Restoration of China Creek: Water Storage and Fish Environment Project

RAMBØLL ENVIRON

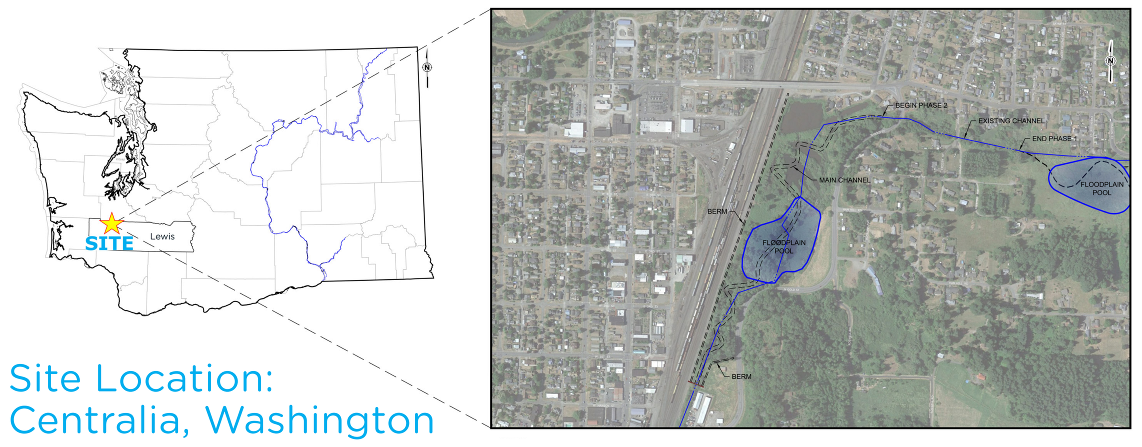
AUTHORS

Felix Kristanovich, PhD, PE, Ramboll Environ Seattle; Greg Reub, Ramboll Environ Olympia; Craig Hansen, Ramboll Environ Olympia

INTRODUCTION

This project was undertaken with the following objectives.

- Reducing flooding in Downtown Centralia, Washington
- Enhancing fish habitat, and creating and enhancing wetlands
- Converting channelized creek to historic naturally meandering creek
- Enhancing recreational opportunities

