

# 3 minute video

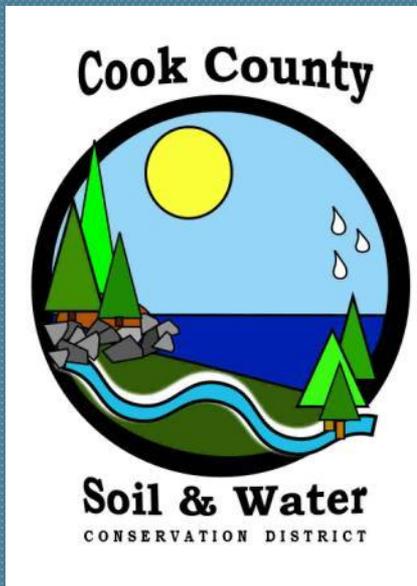
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- <http://www.youtube.com/watch?v=rW3sXyrJh4>

# Flute Reed River Watershed Restoration Projects

MINNESOTA FOREST RESOURCES COUNCIL

September 17, 2014



STARK ENTERPRISES LLC



# Great Lakes Restoration Grant:

- Goal to Reduce Turbidity and Improve Fish Habitat
- 5 Streambank Restoration Projects



# Streambank Restoration Process

- Data assessment: walked the stream and collected data





Bank Height

Root Density

Rooting Depth

Bank Angle

