In-Stream Restoration

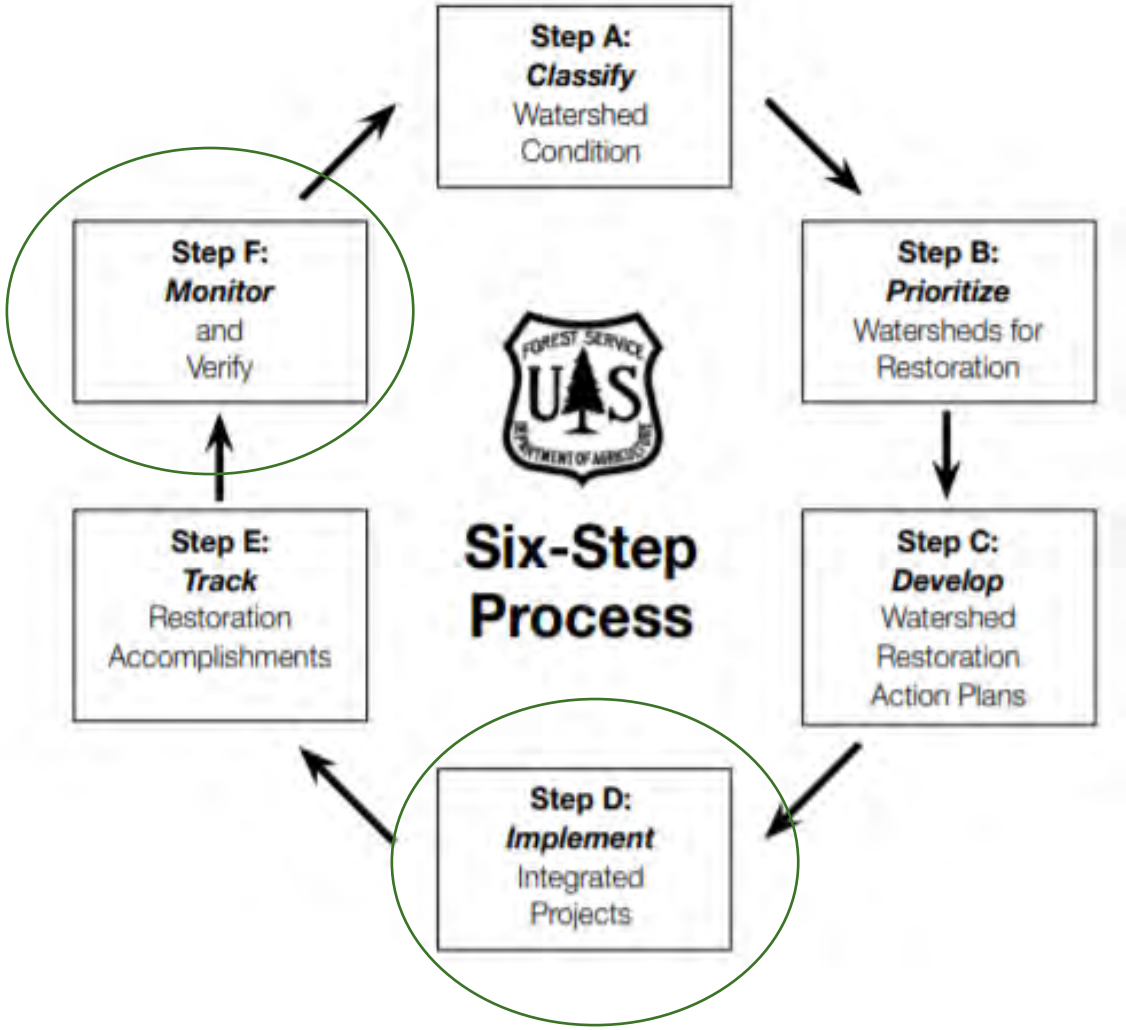
Prince of Wales Ranger District

Ellyn Rickels, Hydrologist

POWLLA Public Workshop (virtual)

November 13, 2021

Stream Restoration



Watershed Restoration

Large wood dominated channel types…

- Flood Plains (FP)
- Moderate Gradient Mixed Control channels (MM)
- Alluvial Fans (AF)

with previous riparian harvest…

- Loss of large woody debris (LWD) in streams
- Lack of mature trees for future LWD recruitment

are eligible for instream restoration.

- Adding LWD to maintain/enhance fish habitat until the riparian area is mature
- Restore function critical to salmon life stages

Large Woody Debris (LWD)

What is the function of large wood in streams?