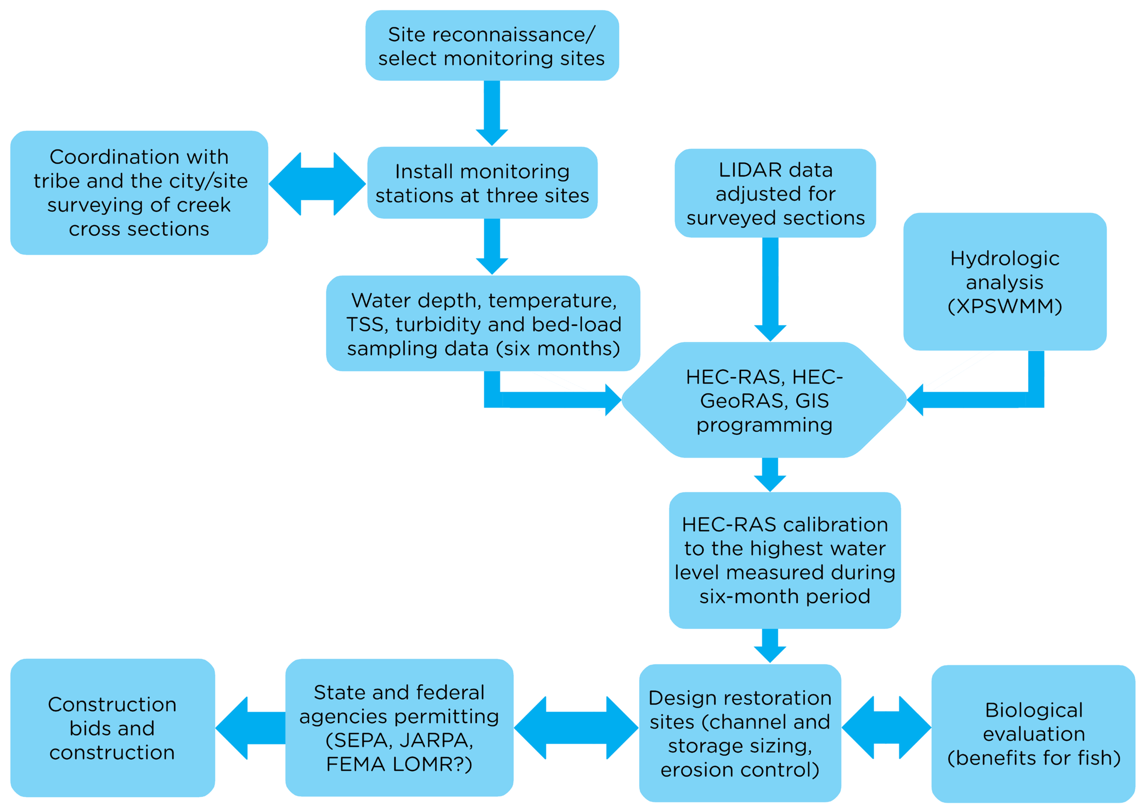


Site Location: Centralia, Washington

DATA AVAILABILITY

- No stream gages on China Creek
- FEMA surveys of the creek from the 1980s (supporting hydrologic studies and FIS 1981)
- City surveys from 2011: 35 structures, 65 creek transects and 47 outfalls (information in GIS)
- Hydrologic analysis of China Creek from 2013 recommends two potential flood storage sites: McAttee Pond site and Agnew Pond site

STUDY METHODOLOGY



MONITORING LOCATIONS

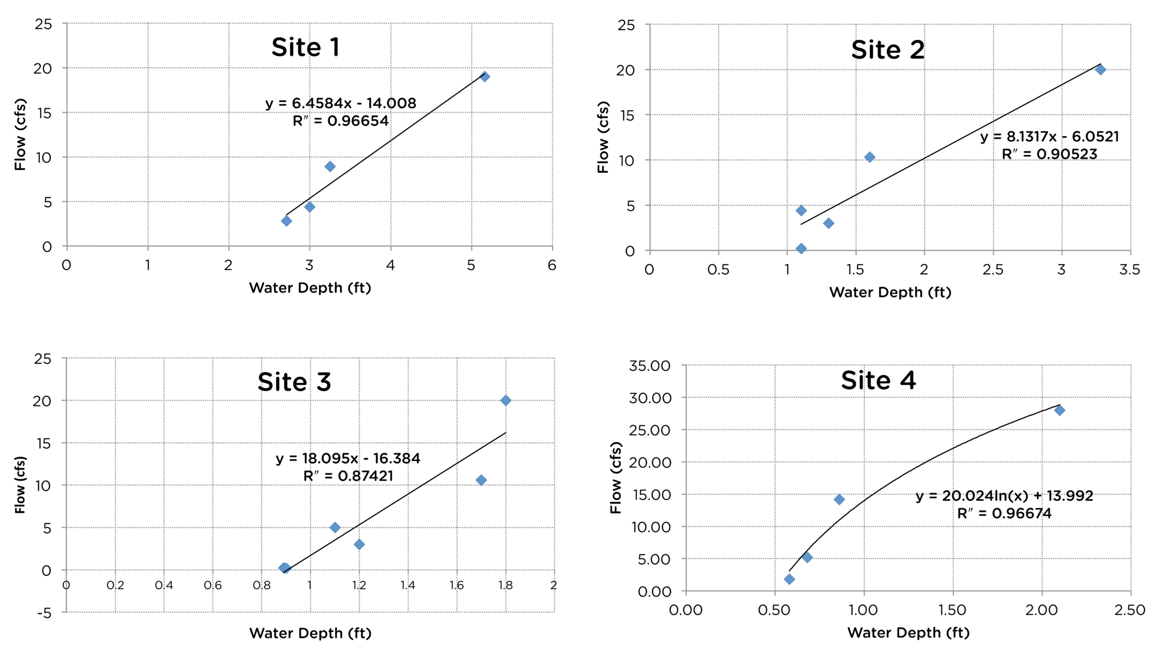
Station 1: Little Hanaford Road/ Lundberg Road

