



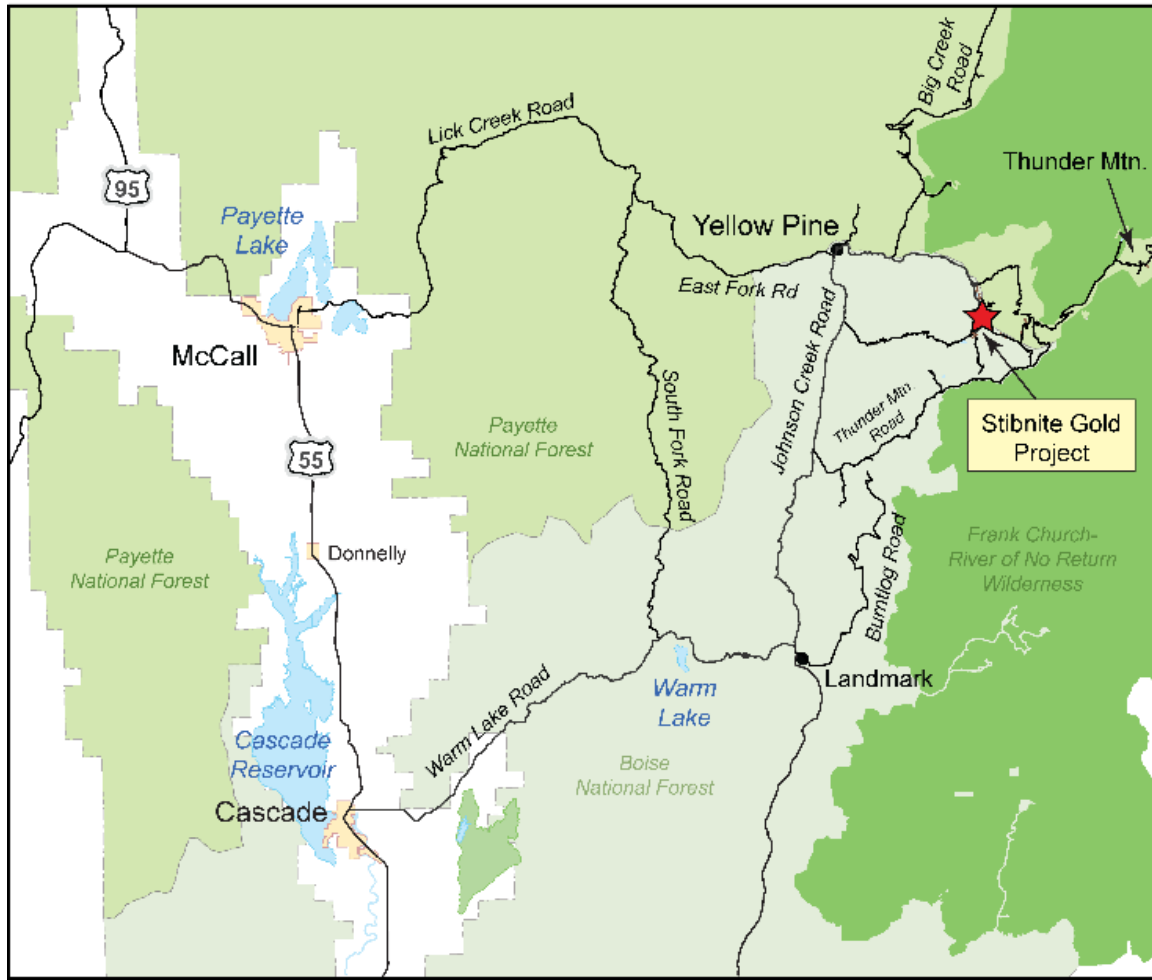
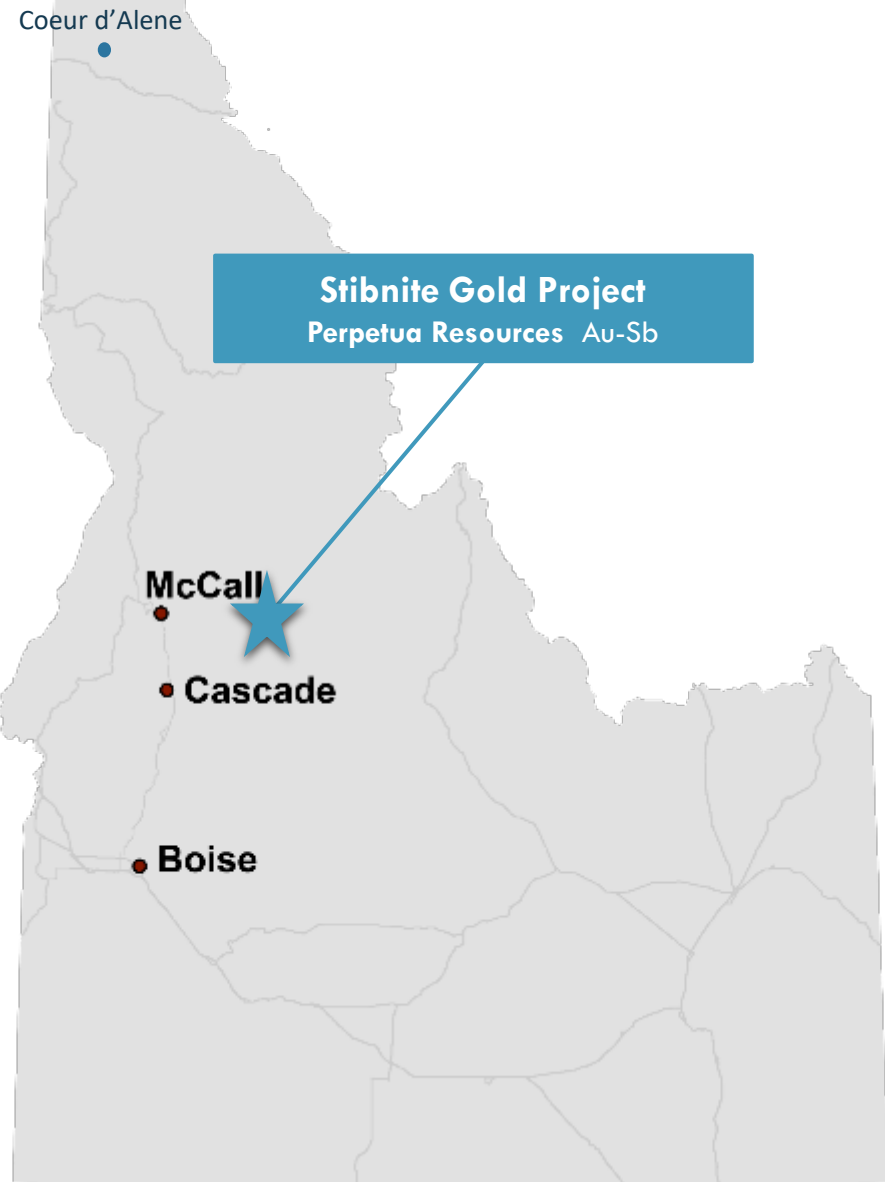
Building a Stream and Wetland Compensatory Mitigation Plan Integrated With an Active Mine Site