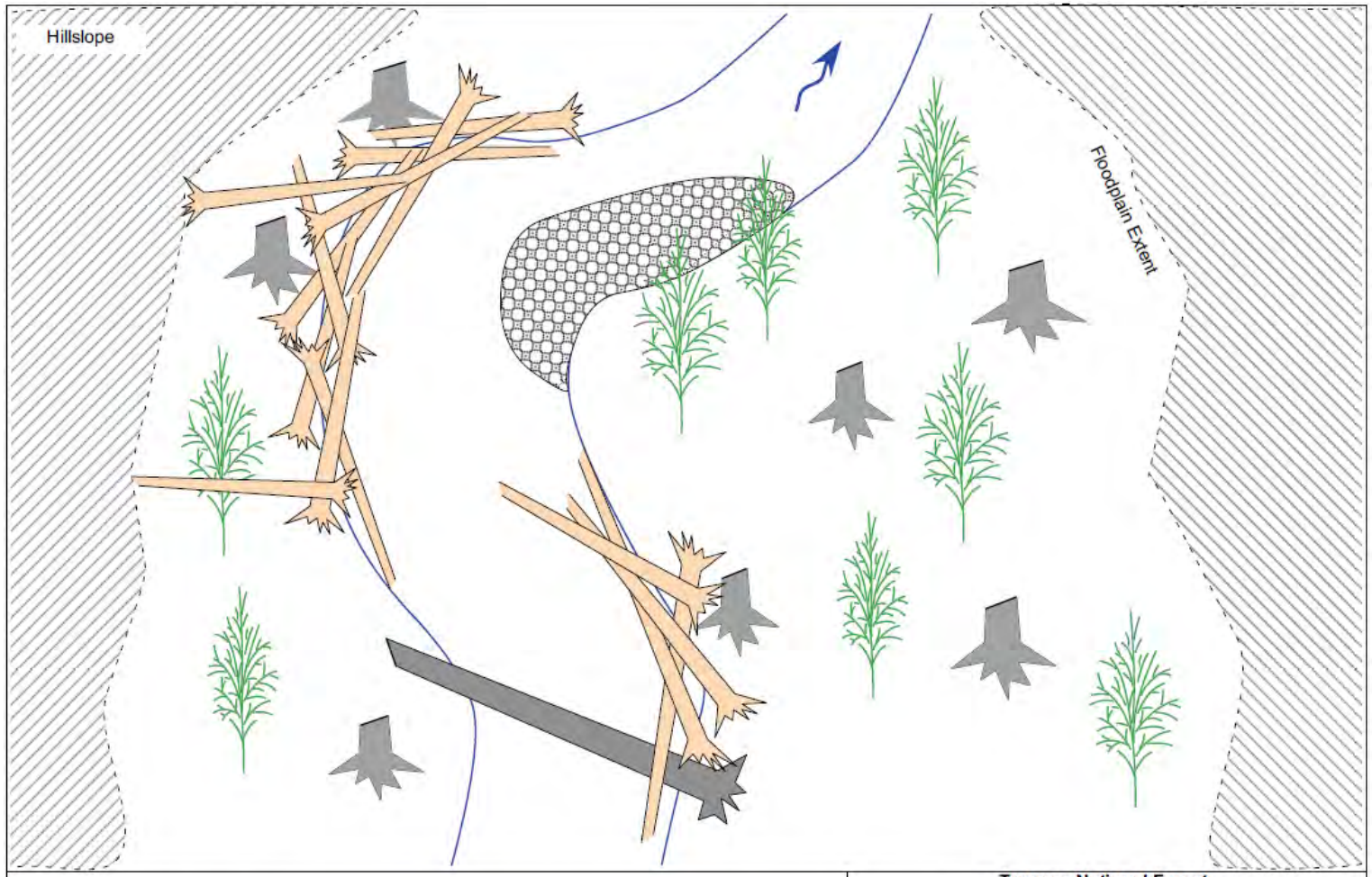
- Stabilizes banks
- Creates complex channel structure and habitat
- Stores sediment
- Provides cover and deep pool habitat
- Dissipates energy during floods
- Traps and holds nutrients

Large Woody Debris (LWD)

What happens to the channel when wood is removed?

- Less complex morphology
  - Reduced depth, width, sediment variability, and pool area
  - Increases in water velocity
  - Decreased sinuosity
  - Decreased pool depth
- Simpler, less diverse channels

Design Typicals



Notes:
Trees, or large woody debris (LWD), are placed along the streambank to provide roughness in order to minimize excessive bank erosion or excessive lateral channel migration. LWD is interwoven and crisscrossed in order to remain relatively stable. LWD is also stacked to weigh the structure down and reduce buoyancy during high flows.

Tongass National Forest
Craig and Thorne Bay Ranger Districts
Typical Design Sketches

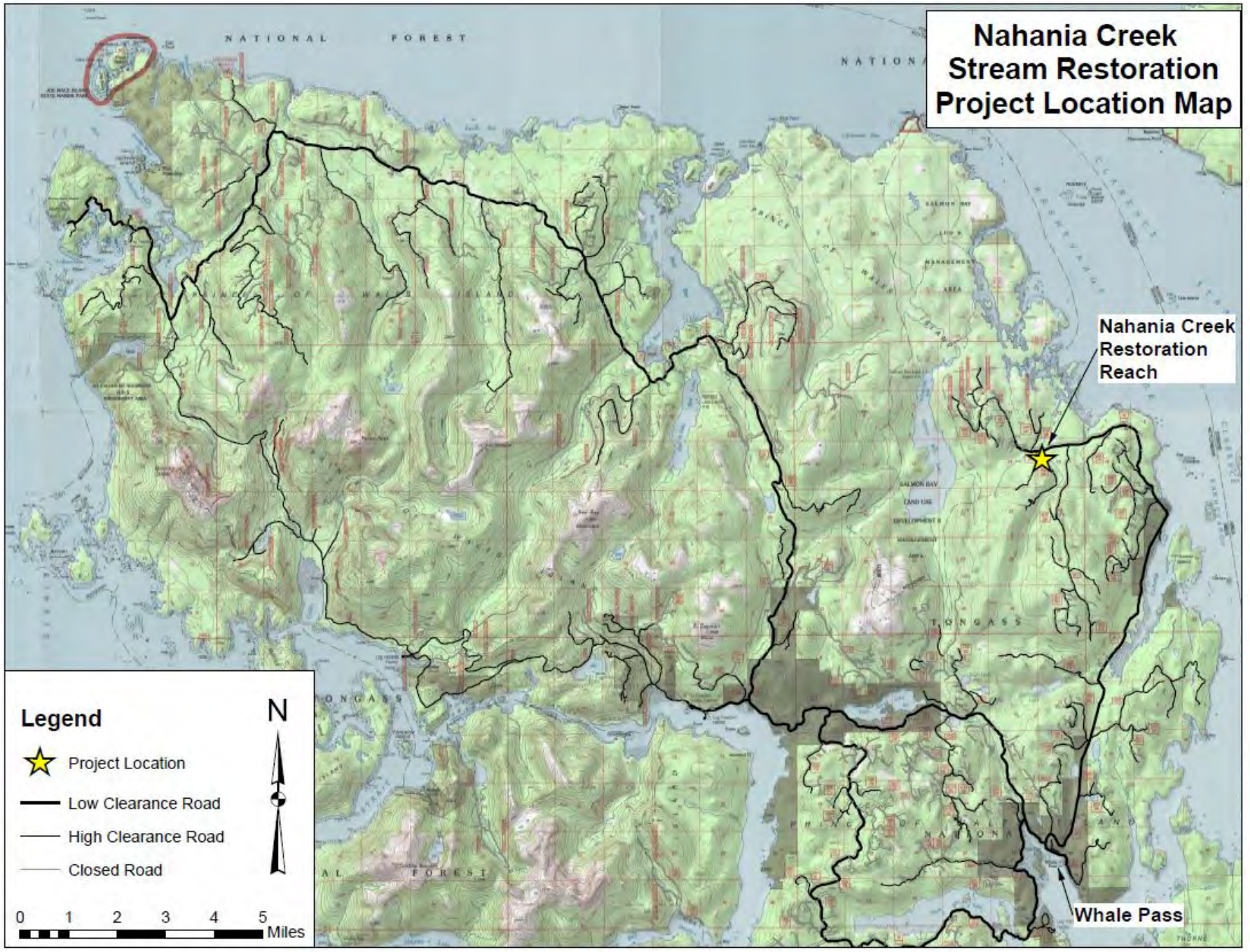
Structure: **Bank Roughness**
Drawn By: Helen Sladek
Date: June 2019
Sheet: 3 of 5

