

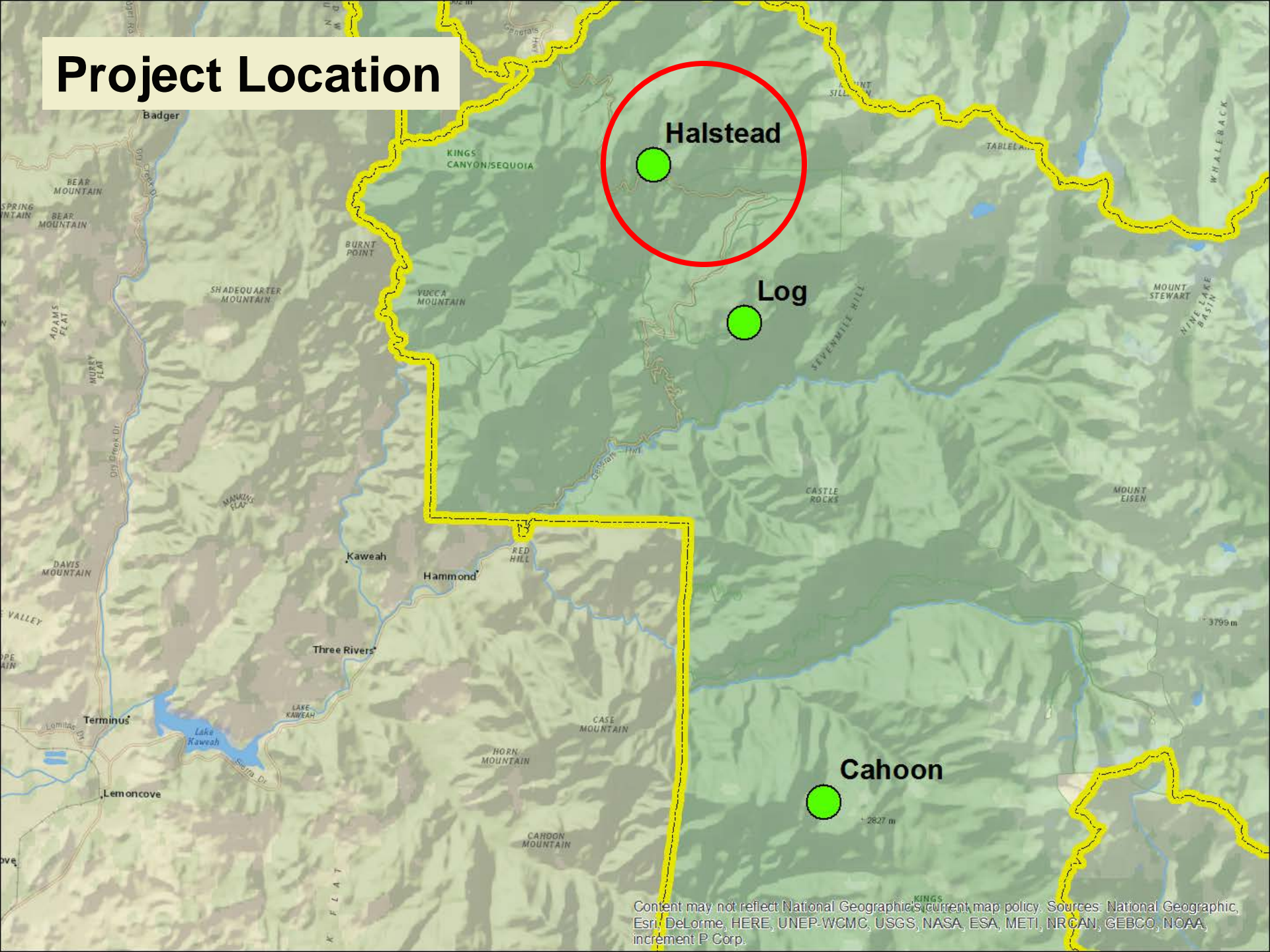
National Park Service
U.S. Department of the Interior



Sequoia and Kings Canyon National Parks

Information on the Rehabilitate Halstead Meadow Project (Phase 3)

Project Location



The Importance of Meadows

- Meadows have great ecological, cultural, and spiritual value.
- Montane meadows have existed largely as we know them for ~3,000 years, with underlying sediments built up over the last ~12,000 years.
- Mechanical impacts initiate feedback loops of destabilization, erosion, and lowered water tables, resulting in the loss of meadow and wetland habitat.