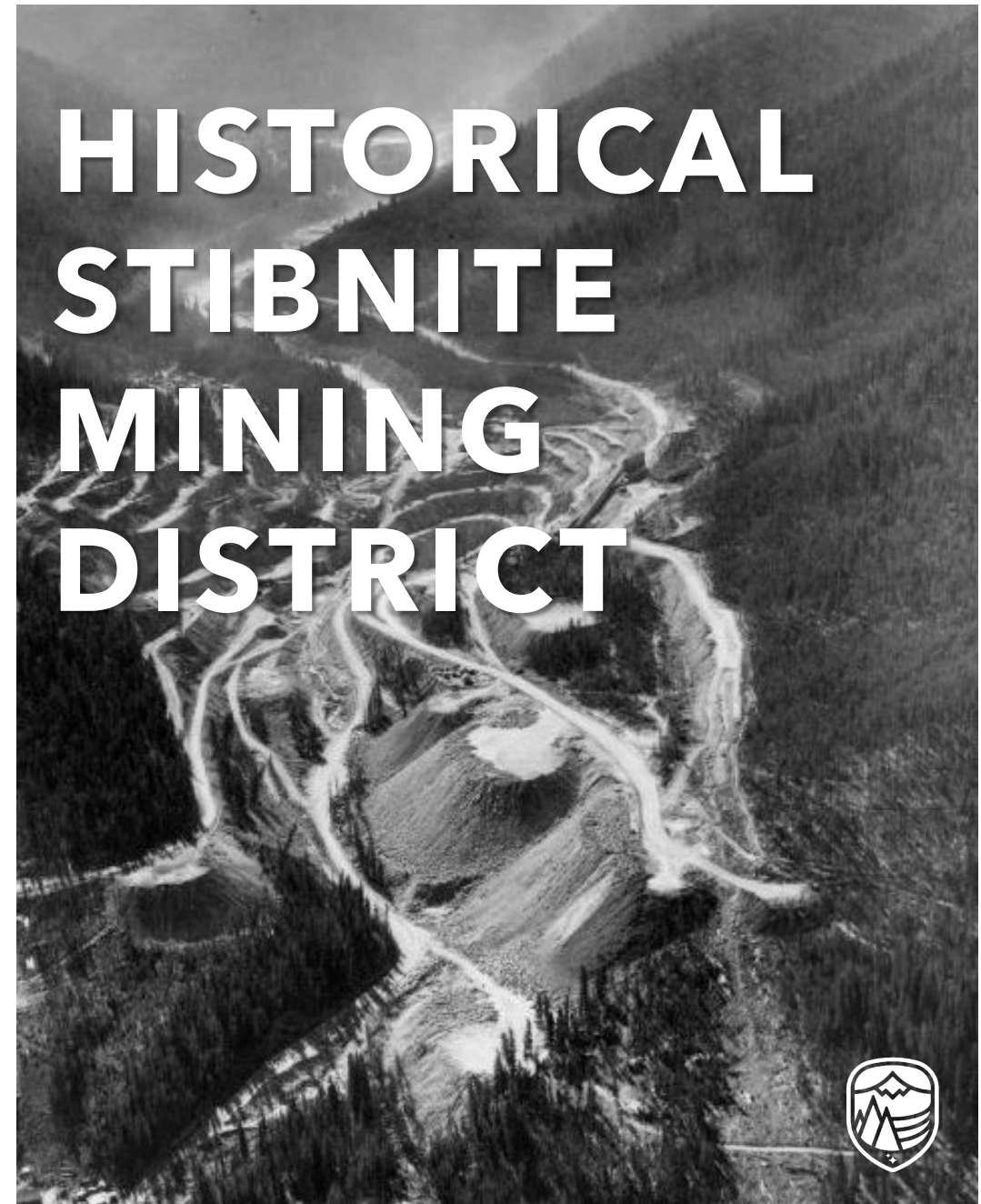
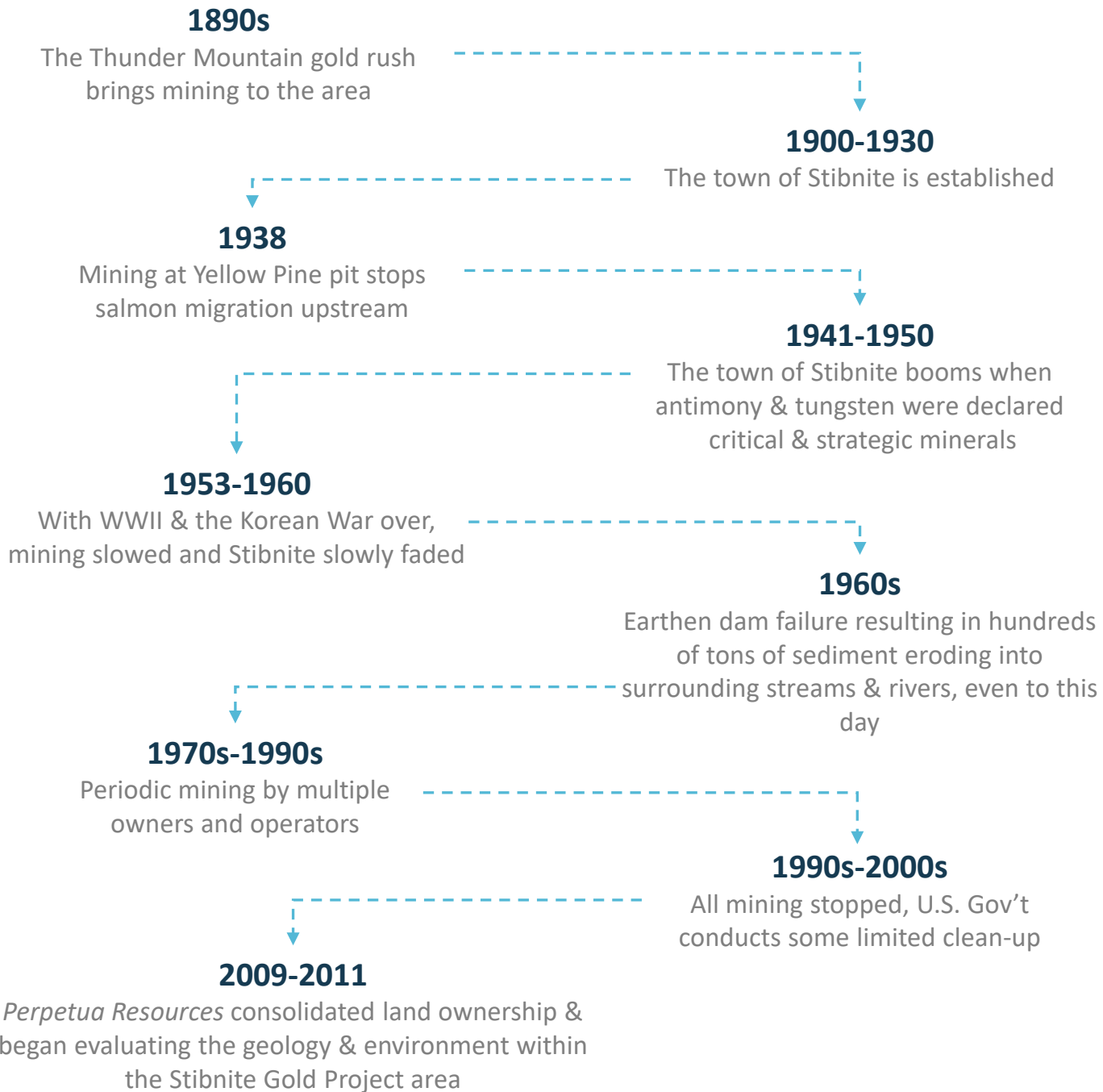
BACKGROUND & CONTEXT