Bankfull Height/Bank Height

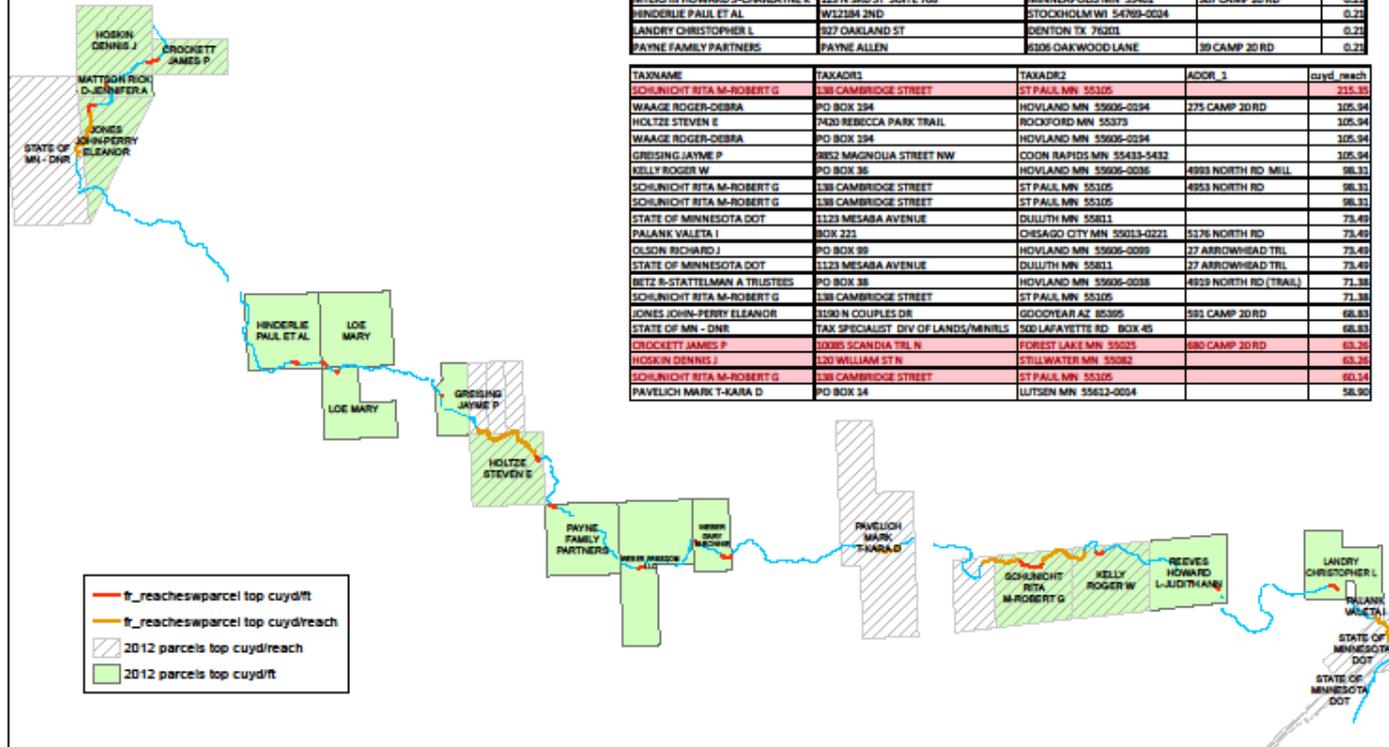
Surface Protection

Bank Material

BEHI Evaluation

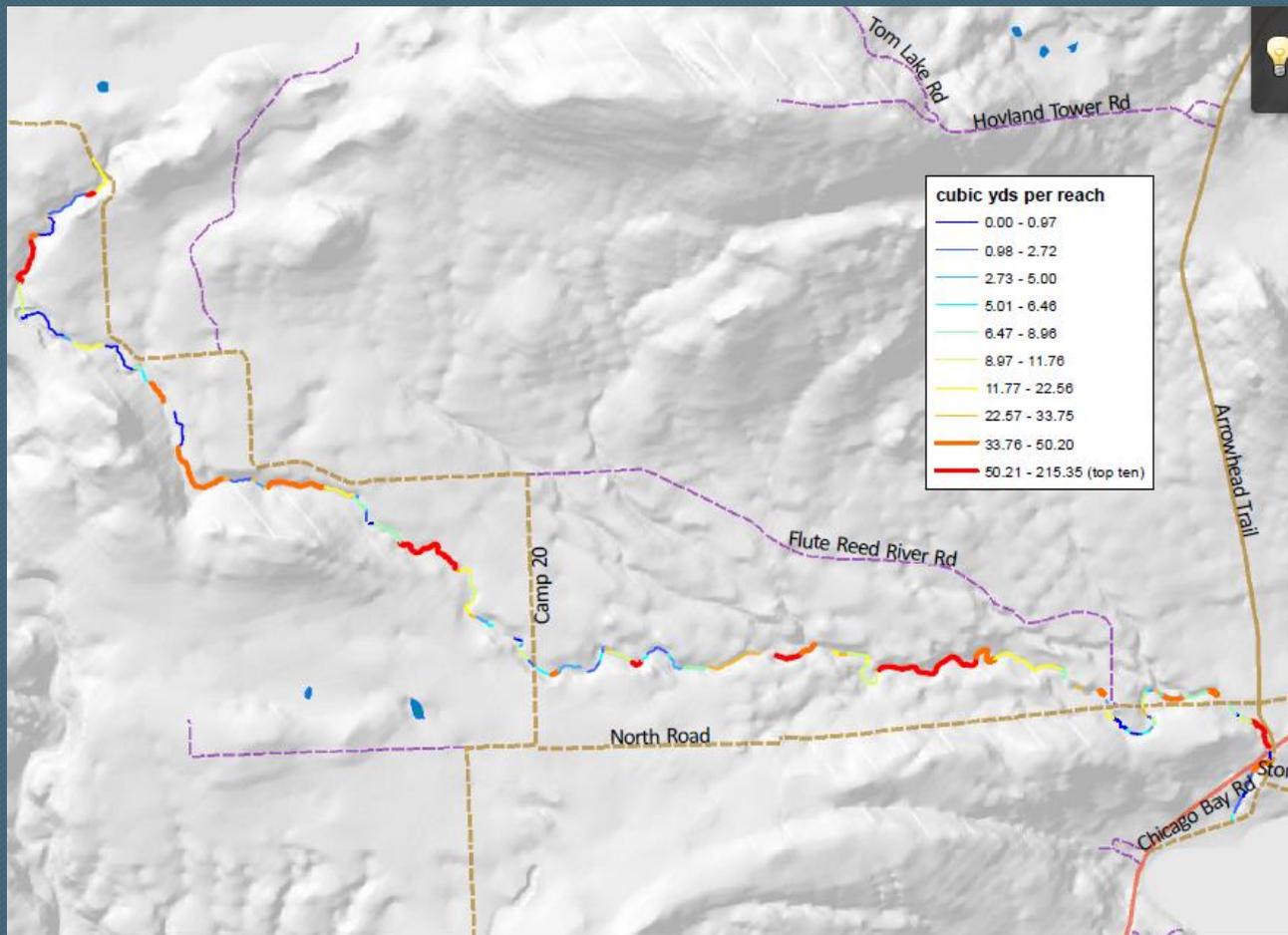
# Top Reaches With Parcels

## Flute Reed Project Ranking Top 20 Stream Reaches by cu yd/ reach and cu yd/ foot