National Park Service Law and Policy

*“...the fundamental purposes of the said parks... is to **conserve the scenery and the natural and historic objects and the wild life therein** and to provide for the enjoyment of the same in such manner and by such means as will leave them **unimpaired for the enjoyment of future generations**”*

NPS Organic Act (1916)

*“Where natural wetland characteristics or functions have been degraded or lost due to previous or ongoing human activities, the NPS will, **to the extent appropriate and practicable, restore them to pre-disturbance conditions**”*

Director's Order 77-1 Wetland Protection (2002)

*“**Wetlands that have been damaged or degraded by previous uses will be considered for restoration.** . . original functions and values of each wetland will be restored to the greatest extent practicable”*

SEKI General Management Plan (2007)

Halstead Meadow – Background

- Halstead Meadow in Sequoia National Park is a large wet meadow and fen complex that formed by sediment and peat accumulation over thousands of years.
- In the past 150 years, impacts to the meadow, including grazing and culverting water flow, have resulted in severe erosion and gully formation. Tens of thousands of cubic yards of ancient sediment have been eroded, water tables have declined, and vegetation has changed.

Halstead Meadow, 1951



Halstead Meadow – Background

- Phase 1: In 2007 the erosion gully in the portion of the meadow north and upstream of the Generals Highway (termed Upper Halstead Meadow) was filled with mineral sediment to create a sheet flow hydrologic system. The following spring 53,000 native wetland plants were planted in the newly restored meadow surface.
- Phase 2: In 2012-2013, the second phase of the meadow restoration project (Lower Halstead Meadow) was completed. This project involved correcting severe erosion problems created by culverts and included constructing a bridge over the meadow, grading to restore the hydrologic system, and planting thousands of native plants.

Phases of the Project

Phase 3, upper

Phase 1, complete

Phase 2, complete

Phase 3, lower

0.25

Miles

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Previous Restoration Work



Previous Restoration Work



Previous Restoration Work



Previous Restoration Work



Halstead Meadow at Generals Highway



Halstead Meadow at Generals Highway



Lower Halstead Meadow – The previous restoration is anchored by 60-year-old structure



Phase 3: Lower Halstead Meadow, 2016



Proposed action

Create Upper Meadow Sediment Traps

Restore Lower Meadow Minimizing Imported Fill Requirements


-OR-

Restore Lower Meadow Maximizing Restored Area

Stabilize Lower Erosion Control Structure

Rehabilitate Picnic Area, Replace Vault Toilet, Add Interpretive Exhibits/Waysides