Perpetua Resources Idaho, Inc.
Stibnite Gold Project



STIBNITE GOLD PROJECT





HISTORICAL LEGACY

After 100+ years of mining activity, many environmental legacies remain.

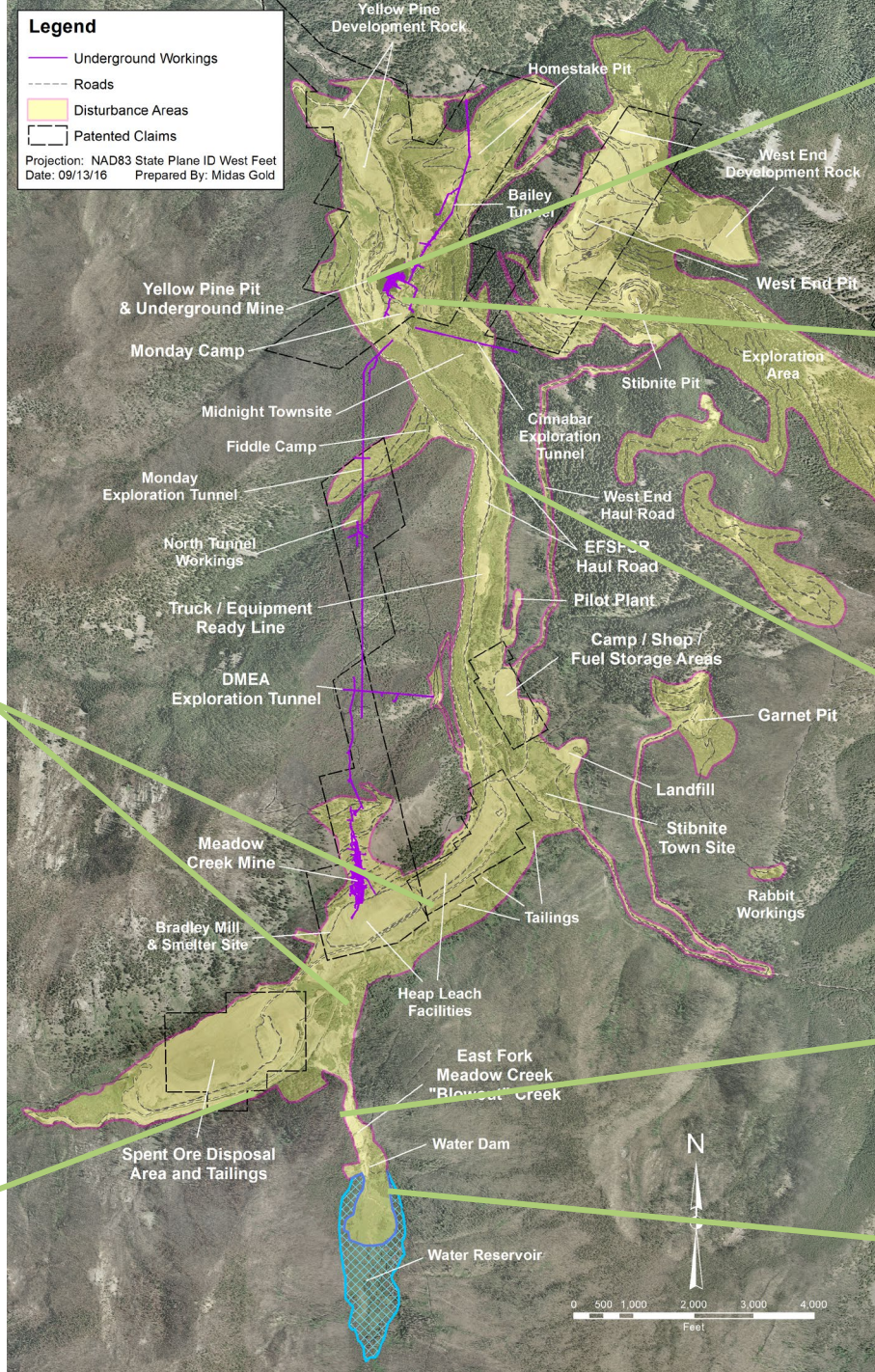
TAILINGS

10.5 million tons of legacy spent ore and unlined tailings interact with ground and surface water