Not to Scale

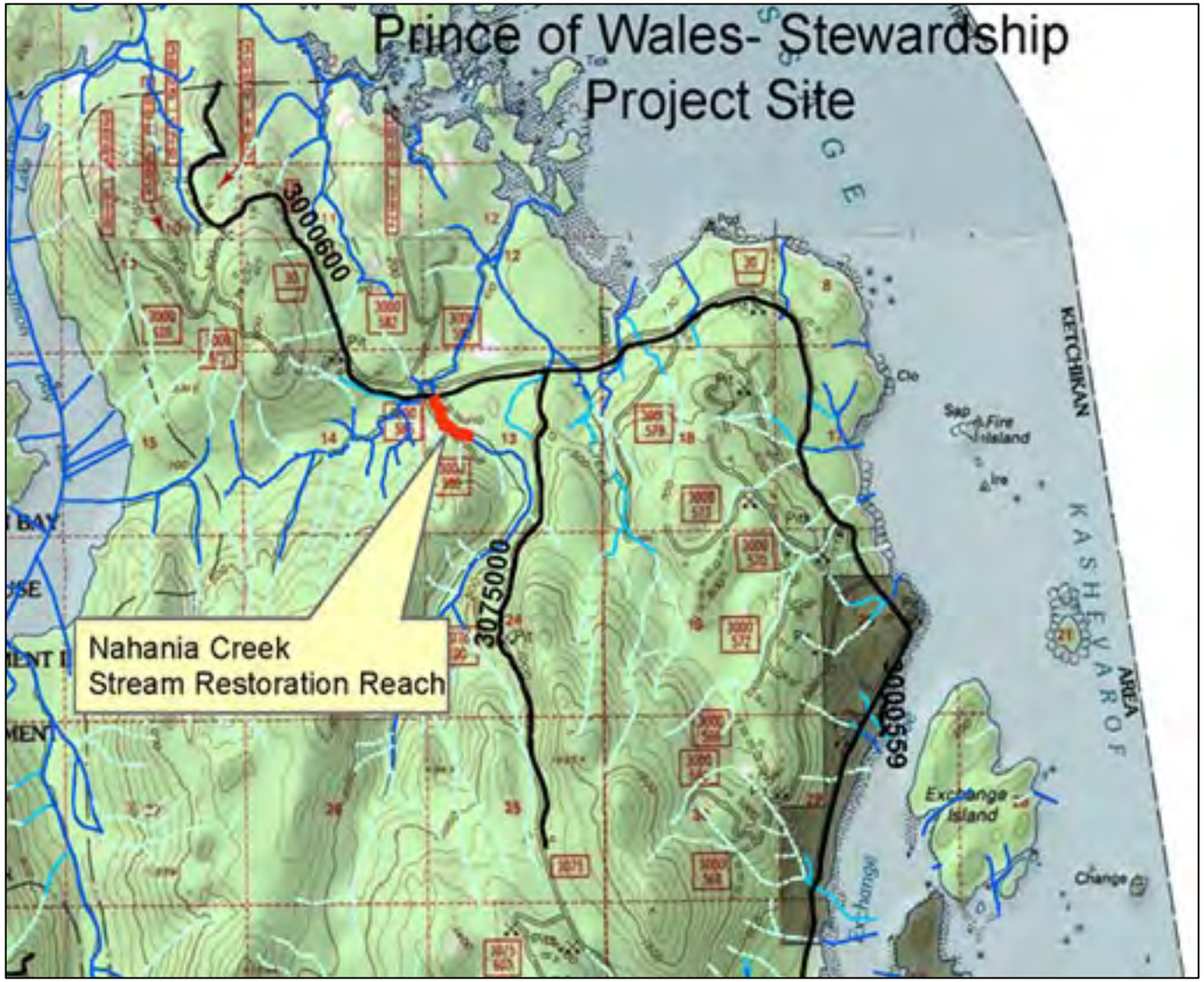
Example of a "typical" restoration design.

