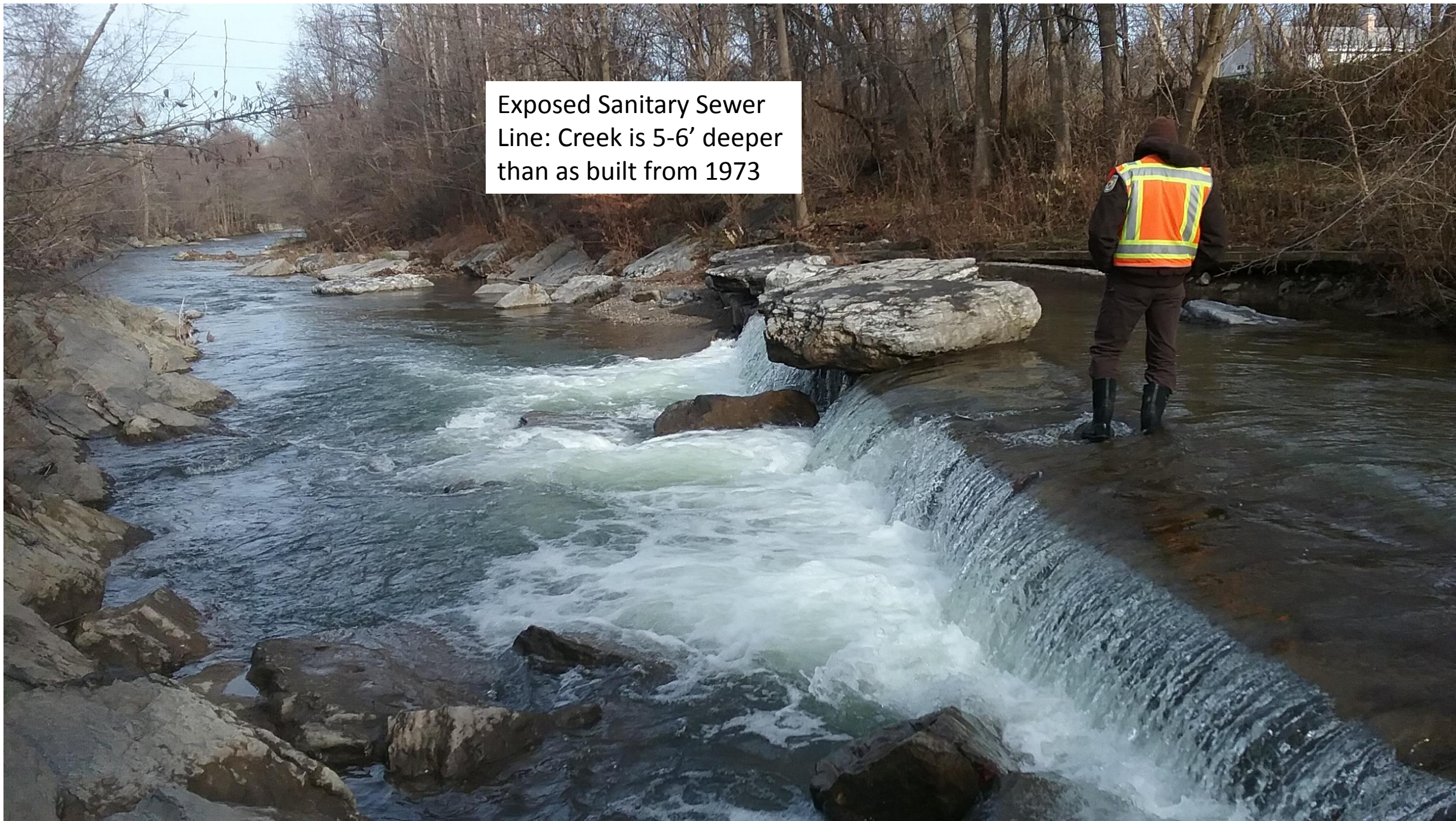
Floodplain Land Use:
1895 Topo Map
Sauquoit Creek,
New Hartford
Floodplain ~2000' wide