MEADOW CREEK

4,900 ft rock lined ditch with limited habitat function



YELLOW PINE PIT

The East Fork of the South Fork dumps into a legacy mine pit. Currently, ~80 feet of sediment has collected at the bottom



FISH PASSAGE

Fish migration is blocked by the Yellow Pine pit



HABITAT

13,000+ ft poor habitat quality



BLOWOUT CREEK

Largest source of sedimentation in the watershed

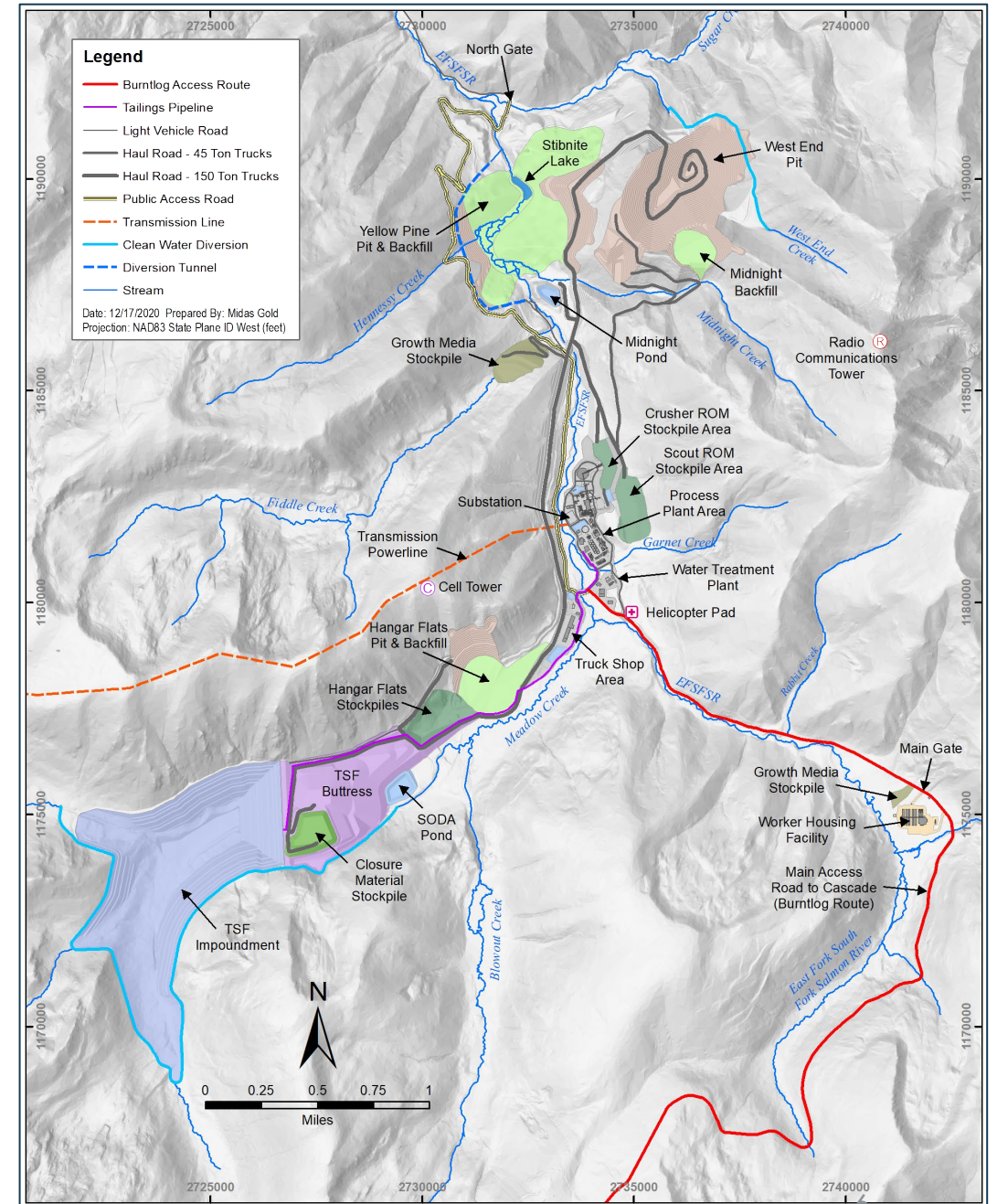
BLOWOUT CREEK VALLEY

14-foot drop in water table, loss of wetlands function



STIBNITE GOLD PROJECT

- Three open pits:
 - Hangar Flats, Yellow Pine and West End and reprocessing of historical tailings
- Geosynthetic-lined Tailings Storage Facility (TSF)
 - Rockfill embankment
 - 90-million-ton development rock buttress
- Hangar Flats, Yellow Pine and Midnight portion of West End Pit backfilled
- Restore river channel across Yellow Pint Pit and provide permanent fish passage on closure



OBJECTIVES

- Illustrate some of the challenges in developing mitigation credit (CMP) for the Stibnite Gold Project.
- Solutions Perpetua developed
- Promote ideas to use on similar project



CLEAN WATER ACT SECTION 404

- Administered by US Army Corps of Engineers (USACE) through EPA authorization
- Permitting process to authorize dredge and fill or other indirect impacts to Waters of the United States (WOTUS)
- Implementation of the Section 404 Rules direct Applicants to:

- Avoid
- Minimization
- Compensation

Compensatory Mitigation Plan (CMP)