Station 2: Gold Street crossing

Station 3: Just downstream of Agnew Mill Ponds

Station 4: Downtown Centralia

HYDRAULIC RATING CURVES



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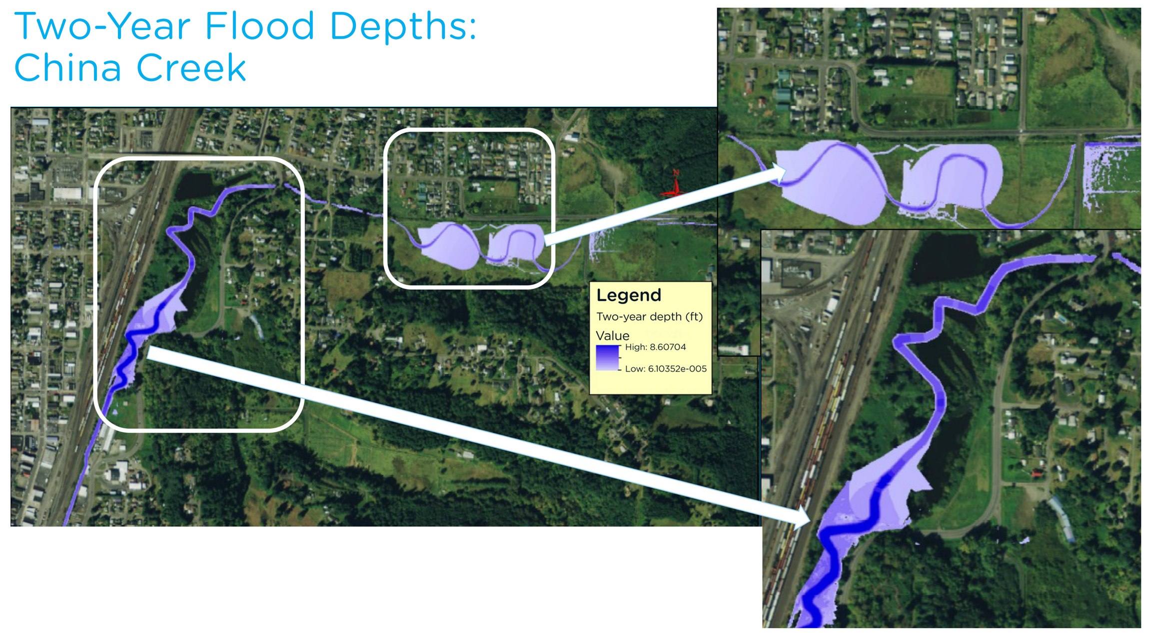
CONTACT
Felix Kristanovich, PhD, PE
+1 206 336 1681
fkristanovich@ramboll.com

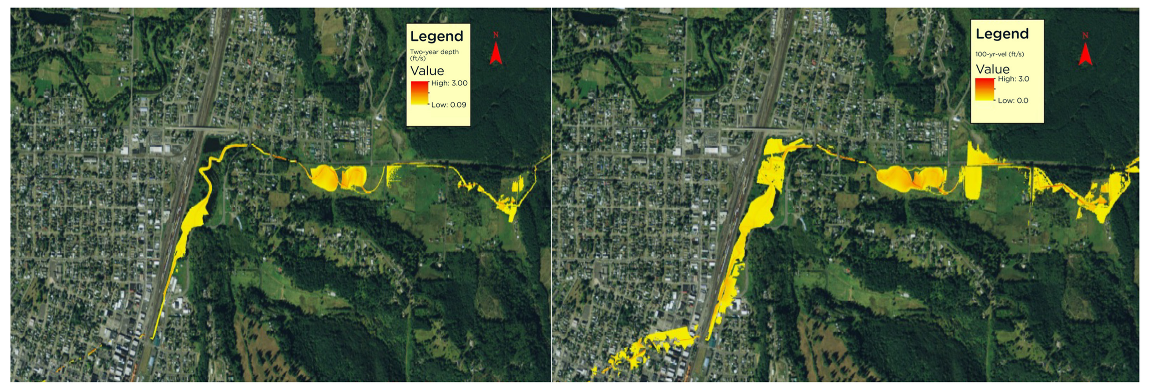
SIMULATION RESULTS

Flood Reduction Results

Two-Year Flood Depths: China Creek



Simulated Flow Velocities (Two-Year vs. 100-Year Flows)



Reduction in Flooding Depth (ft) – Lundberg Ponds

RAS-section	Existing 100-yr	Proposed 100-yr	Depth Reduction (ft)
12915	192.28	192.28	0
13774	194.73	193.07	1.66
14361	194.79	193.15	1.64
15275	194.90	193.75	1.15
15675	196.66	195.62	1.04
15947	199.09	199.09	0