Land Use:
2017 photo, Google
Floodplain ~80 feet wide
Catastrophic Floods
Exposed Infrastructure



Exposed Sanitary Sewer
Line: Creek is 5-6' deeper
than as built from 1973



Stream Restoration

- State funded studies of priority watersheds after 2013 event;
- Stream restoration funding emerged.
- 4 Storms of Record in 6 years.
- Ability to focus on Planning and Implementing **progressive** restoration projects .
- Use ESI as a template.
- Use Rosgen's Natural Channel Design (USFWS)
- **2010 First NCD in Oneida County:**
Stokes Westernville Road project on the Mohawk
 - USFWS/Canal Corp/DOT/DEC



Rosgen's Natural Channel Design (ABBREVIATED!!)

- A stable stream balances water flow and sediment transport
- An unstable stream is “trying” to re-establish stable conditions.
- Try to Establish stable **bankfull dimensions** for the DA.
- **Identify and Preserve stable features**
- **Right size infrastructure to 1.25 or (1.5x) bf dimensions**
- **Bank stabilization:**
 - Stabilization of urbanized (incised) streams
 - Stabilization of bed(**Grade control**):
- **Reconnection to Floodplain**
- **Re-Vegetation:** willow stakes, bare root stock, seed and mulch all disturbed areas.
- **OCSWCD: Stable Streams are better for everyone, terrestrial and aquatic residents!**



