Sproul Creek Watershed Meeting

May 12, 2022

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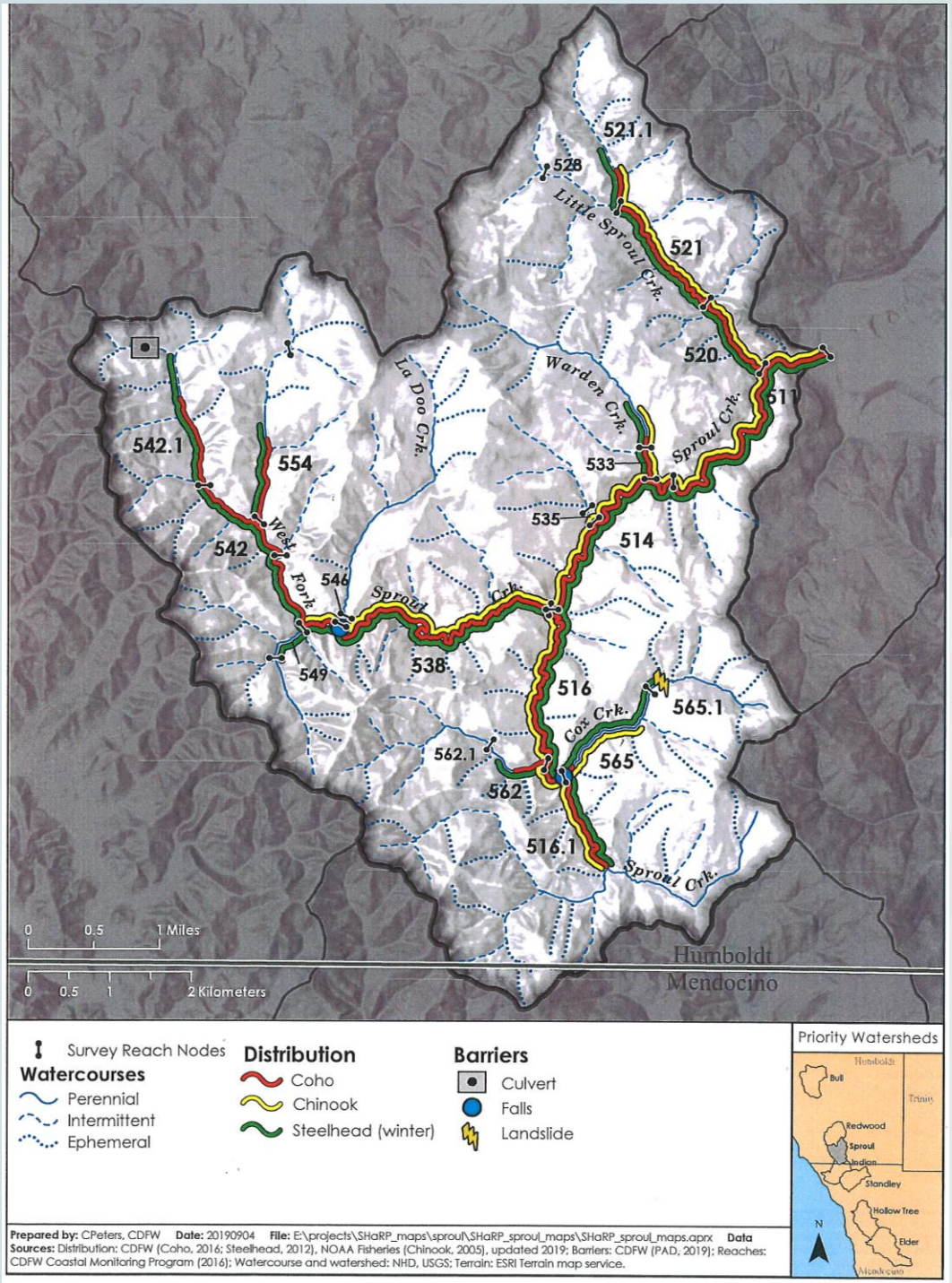
Stillwater Sciences