Reduction in Flooding Depth (ft) – Agnew Mill Ponds

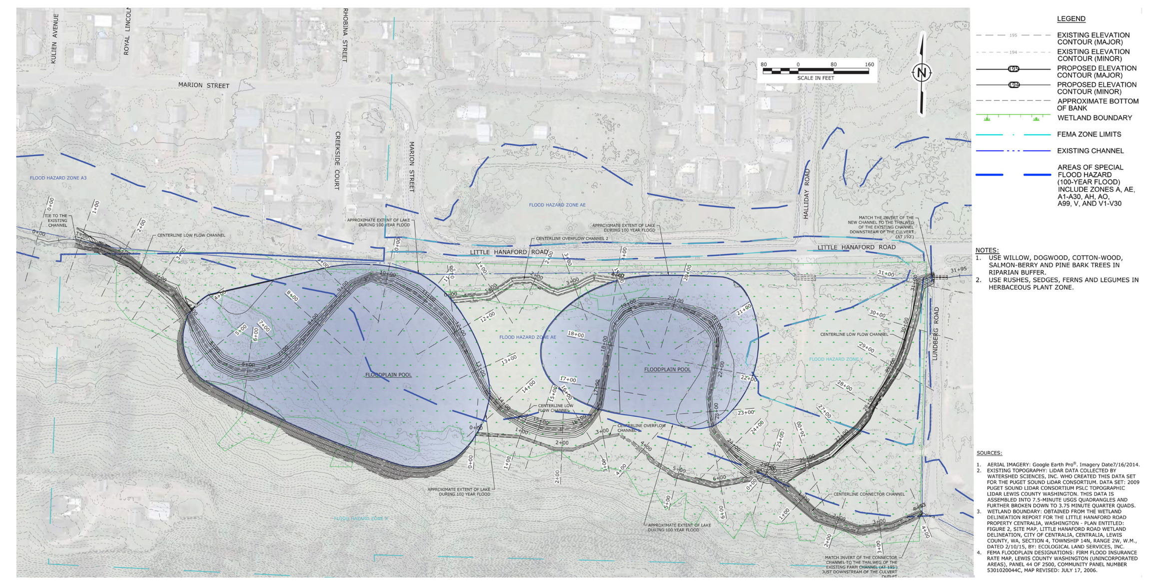
Flood Frequency	Water Surface Elevation: Peak Flood (ft)		Reduction in Flood Peak (ft)
	Existing Conditions	Proposed Conditions	
2-year	183.86	183.40	0.46
10-year	184.04	183.44	0.60
100-year	188.28	187.03	1.25

FISH MIGRATION FACTS

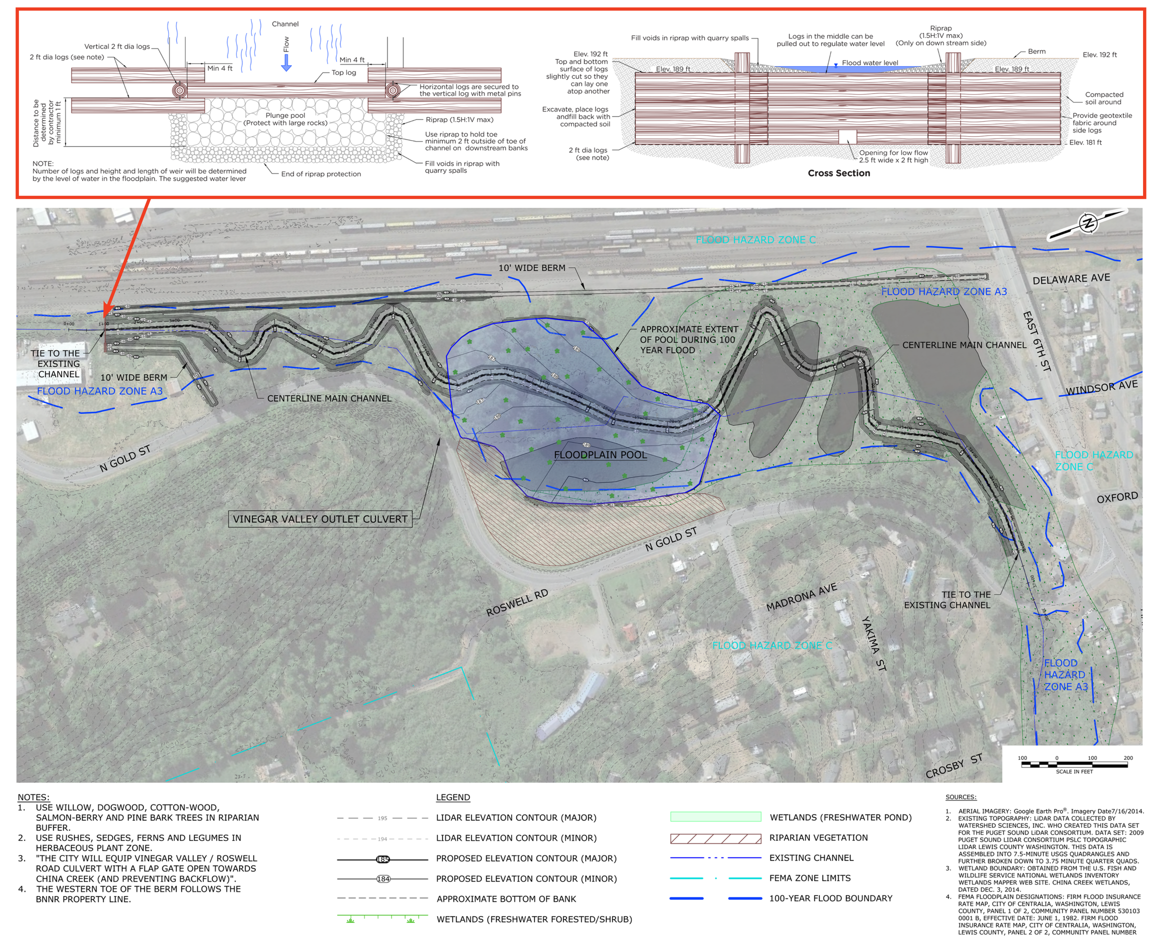
Fish Habitat Areas – Rearing
(Velocities < 2ft/s, Depth > 0.5 ft)