Reference Reach of C3

Summer Flow

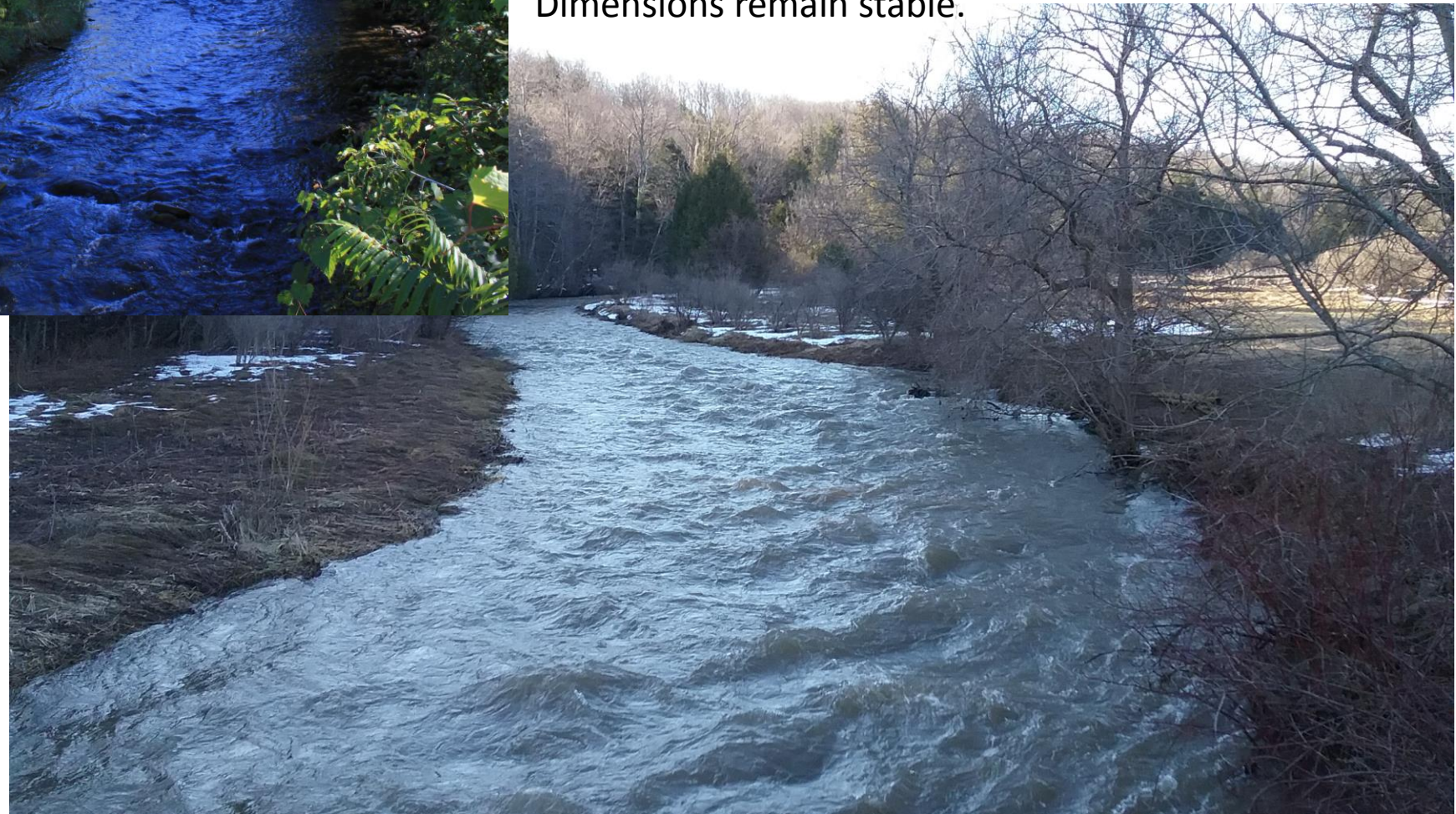
Good Veg

No Development Pressure

Properly sized infrastructure

Bankfull at Spring Runoff

Dimensions remain stable.



Design Elements: Do we like fish more than people?