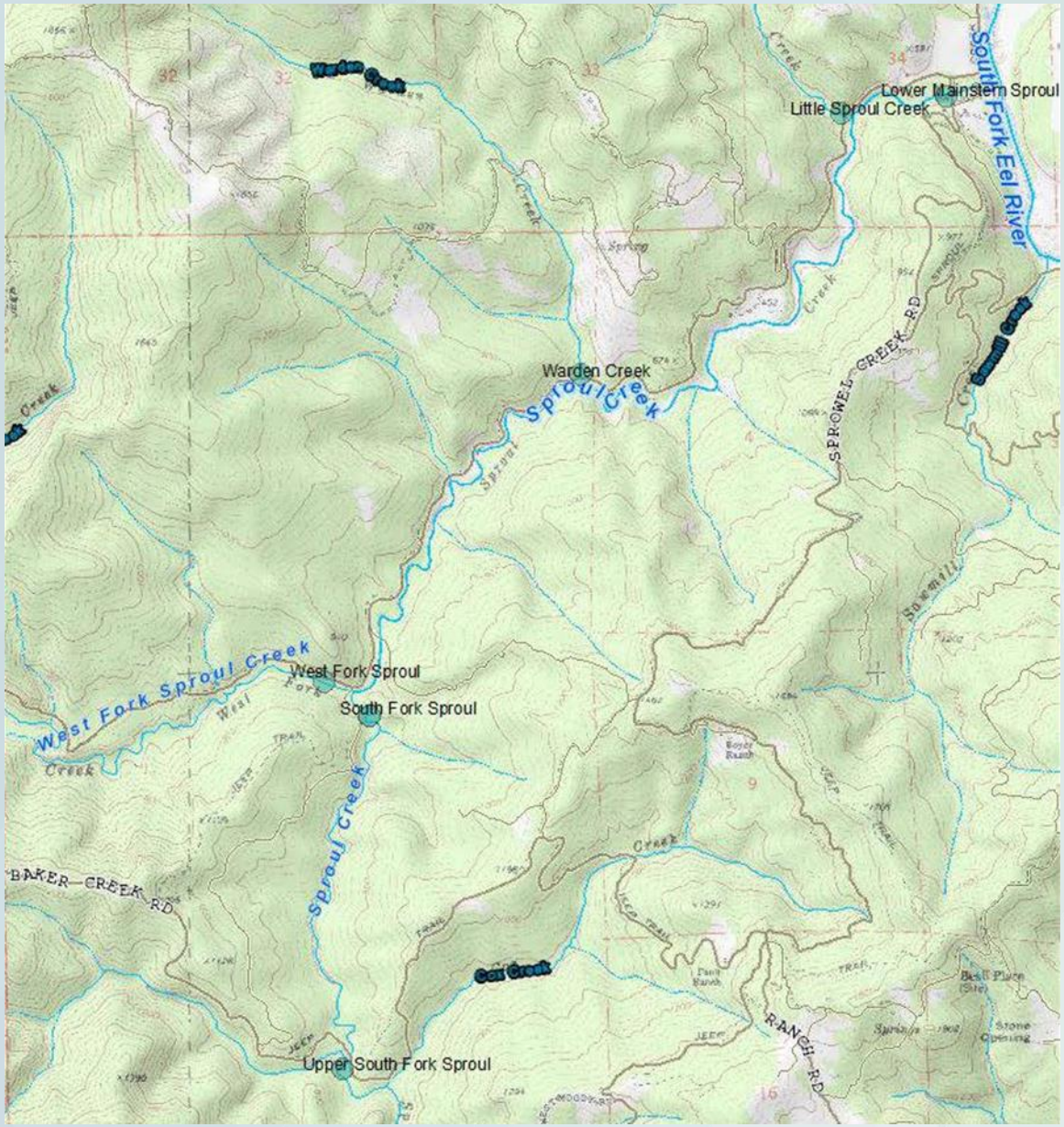
Meeting Agenda

- Dry Season Flow Monitoring Summary
- 2020 Field Assessment Results and Implications
- General Flow Enhancement