USACE Mitigation Preferences

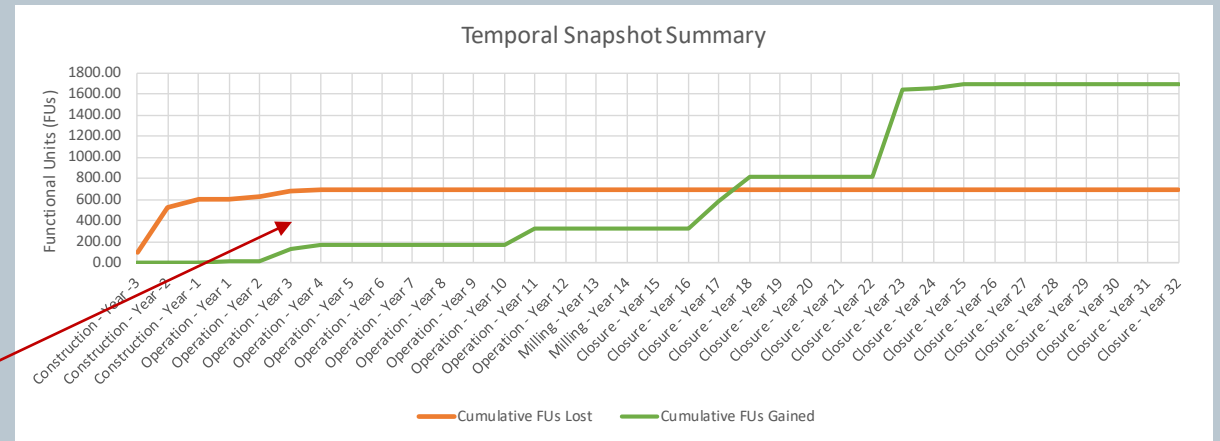
- Mitigation Bank
- In-Lieu Fee
- Proponent Sponsored Projects



FUNCTIONS & VALUES LEDGER

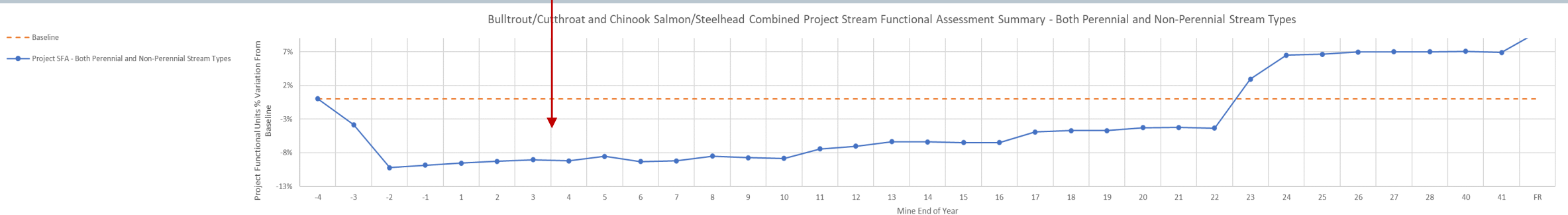
Wetland Functional Assessment Ledger of Impacts and Credits (Tetra Tec)

Salmon River Drainage - All Delineated Wetlands			
Gains and Losses Summary - Acres		Gains and Losses Summary - MWAM	
	Acres		FUs
Total Direct Wetland Losses	122.4	Total Wetland Debits	686.6
Total Wetland Conversion Losses	15.8	Total Wetland Conversion Debit	5.5
Total Wetland Gains	237.0	Total Wetland Credits	1,692.9
Acreage Residuals	98.8	FU Residuals	1,000.7



Temporal Losses

Stream Functional Assessment Ledger of Impacts and Credits (Rio ASE)



SOLUTIONS

Finding Stream and Wetland
Mitigation Credit



RESTORATION OF LEGACY IMPACTS

Mitigation Credit in Restoration



Early repair of the largest source of sedimentation



Pick up, reprocess, reuse and safely store 10.5M tons of tailings and spent ore



Re-establish fish migration and provide permanent river restoration

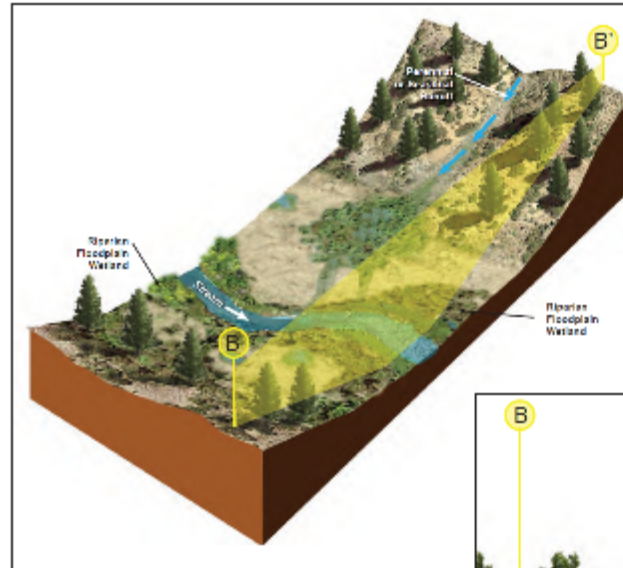


REMOVE & REPROCESS LEGACY TAILINGS

CURRENT

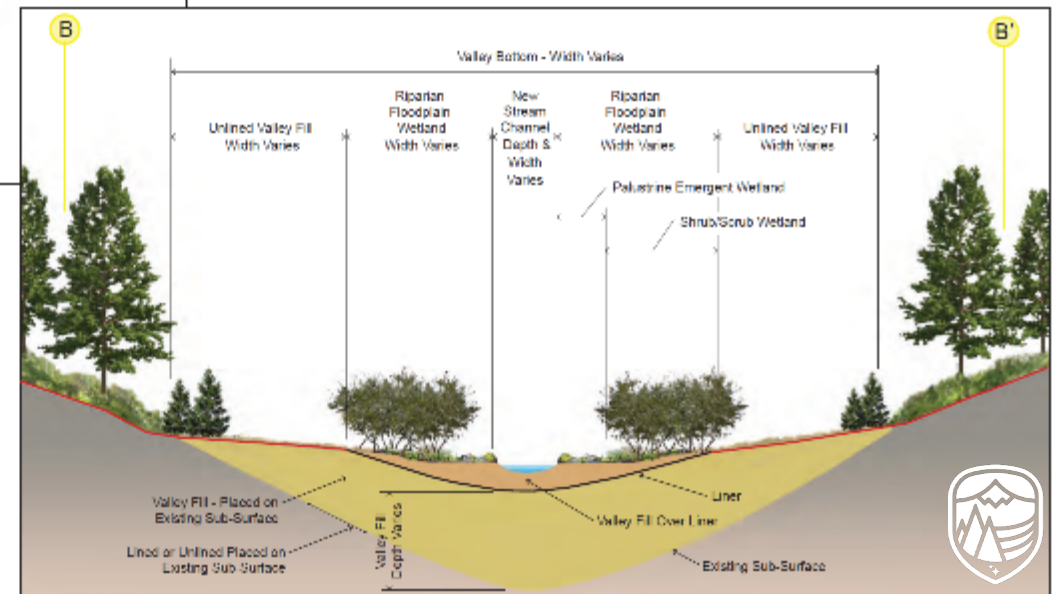


RESTORATION



Reprocess 3 million tons of historical tailings & repurpose the 7.5 million tons of spent heap leach ore, removing an existing potential source of water degradation.