We can't help people **or** fish unless we address the stream conditions.

Trying to get the basics right so everyone can benefit.

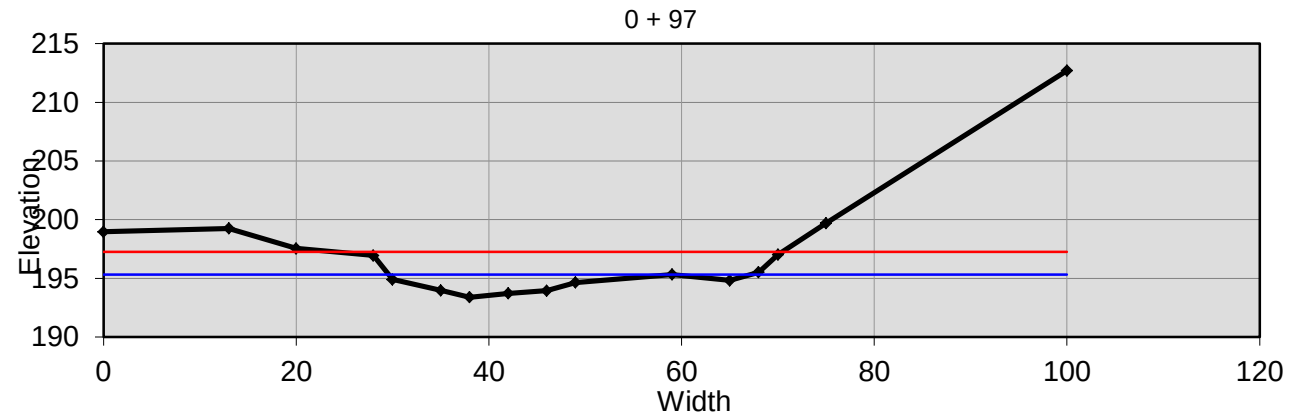
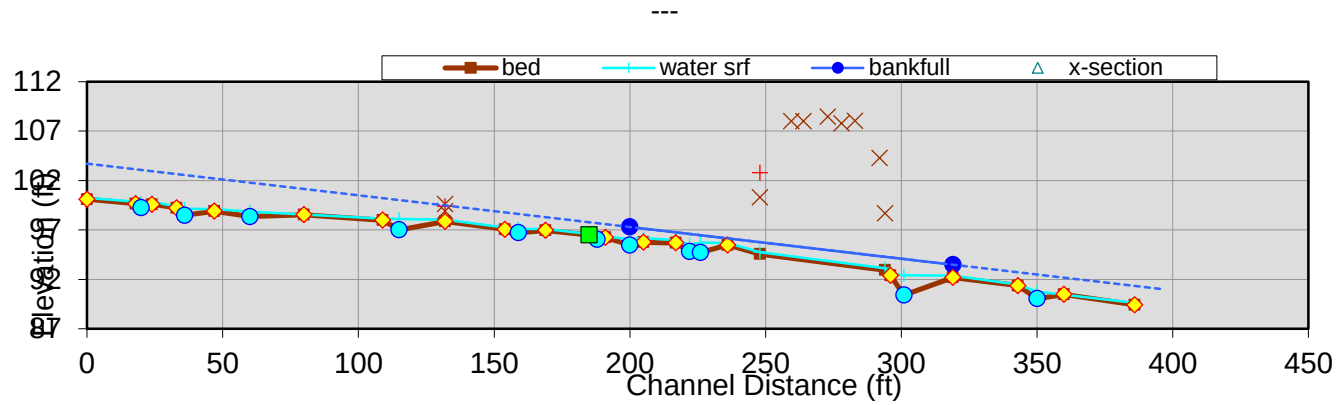