Approach for Sproul Creek
- 2021 LiDAR Analysis Summary
- Identification of Near-term Priority Projects
- Long-term Flow Enhancement Approach
- Discussion and Questions

Watershed Overview



Dry Season Flow Monitoring Stations



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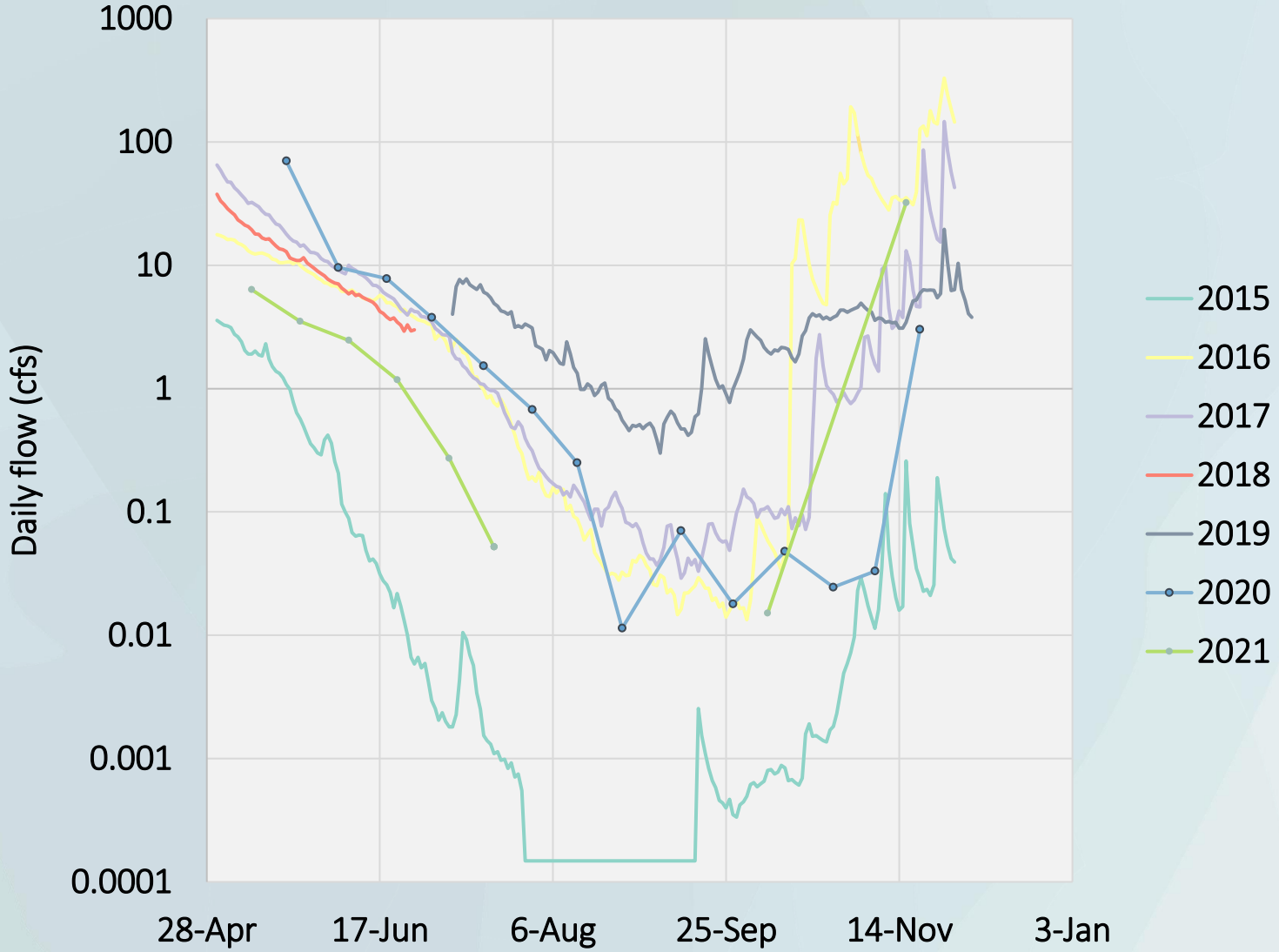