More available – talk to me in break out session.

2021 Nahania Creek



Nahania Creek



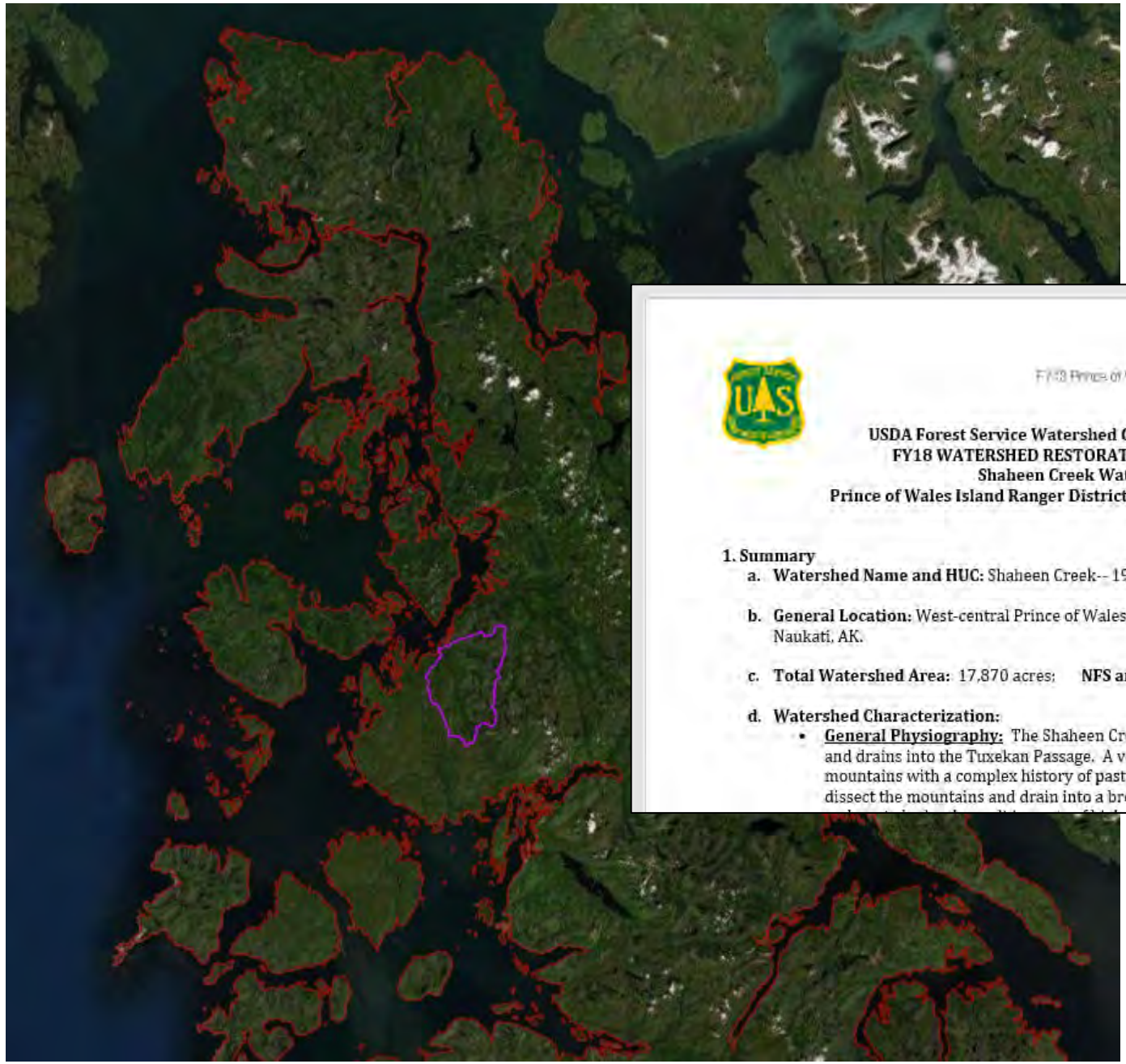
Implementation Summer 2021
0.32 stream miles
100 root wad trees
7 logjam sites

The Nature Conservancy

Nahania Creek

Nahania Creek

2022 Shaheen Creek



USDA Forest Service Watershed Condition Framework
FY18 WATERSHED RESTORATION ACTION PLAN
Shaheen Creek Watershed
Prince of Wales Island Ranger Districts, Tongass National Forest