The U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, Coastal Program - Stream Assessment and Restoration team developed the document "A Function-Based Framework for Stream Assessments, Restoration Goals Performance Standards, and Standard Operating Procedures."

NCD Methods (Rosgen):

What's different than traditional methods?

- Principles of Fluvial Geomorphology
- Identify Objectives for stabilizing the reach, not just putting a bandage on a bank.
- Ask WHY a stream is unstable first – diagnostics!.
 - Identify Valley Type
 - Drainage Area
 - Water Surface Slope
 - Record dimensions of cross sectional areas
 - Sinuosity
 - Bankfull dimensions
 - Width of Floodprone Area
 - Meander dimensions
 - Pool to Pool spacing
 - Record bed material D50
 - Identify Stream Type
- Then, figure out HOW to stabilize the reach, not just the eroding bank.
- **NCD is a HUGE topic!** The Emergency Stream Intervention Course is a good start but even Einstein didn't have rivers totally figured out!*
- *The Cause of the Formation of Meanders in the Courses of Rivers and of the So-Called Baer's Law by Albert Einstein.



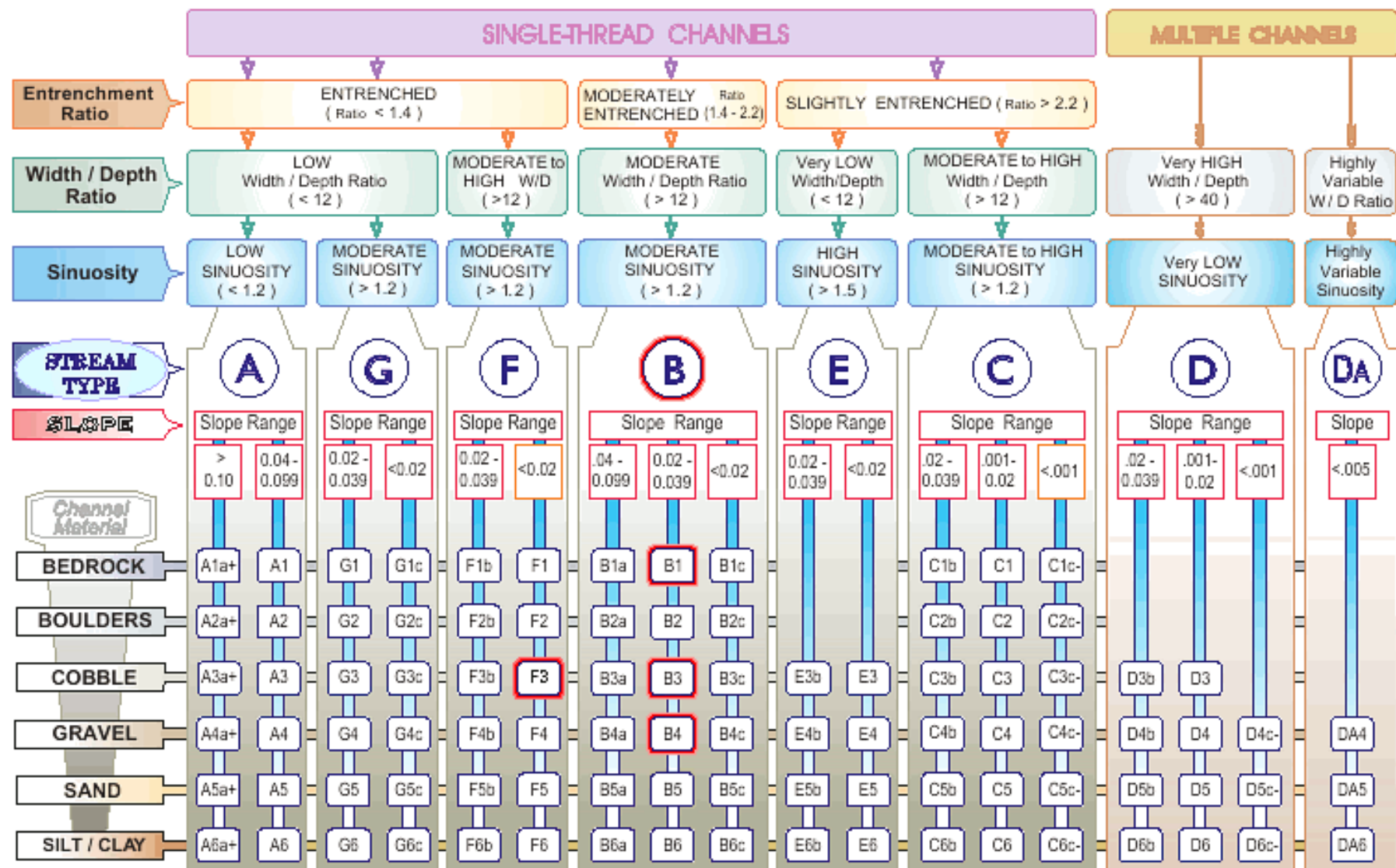
Longitudinal profiles,
cross sections at riffles,
Pebble counts

Document the existing conditions to help determine how to repair the channel.

Not all streams are the same!!

Not a cookie-cutter design approach!

The Key to the Rosgen Classification of Natural Rivers



KEY to the ROSGEN CLASSIFICATION of NATURAL RIVERS.

As a function of the "continuum of physical variables" within stream reaches, values of **Entrenchment** and **Sinuosity** ratios can vary by +/- 0.2 units; while values for **Width / Depth** ratios can vary by +/- 2.0 units.

An aerial photograph showing a river flowing through a landscape. A bridge crosses the river, and the surrounding area includes fields and forested regions. The river's path is visible, showing some deviation from a straight line.

First major Natural
Channel Design
project in Oneida
County on the
Mohawk River;
NYSDEC, USFWS, NYS
Canal Corps, DOT

2008 GIS Aerial image, Stokes Westernville Road (bridge approx 130' span); River is almost 200 feet from path in mid 1990s. Possibly caused by gravel removal.