Restoration follows construction and operation of TSF and Hangar Flats DRSF within portions of the SODA footprint.

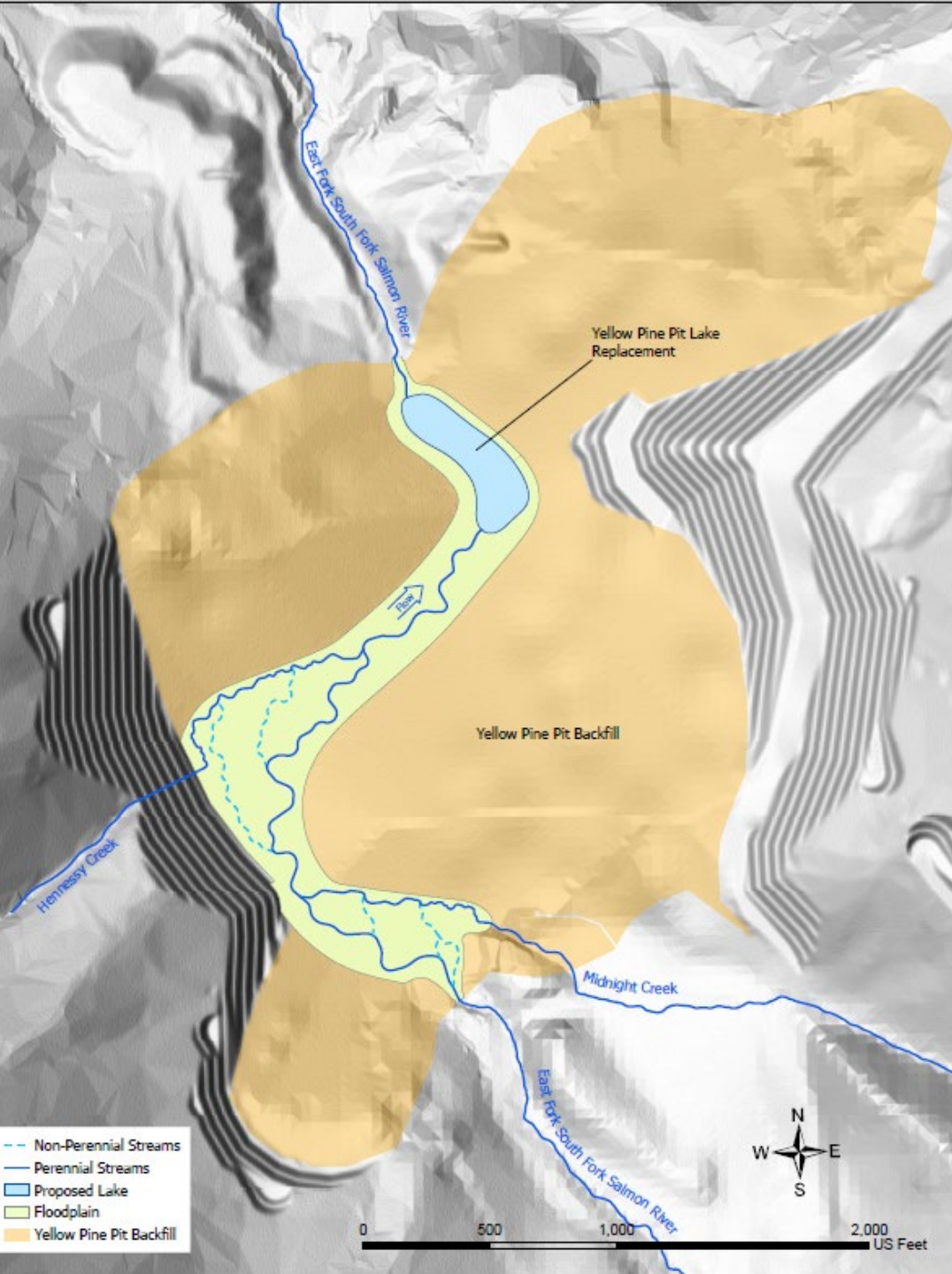


EFSFSR RESTORATION

OVER BACKFILLED YPP

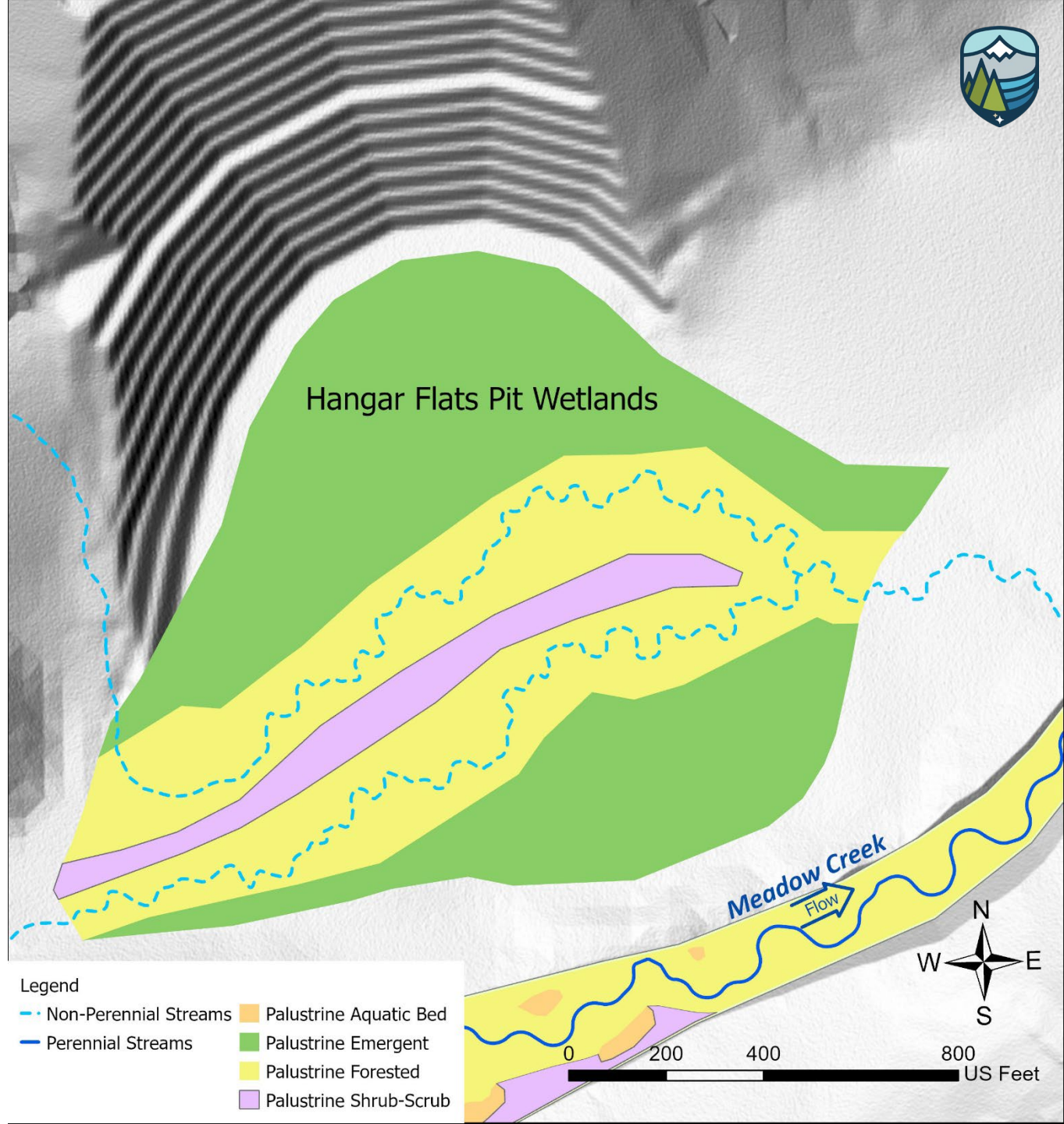


EFSFSR: East Fork of the South Fork of the Salmon River
YPP: Yellow Pine pit



HANGAR FLATS PIT BACKFILL