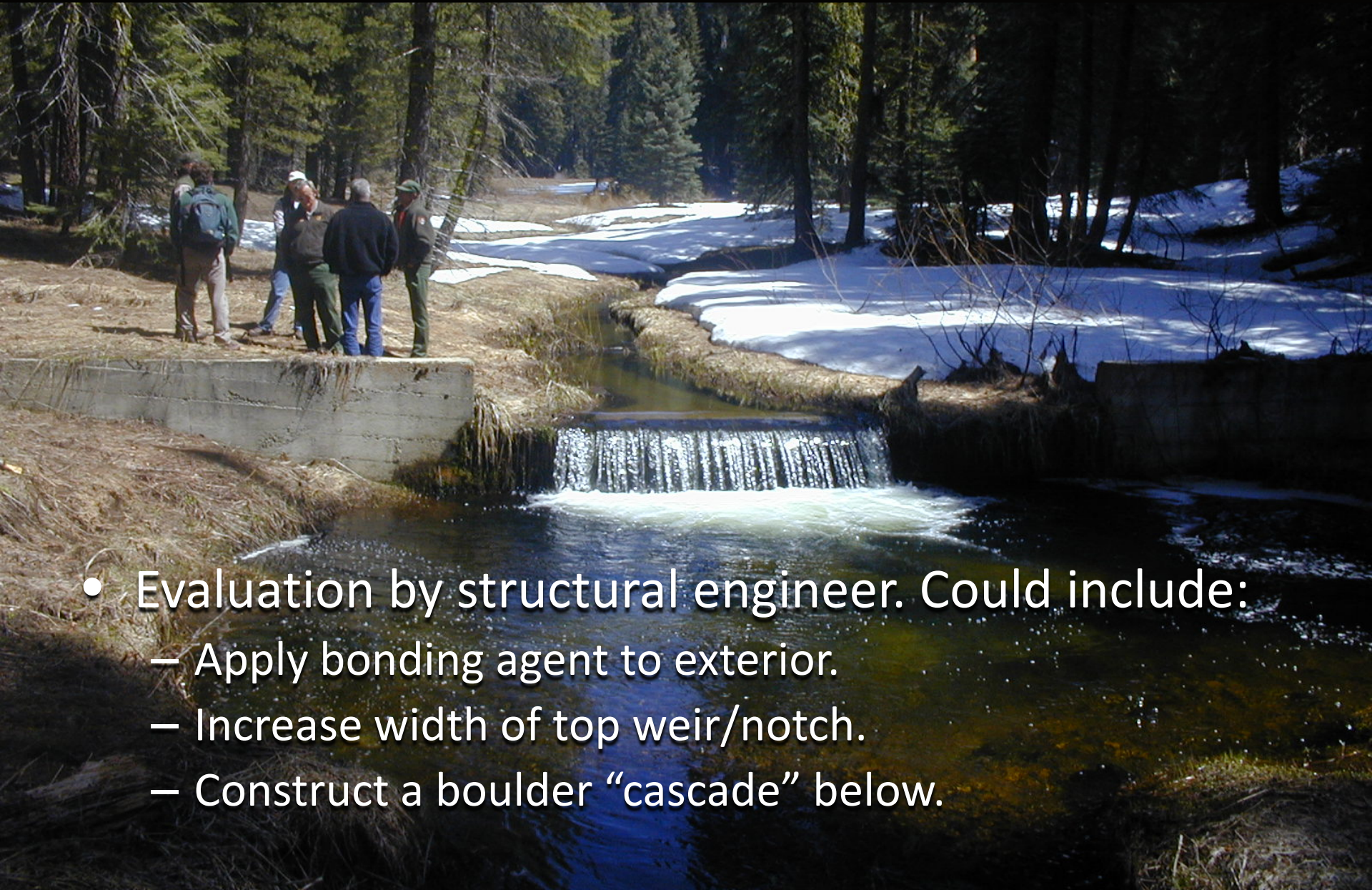
Upper Meadow Sediment Traps

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- Install in-channel structures to aggrade sediments and raise water tables.
 - No imported fill.
 - Some planting of locally propagated plant materials.