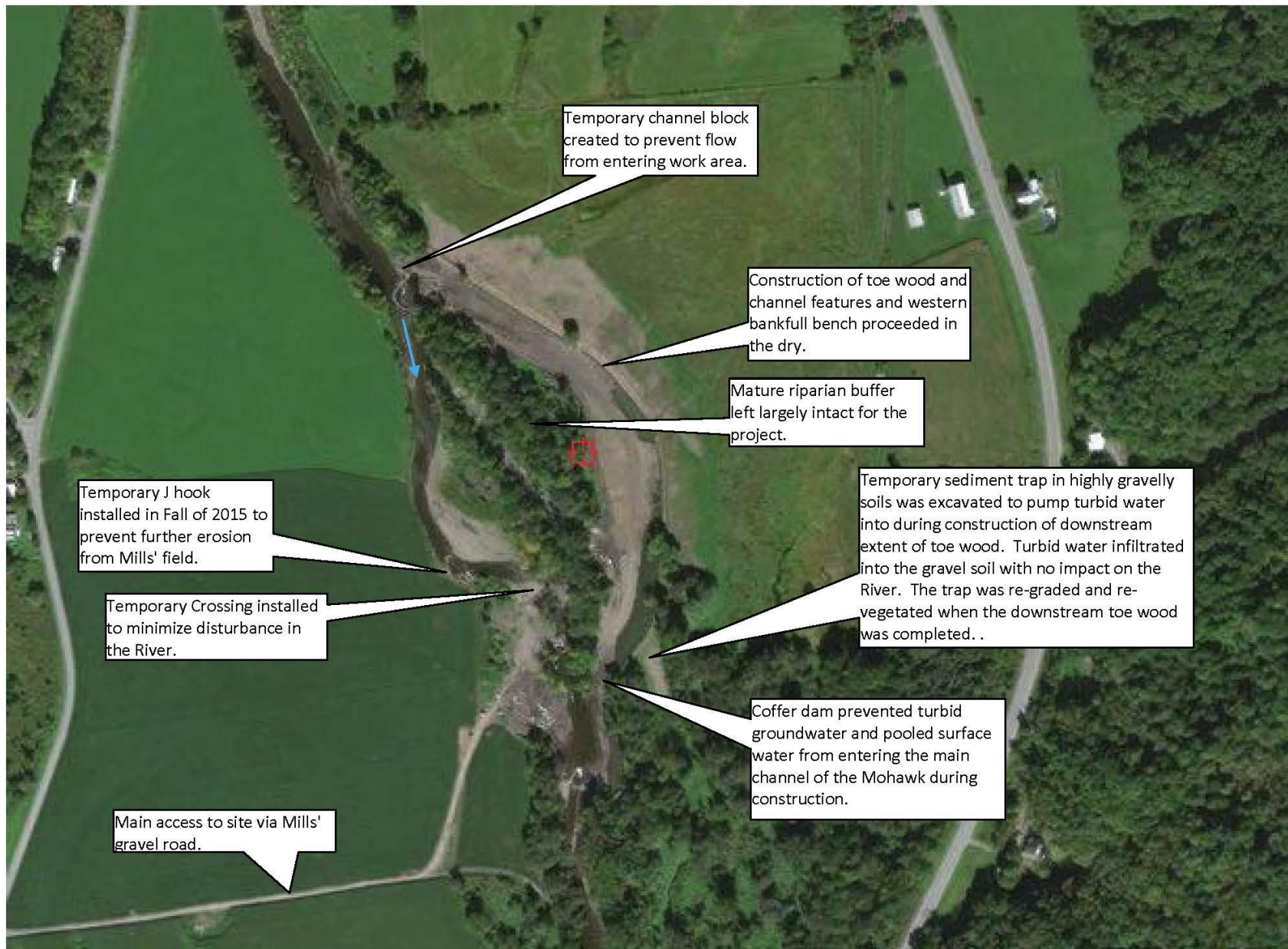
2015 GIS Aerial Stokes Westernville project, fully vegetated and stable.



Mills' field had lost approximately 7 acres of ground between 1995 and 2015. In some areas, the lateral migration on the bank was over 100 feet.

Shallow bedrock prevented further downcutting in channel in the mid-2000s. A sediment bar formed on the upstream side of the bedrock forcing flow into the western channel which then became the main channel. In storm events, the center channel also conveyed flow.

2015 Mills site



Temporary channel block created to prevent flow from entering work area.

Construction of toe wood and channel features and western bankfull bench proceeded in the dry.

Mature riparian buffer left largely intact for the project.