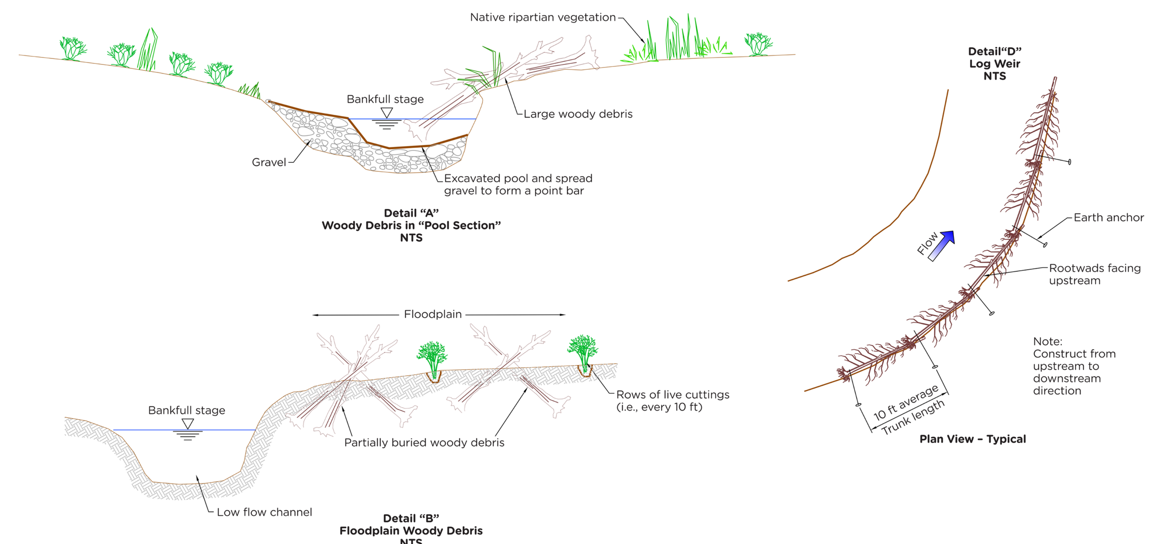
10-Year Flows   100-Year Flows

PLANS AND SPECIFICATIONS: LUNDBERG PONDS (PHASE 1)



PLANS AND SPECIFICATIONS: AGNEW MILL PONDS (PHASE 2)



COMMON DESIGN ELEMENTS

- Utilizing existing wetland areas
- Creating new floodplain submergence area
- Providing protection/ring levee west and south
- Reducing flooding at the BNNR crossing downstream
- Reducing FEMA floodplain footprint in the restoration area
- Providing fish refuge/rearing habitats
- Enabling fast flood overflow through emergency connector channels