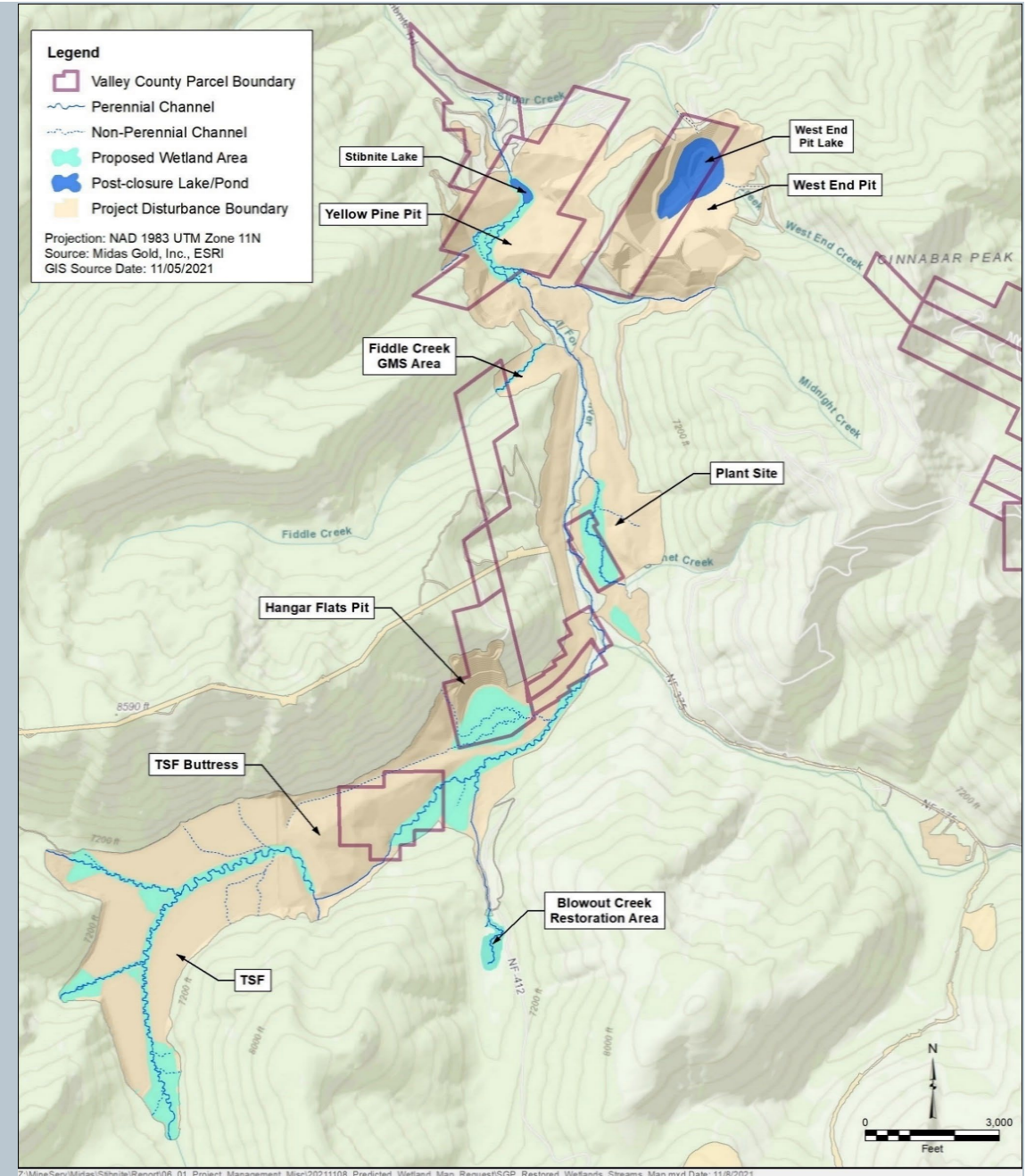
STREAM AND WETLANDS



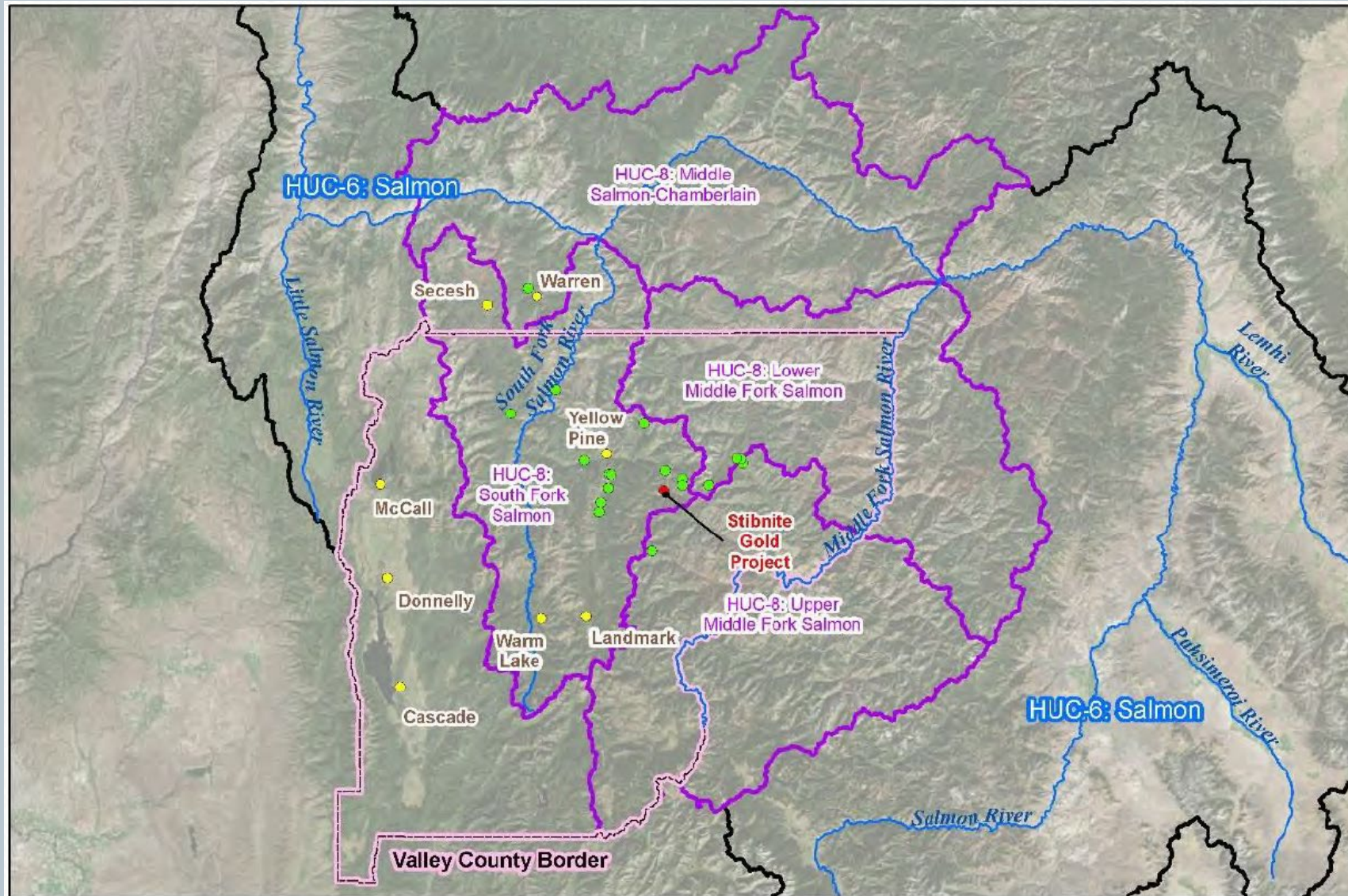
COMPENSATORY MITIGATION

SALMON RIVER WATERSHED

- On site stream and wetland restoration
 - Direct and Indirect impact to stream and wetlands
 - Temporal for wetland
- Lemhi River Stream Enhancement Project
 - Temporal stream losses

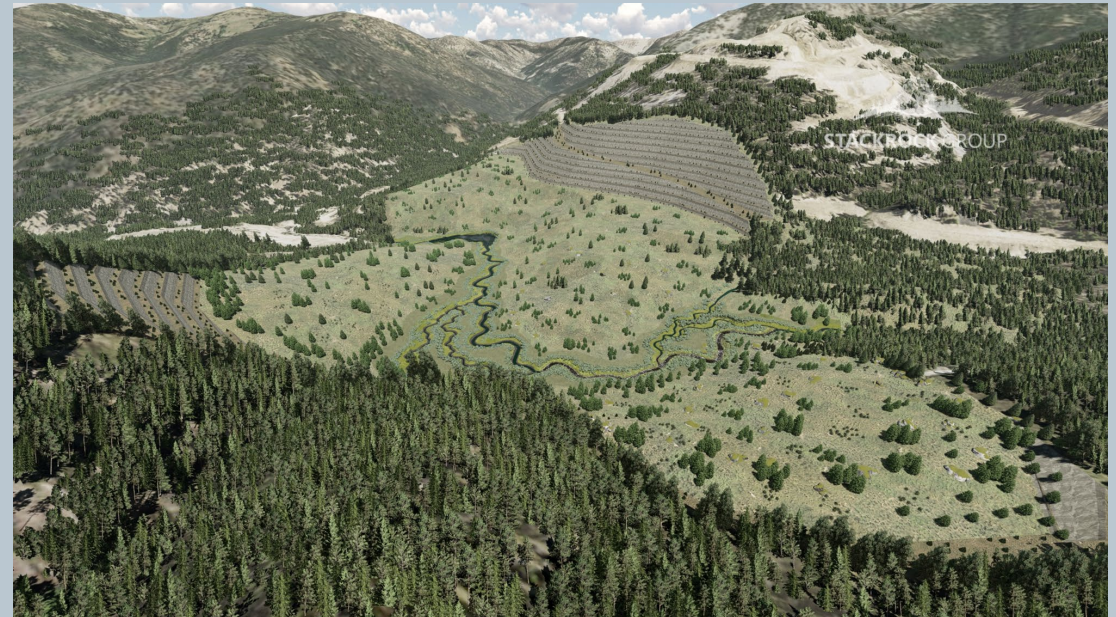


OFF-SITE MITIGATION PROSPECTS



CONCLUSIONS

- Find mitigation credits in restoration of brownfield sites
- Functions and Values assessment ledgers can give flexibility to mitigation plans
- Utilizing multiple aspect of credit opportunities to create a mitigation portfolio
- Think outside the box when developing compensatory mitigation plans



Questions ?

Thank You!