1. Summary

a. **Watershed Name and HUC:** Shaheen Creek-- 190101031005

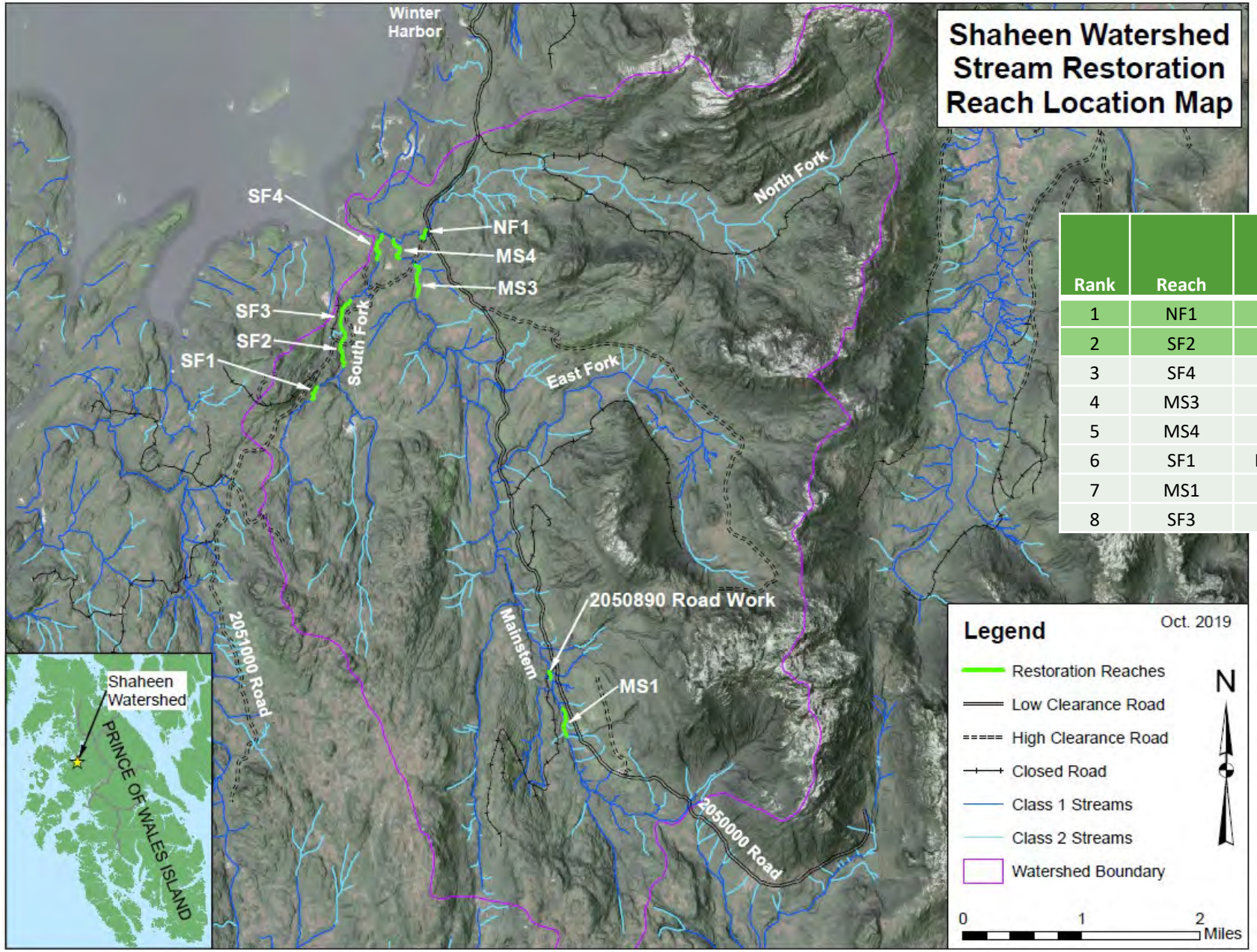
b. **General Location:** West-central Prince of Wales Island, approximately 11 miles south of Naukati, AK.