# Streambank Restoration Process

- Selected 5 high priority sites and worked with willing landowners



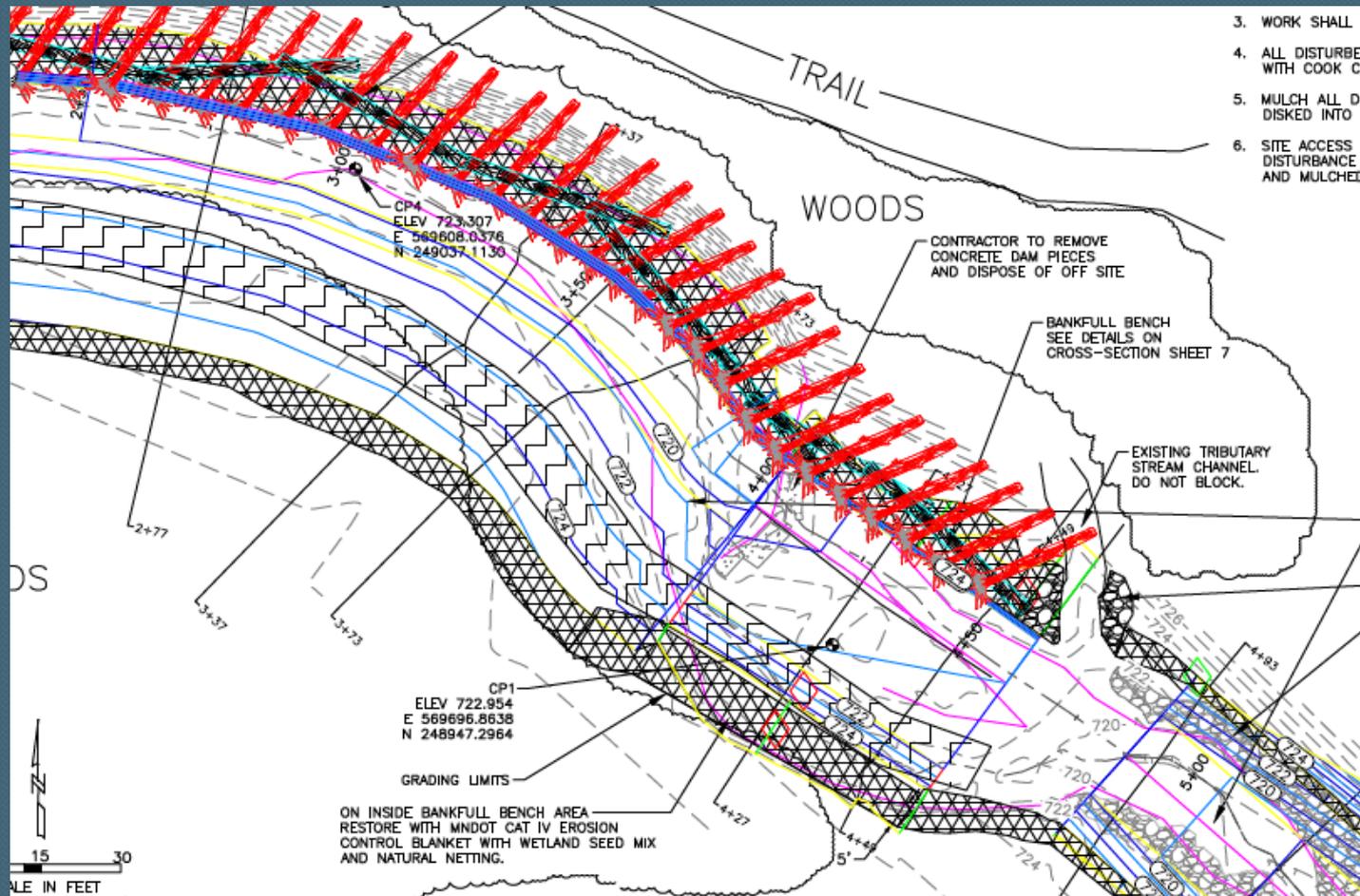
# Streambank Restoration Process

- Surveyed the 5 bank sites

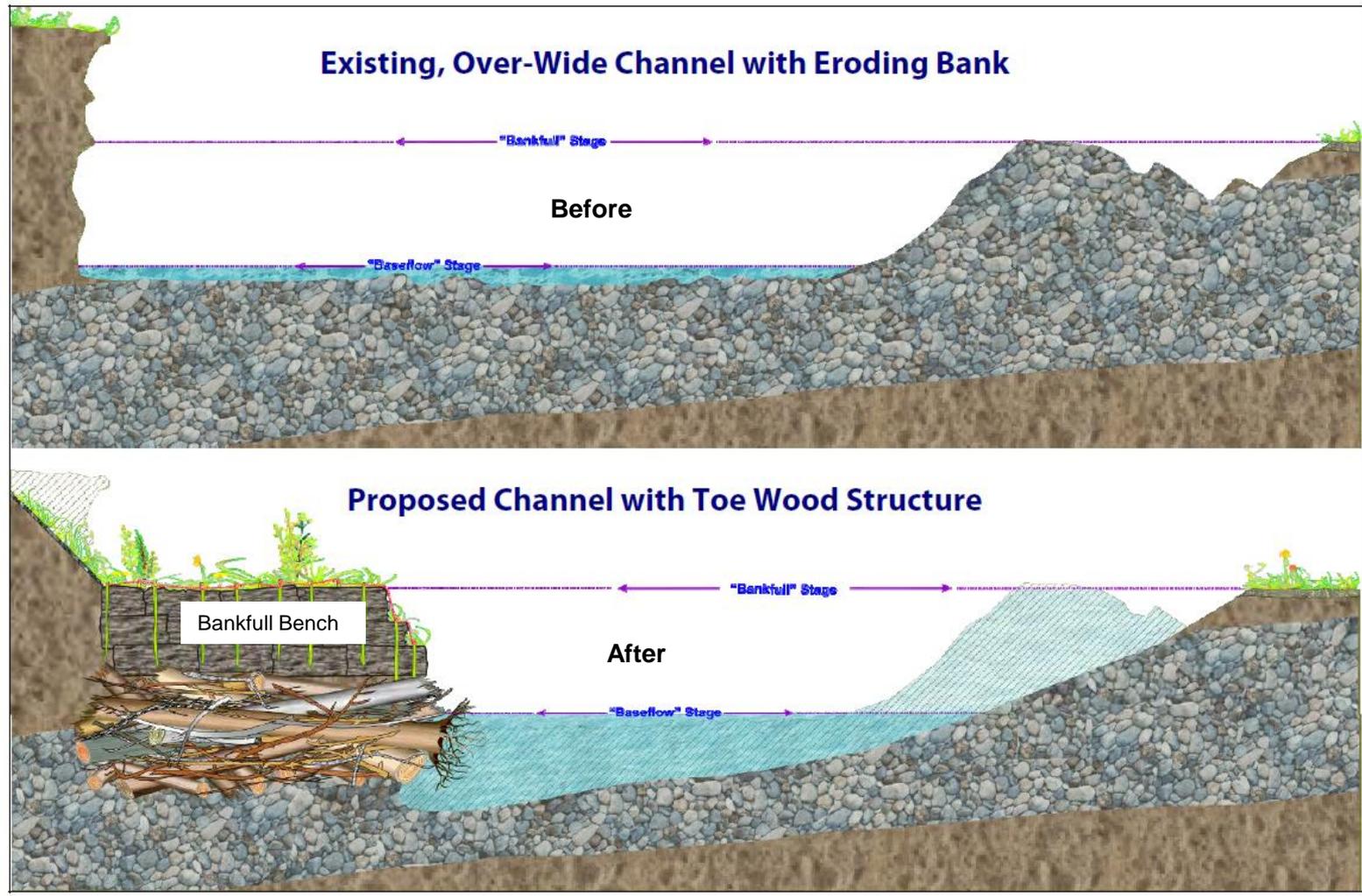