Temporary J hook installed in Fall of 2015 to prevent further erosion from Mills' field.

Temporary Crossing installed to minimize disturbance in the River.

Main access to site via Mills' gravel road.

Temporary sediment trap in highly gravelly soils was excavated to pump turbid water into during construction of downstream extent of toe wood. Turbid water infiltrated into the gravel soil with no impact on the River. The trap was re-graded and re-vegetated when the downstream toe wood was completed. .

Coffer dam prevented turbid groundwater and pooled surface water from entering the main channel of the Mohawk during construction.

2016 aerial during construction at Mills



Google Earth 2017 imagery, Elevations; overall channel grade approximately 0.4%.

Rock adds extra insurance
to logs especially during
high flows.





Not just water to consider...

Ice

Low Gradient

High Bedload

















Facing downstream from the meander toe wood in September of 2016 approximately 1 week post construction.



May, 2017: Facing downstream from the upstream extent of the toe wood at the meander



7.1.17 storm flow



Sept, 2017: Facing downstream from the upstream extent of the meander toe wood







Water overtops this bank by up to 1.5 feet in large events but toe wood held. Minor repairs were needed on the upper bank after 7.1.17 storm.

































Rock and Roll Logs:
First try with these.
May need to put
fabric on logs to help
seal gaps if there isn't
a lot of material
coming from
upstream.

















Lessons learned

- The more you know, the more you realize what you don't know!
- Identify the **project objective** before you start anything
 - Identify what we are protecting early on.
- We **can't stop flooding**, we can reduce erosion.
- Don't replace, right size!
- Keep learning!
 - Appreciate and learn from **good contractors**!
- Good communication, early on!
 - regulators, landowners, municipalities, etc.
- **Easements:** be clear with landowners up front. **THESE ARE HARDER THAN PERMITS!**
- Take care of those willows!
 - careful (ethical) harvesting, pre-soaking, planting,
- Rivers change, designs may need to also.
- Japanese Knotweed is awful.
- **IT TAKES A LONG TIME TO GET REIMBURSED FOR THESE PROJECTS!**
 - If we can't get the contractor paid within 2 months, we can't do the project.
 - Municipality may have to pay up front and wait for reimbursement – project may not happen.
- **Reminder: Watershed management and land use affect stream stability!**
 - **Protect Wetlands and Avoid Building in the Floodzone**

References

Dave Rosgen's Material: <https://wildlandhydrology.com//>

North Carolina Material:

https://www.bae.ncsu.edu/programs/extension/wqg/sri/stream_rest_guidebook/guidebook.html

USFWS Natural Channel Design Review Presentation:

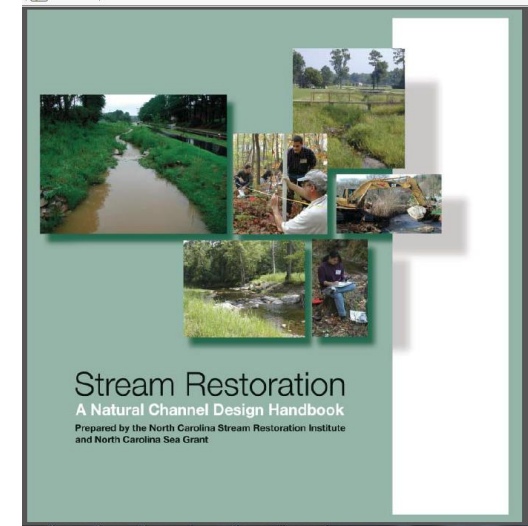
https://www.epa.gov/sites/production/files/2015-07/documents/natural_stream_channel_design_techniques_and_review.pdf

USFWS Natural Channel Design Review Book:

<https://www.fws.gov/chesapeakebay/StreamReports/NCD%20Review%20Checklist/Natural%20Channel%20Design%20Checklist%20Doc%20V2%20Final%2011-4-11.pdf>.

Washington State Fish Passage:

<http://wdfw.wa.gov/publications/01501/wdfw01501.pdf>.



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