c. **Total Watershed Area:** 17,870 acres; **NFS area within watershed:** 100%

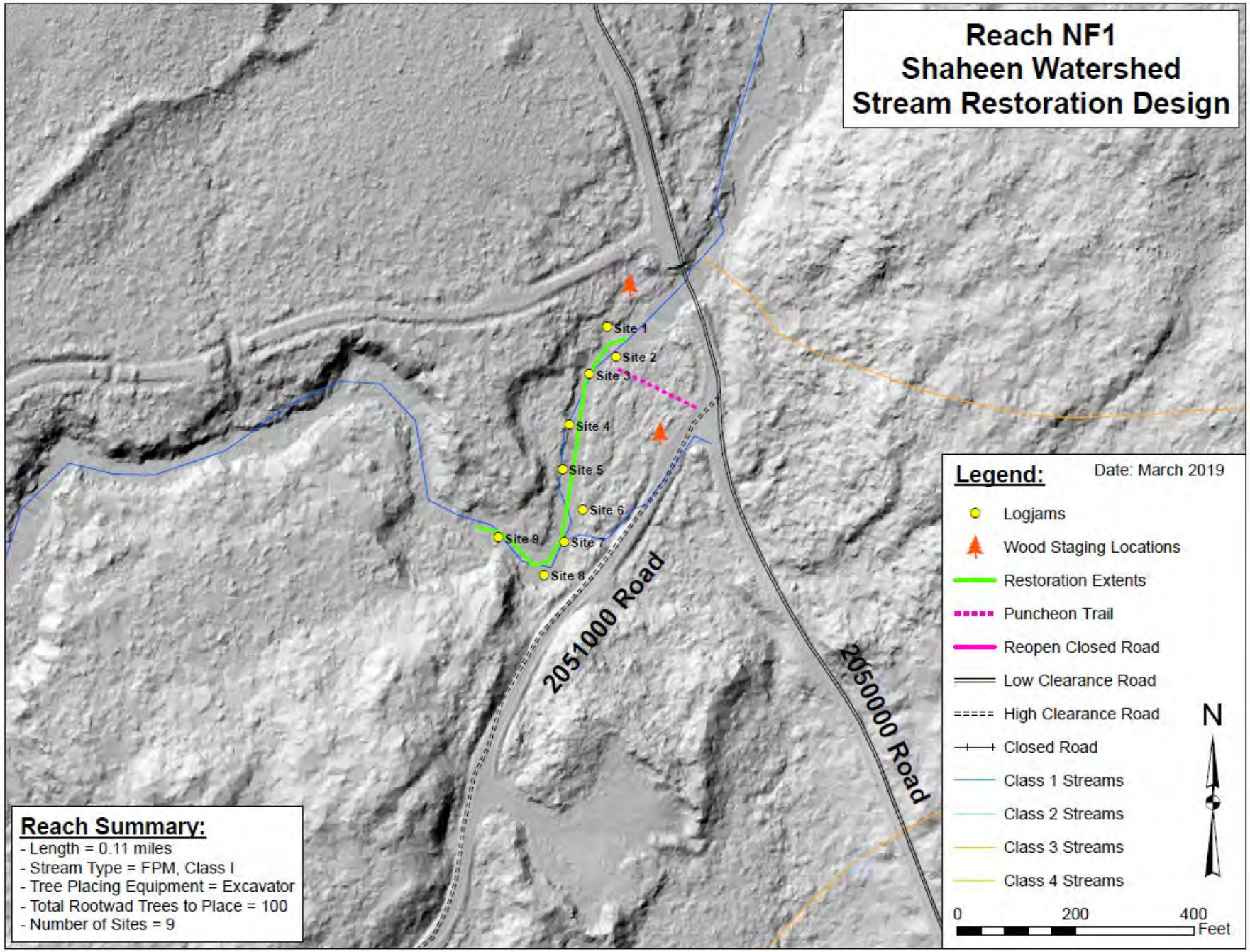
d. **Watershed Characterization:**

- **General Physiography:** The Shaheen Creek watershed covers over 28 square miles and drains into the Tuxekan Passage. A volcanic terrain consists of rugged mountains with a complex history of past glaciation. Many small and steep valleys dissect the mountains and drain into a broad valley and lowlands. Areas of

Shaheen Creek Restoration



Rank	Reach	Equipment	Stream Length (mi)	Number of Structures	Rootwad Trees
1	NF1	Excavator	0.11	9	~80
2	SF2	Excavator	0.28	9	~100
3	SF4	Excavator	0.27	12	100
4	MS3	Excavator	0.32	10	297
5	MS4	Excavator	0.22	10	220
6	SF1	Helicopter & Excavator	0.16	3	60
7	MS1	Helicopter	0.26	9	184
8	SF3	Helicopter	0.34	8	120



ISSUES

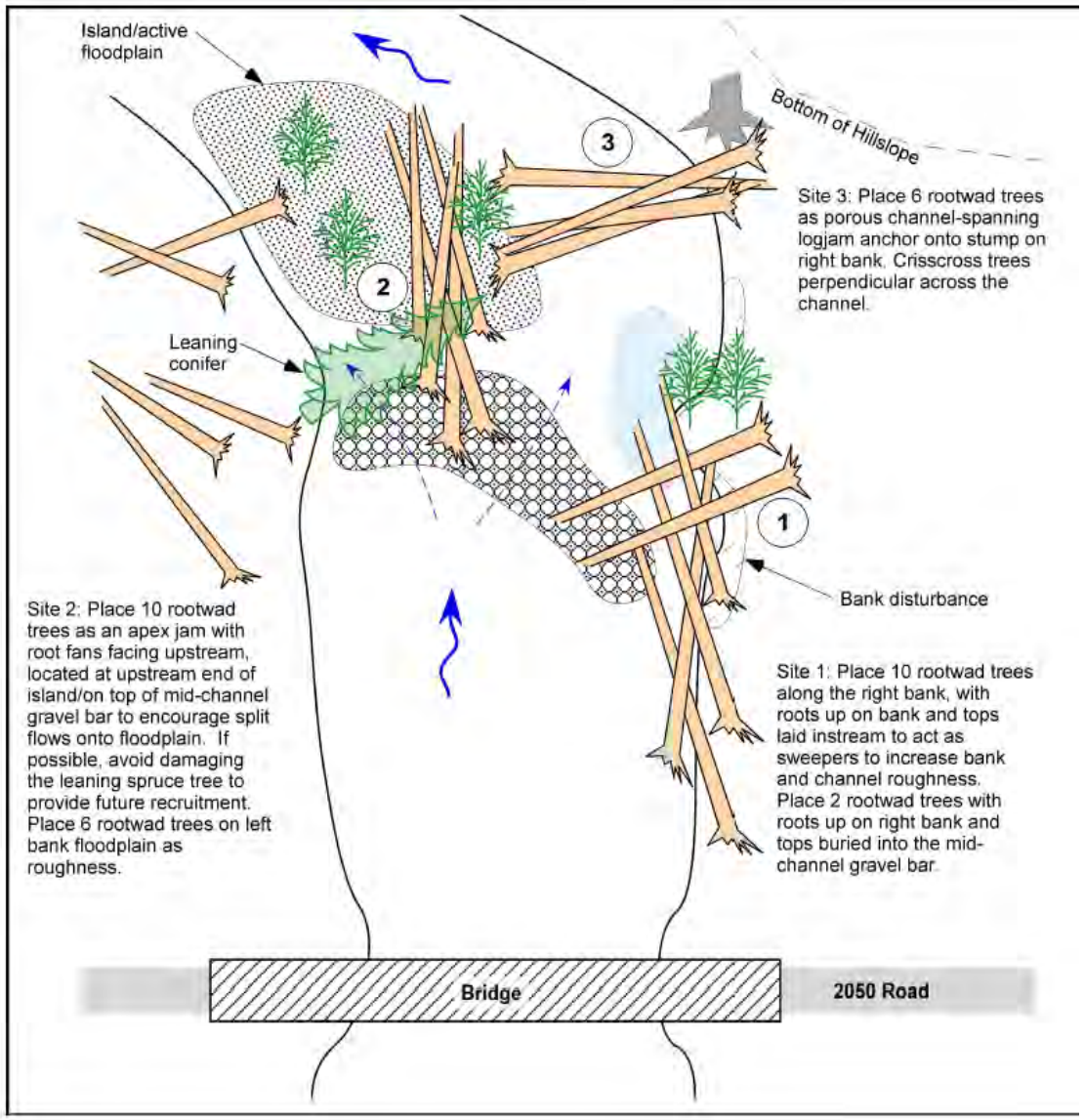
- Past harvest
- Decaying instream wood
- Aging logjams
- Little potential for large wood recruitment