# Streambank Restoration Process

- Complete engineering designs and bid out projects

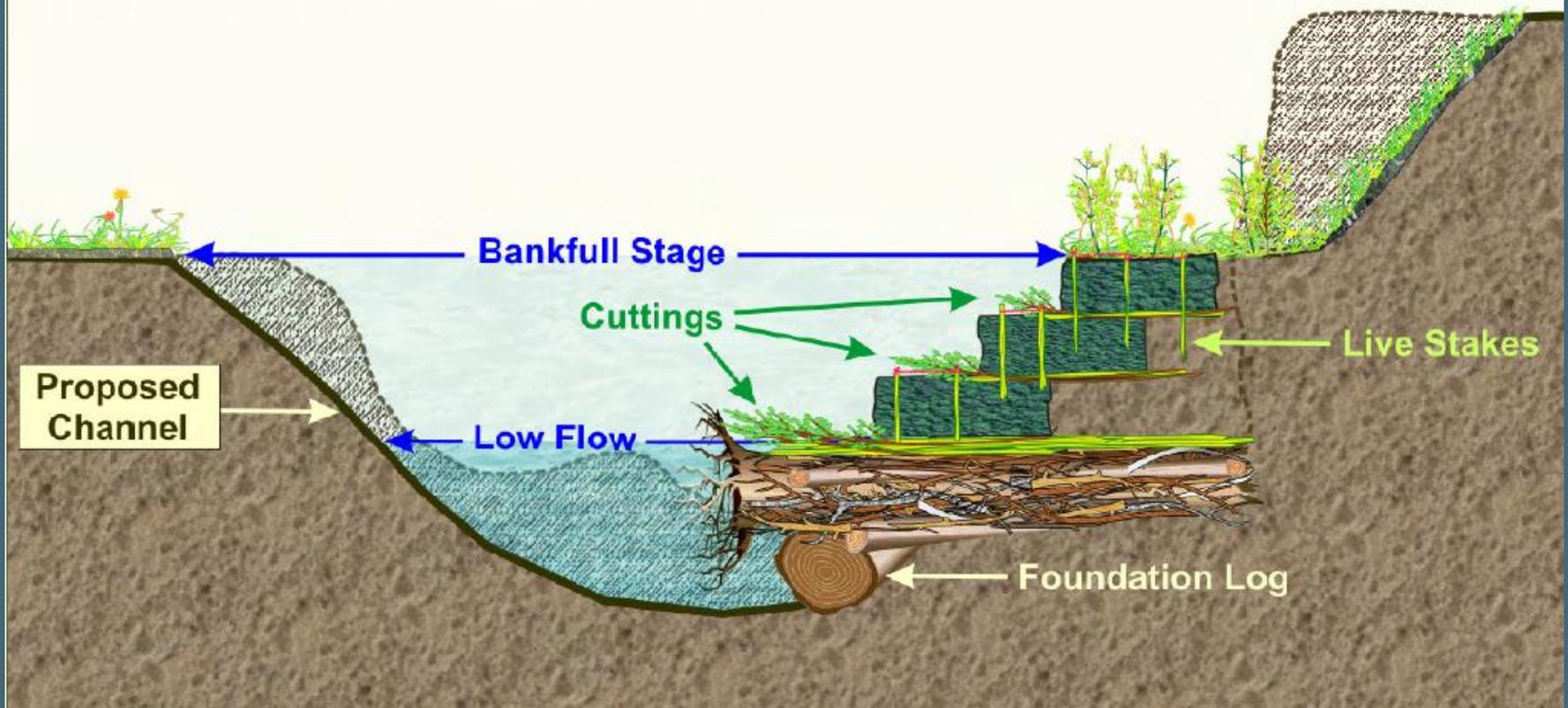


# General Concept



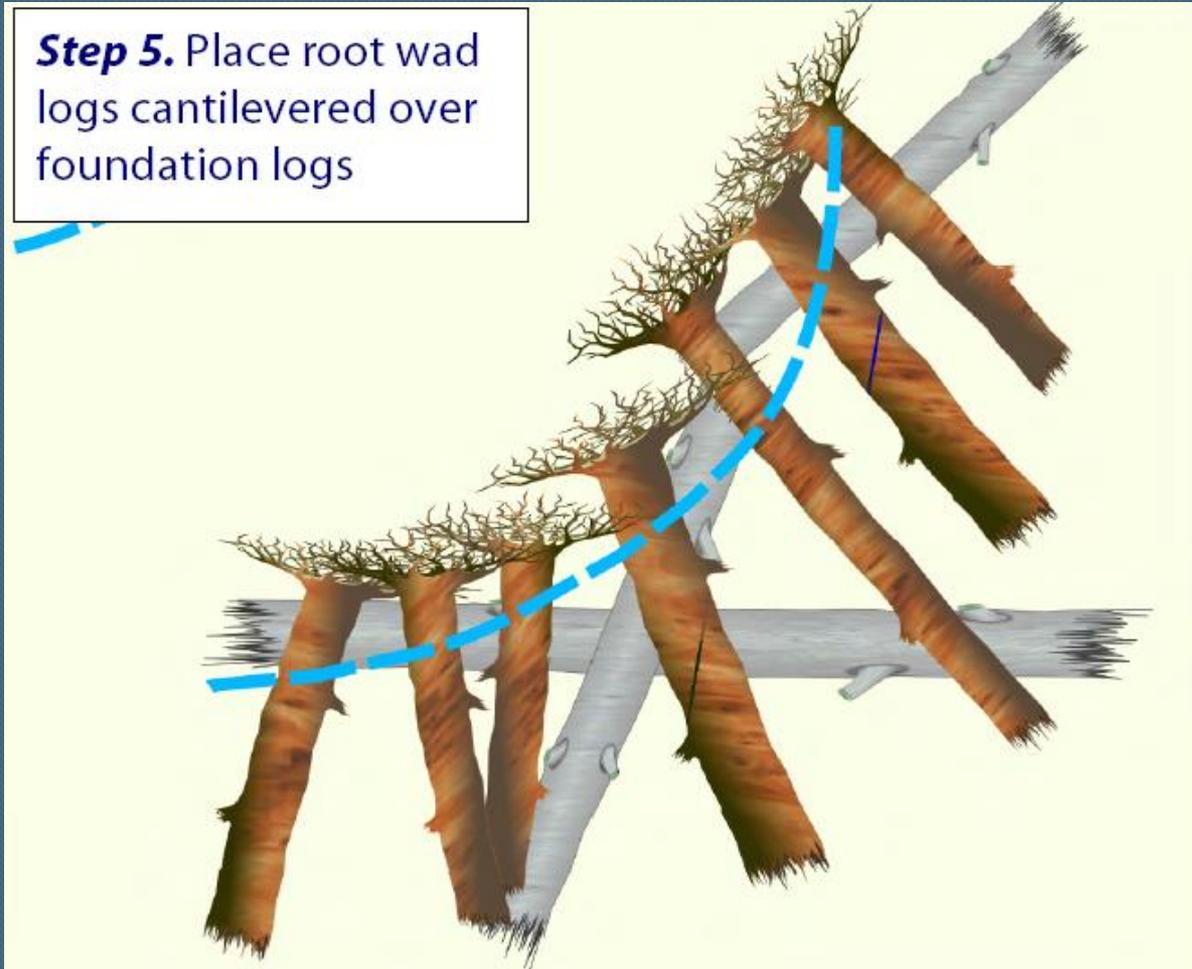
# Toe Wood Technique

## Sod Mats with Live Staking Option



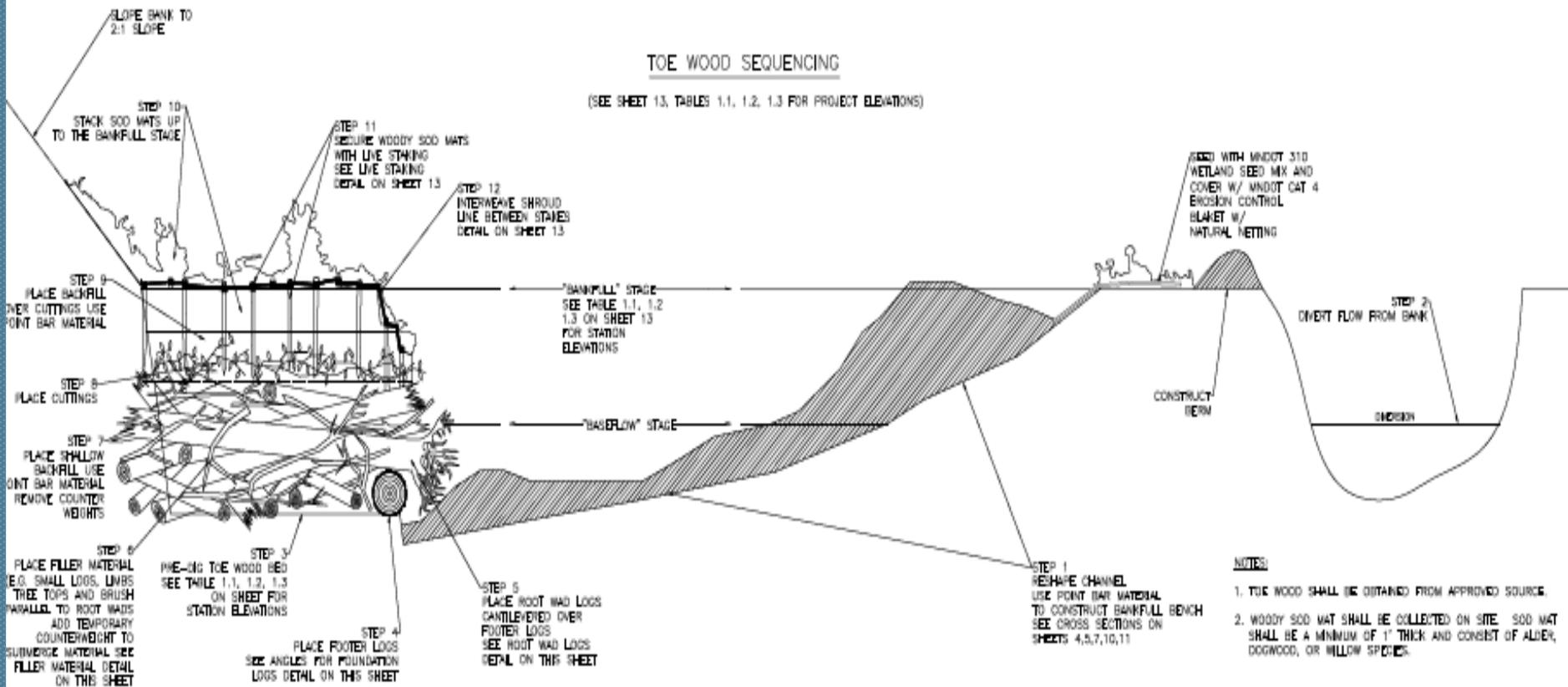
# Toe Wood Technique

**Step 5.** Place root wad logs cantilevered over foundation logs



Drawing courtesy Dave Rosgen

# Toe Wood Technique



# Toewood Bankfull Bench

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- Footer logs and root wads were pine, spruce, or other coniferous species.
- Footer Logs - 8' long and 12" diameter.
- Root Wad Logs - The root wads were harvested by carefully excavating around the roots of the tree and by pushing the tree over to expose the root wad. A minimum trunk diameter at breast height was 12" and the minimum height is 15'.