Full Restoration

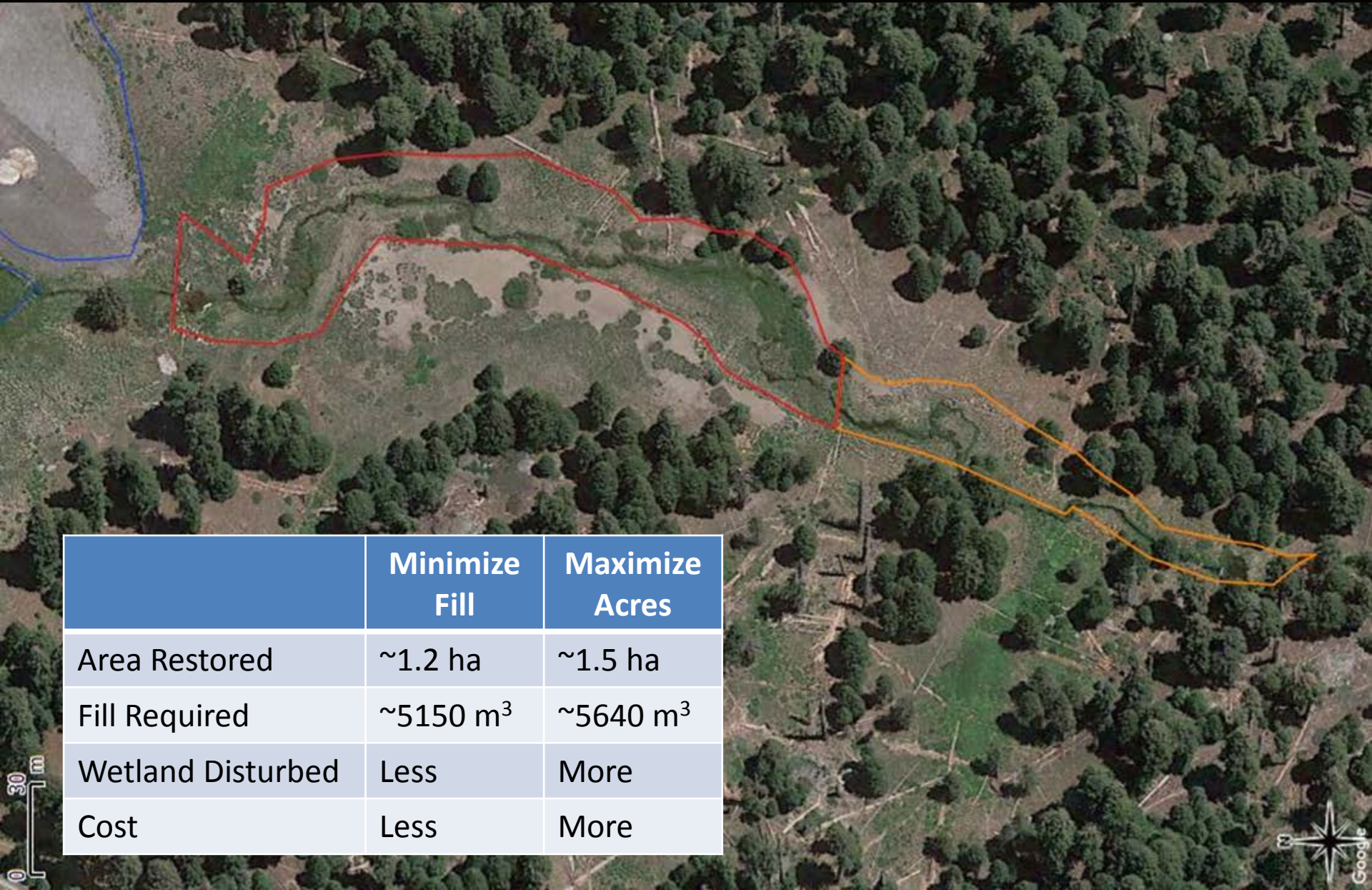
- Equipment and vehicle access via picnic area.
- Install monitoring wells.
- Divert water into bypass pipe.
- Fill with on-site sediments plus wood chips and imported fill; grade level in cross section.
- Install erosion control blanket and wattles.
- Return water flow over meadow surface.
- Salvage on-site sod; plant commercially increased material from local sources.
- Maintain until plants reestablish.

Stabilize Lower Erosion Control Structure



- Evaluation by structural engineer. Could include:
 - Apply bonding agent to exterior.
 - Increase width of top weir/notch.
 - Construct a boulder “cascade” below.

Restoration Alternatives



	Minimize Fill	Maximize Acres
Area Restored	~1.2 ha	~1.5 ha
Fill Required	~5150 m ³	~5640 m ³
Wetland Disturbed	Less	More
Cost	Less	More

Rehabilitate Picnic Area



Rehabilitate Picnic Area



- Interpretive Waysides
- Vault Toilet
- Picnic Tables
- Fire Rings
- Trash Cans
- Access Gate

Timeline

Summer 2017: Public input on Proposed Action through July 14, 2017

Summer 2017: Finalize alternatives and analyze the effects

Winter 2017: Complete analysis per the National Environmental Policy Act (NEPA)

Early 2018: Public input on Environmental Assessment

Summer 2023: Implementation of Selected Action

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www.nps.gov/seki



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