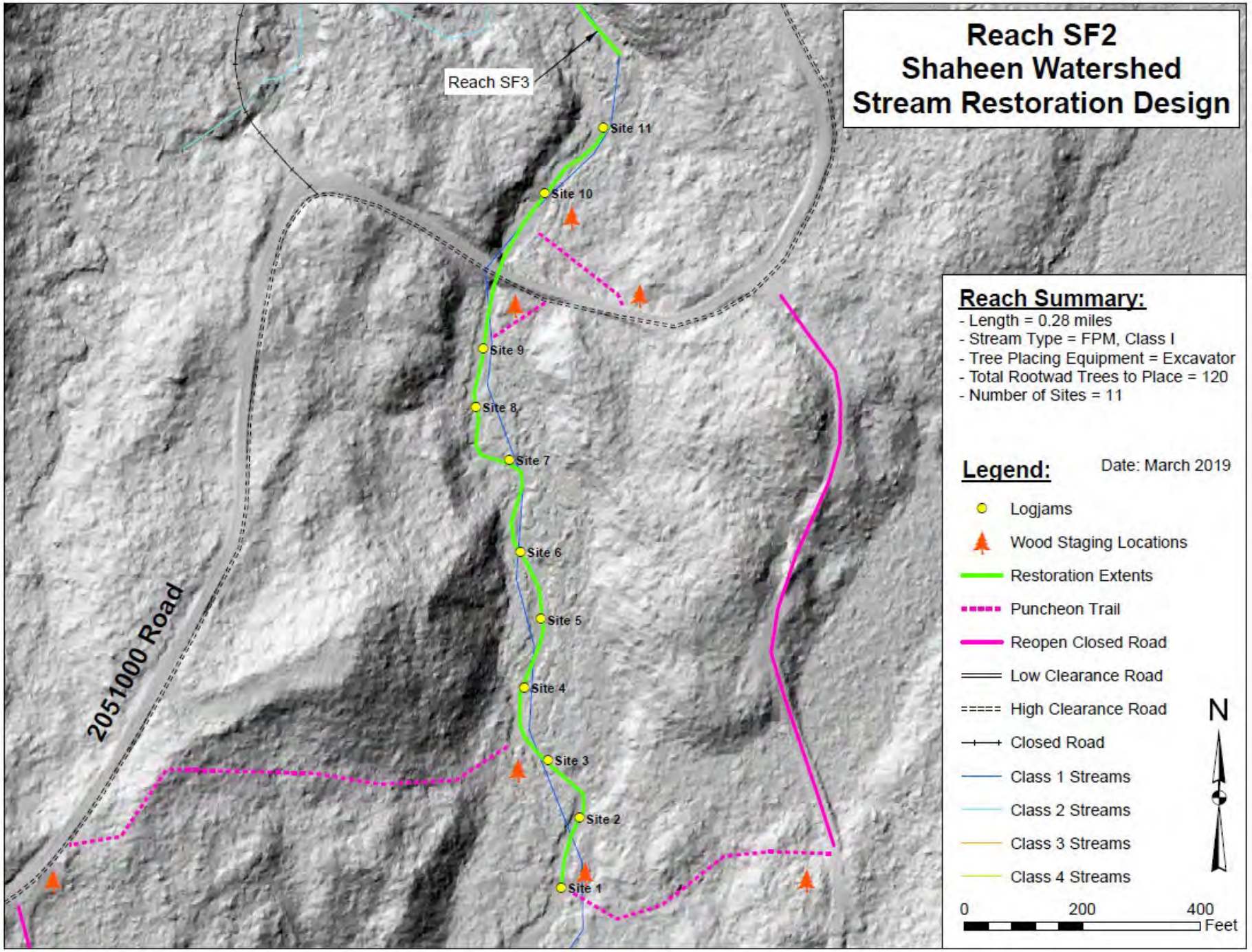
GOALS

- Channel resilience
- Habitat diversity
- Floodplain roughness
- Maintenance until natural recruitment