# Footer Logs





# Root Wads



# Construction Photos

## North Road Bridge Site



Before

# Construction Photos

North Road Bridge Site



Before

# Construction Photos

North Road Bridge Site



Before

# Construction Photos

## North Road Bridge Site



Before

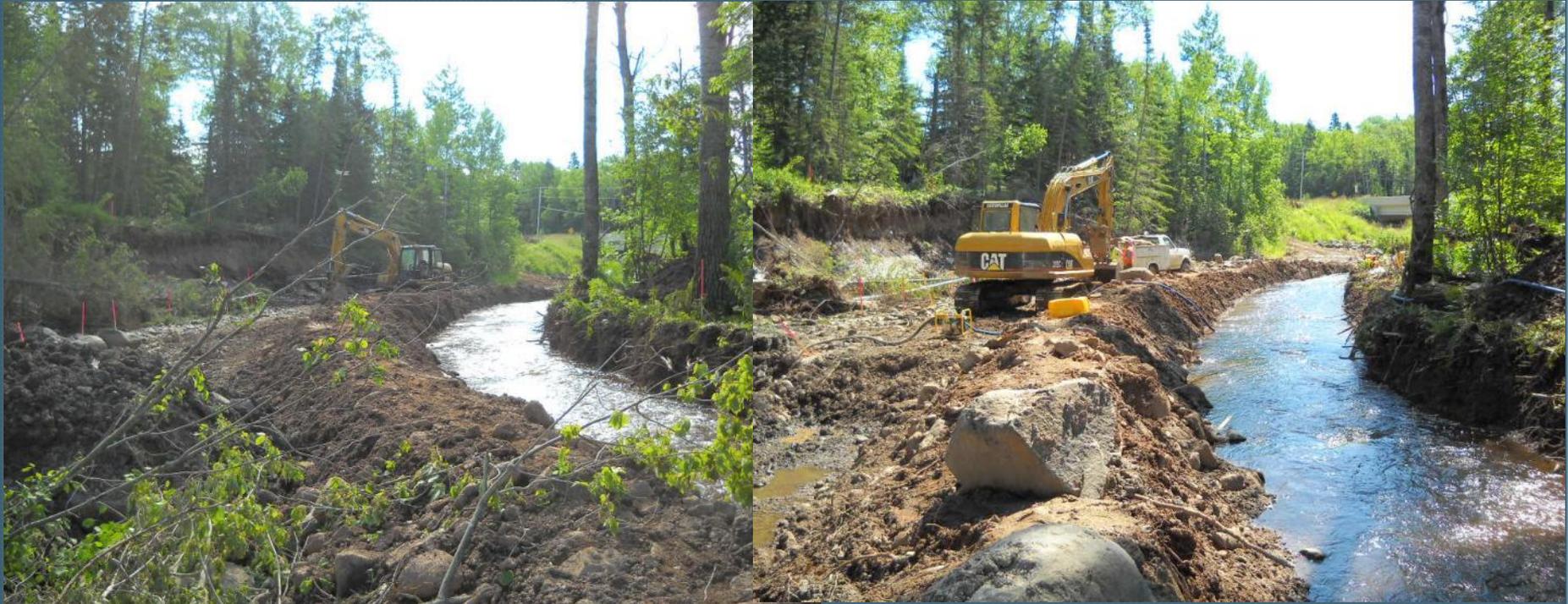
# Construction Photos

## North Road Bridge Site



# Construction Photos

## North Road Bridge Site



During

# Construction Photos

## North Road Bridge Site



During

# Construction Photos

## North Road Bridge Site



During

# Construction Photos

## North Road Bridge Site

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# Construction Photos

North Road Bridge Site



# North Road Bridge Site Complete

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# North Road Bridge Site Complete

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# North Road Bridge Site Complete



# North Road Bridge Site Complete



08/26/2014

# North Road Bridge Site Complete



# North Road Bridge Site Complete

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# Other Bank Sites



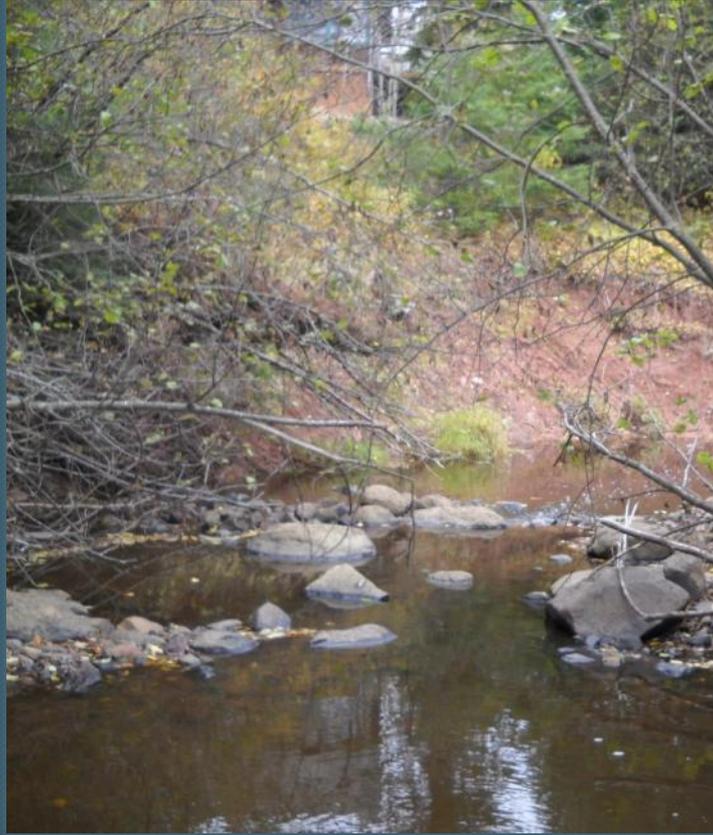








# Other Bank Sites









# Thank You!