Shaheen Reach NF1

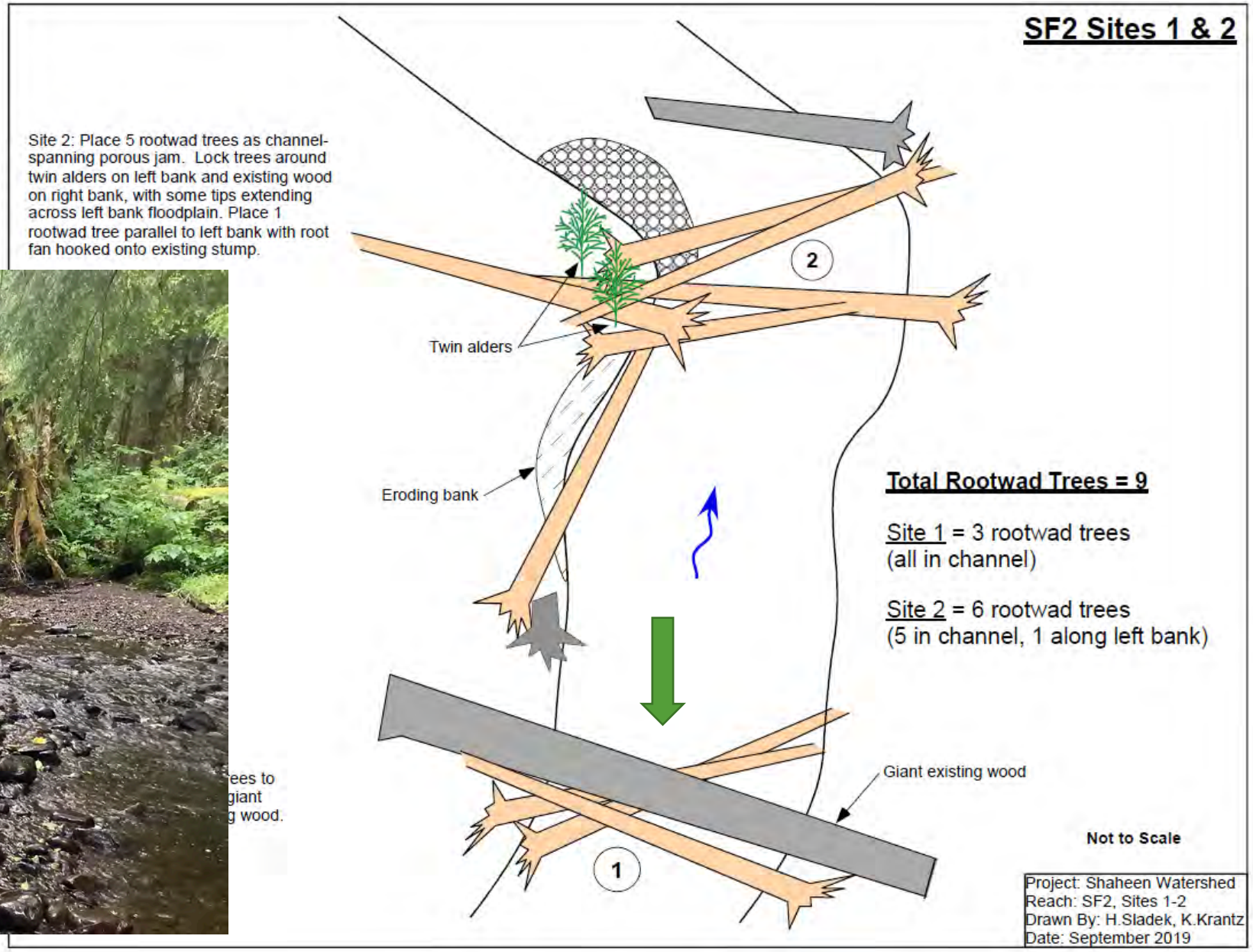
Example of site-specific design




Reach SF2
Shaheen Watershed
Stream Restoration Design
Reach SF3
Site 11
Site 10
Site 9
Site 8
Site 7
Site 6
Site 5
Site 4
Site 3
Site 2
Site 1
2051000 Road
Reach Summary:
- Length = 0.28 miles
- Stream Type = FPM, Class I
- Tree Placing Equipment = Excavator
- Total Rootwad Trees to Place = 120
- Number of Sites = 11
Legend:
Date: March 2019
Logjams
Wood Staging Locations
Restoration Extents
Puncheon Trail
Reopen Closed Road
Low Clearance Road
High Clearance Road
Closed Road
Class 1 Streams
Class 2 Streams
Class 3 Streams
Class 4 Streams
N
0
200
400
Feet

Shaheen Reach SF2

Example of site-specific design



Future Restoration Projects

Proposed Restoration Projects

FISCAL YEARS 2023-2024 Watershed Improvement and Restoration	Current Status	Associated Documents	List Field Surveys Required	Timeframe for Surveys to be Completed
Stream Restoration				
1. Shaheen MS1 Restoration	Preliminary designs complete	Shaheen Design Maps, workshop presentation	Botany/Invasives, Engineering, Karst, Silviculture, Soils, Wildlife	2022
2. Shaheen MS3 Restoration	Preliminary designs complete	Shaheen Design Maps, workshop presentation	Botany/Invasives, Engineering, Karst, Silviculture, Soils, Wildlife	2022
3. Shaheen MS4 Restoration	Preliminary designs complete	Shaheen Design Maps, workshop presentation	Botany/Invasives, Engineering, Karst, Silviculture, Soils, Wildlife	2022
4. Shaheen SF1 Restoration	Preliminary designs complete	Shaheen Design Maps, workshop presentation	Botany/Invasives, Engineering, Karst, Silviculture, Soils, Wildlife	2022
5. Shaheen SF3 Restoration	Preliminary designs complete	Shaheen Design Maps, workshop presentation	Botany/Invasives, Engineering, Karst, Silviculture, Soils, Wildlife	2022
6. Shaheen SF4 Restoration	Preliminary designs complete	Shaheen Design Maps, workshop presentation	Botany/Invasives, Engineering, Karst, Silviculture, Soils, Wildlife	2022
7. Flicker Creek Restoration	Postponed indefinitely	North POW Restoration Locations Map	Soils, Botany, Heritage	Not Planned
8. Buster Creek Restoration	Postponed indefinitely	North POW Restoration Locations Map	Soils, Botany, Heritage	Not Planned

Other Resources & Information

The following files will be available in the workshop meeting files:

- **Examples of Typical Design Sketches**
  - Sketches and descriptions of typical in-stream large woody debris (LWD) restoration designs
- **Shaheen Creek Preliminary Design Maps**
  - Map showing each reach proposed for future restoration
- **Shaheen Creek Watershed Restoration Action Plan**
  - Descriptions of essential projects planned within the Shaheen Creek Watershed

Join the breakout room to discuss these files or any other questions you may have!