Lower Mainstem Sproul Creek



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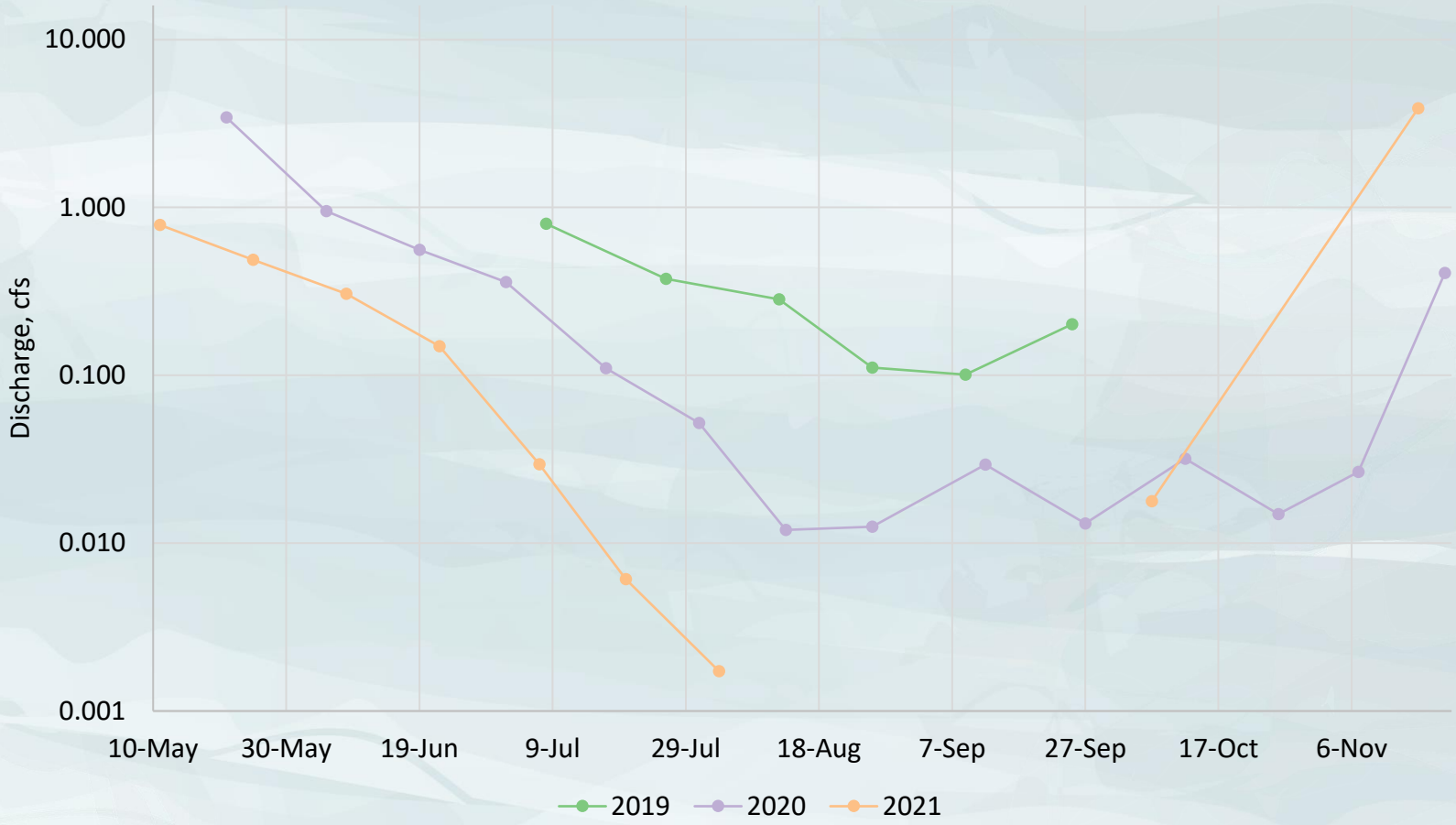
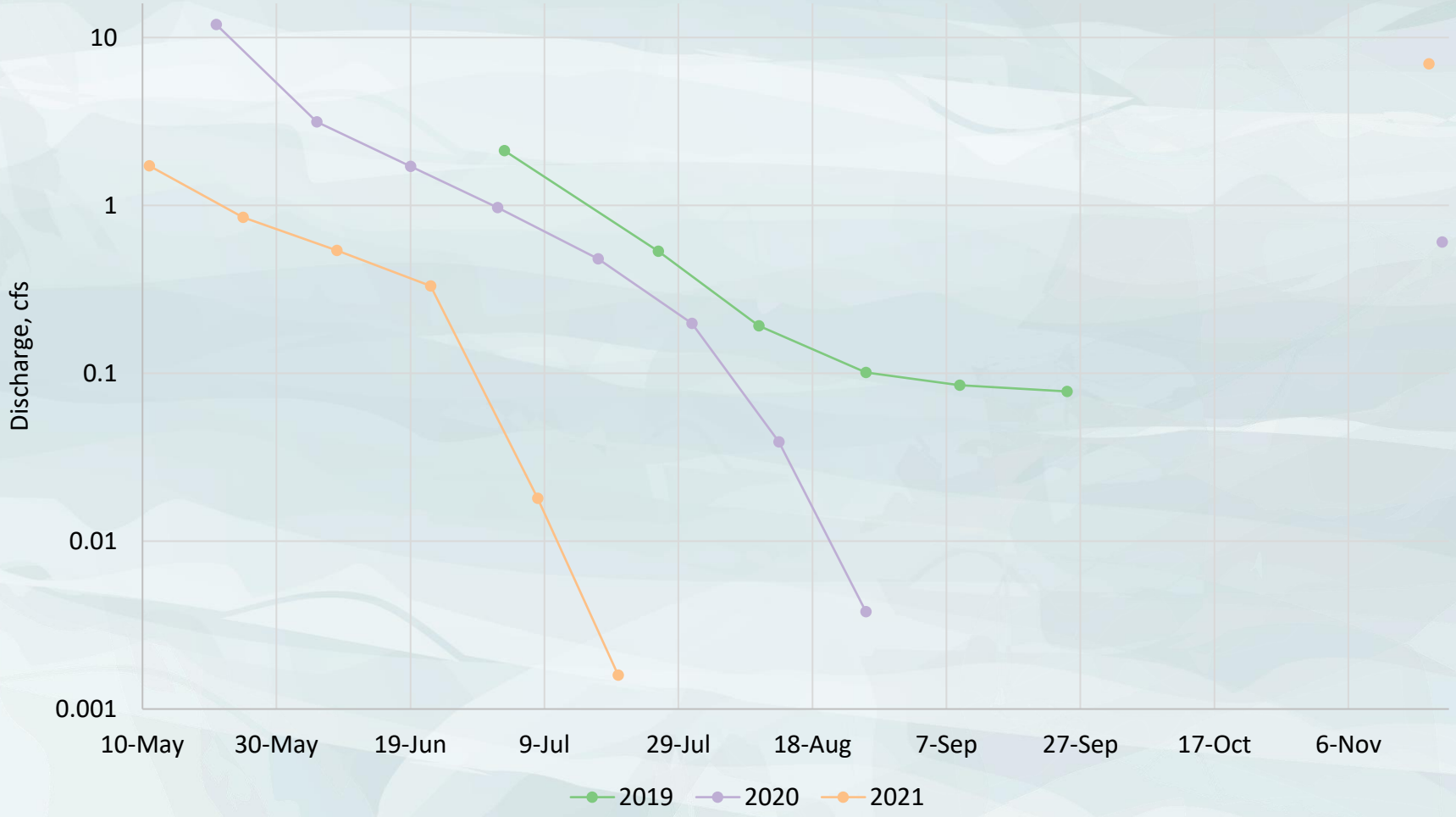
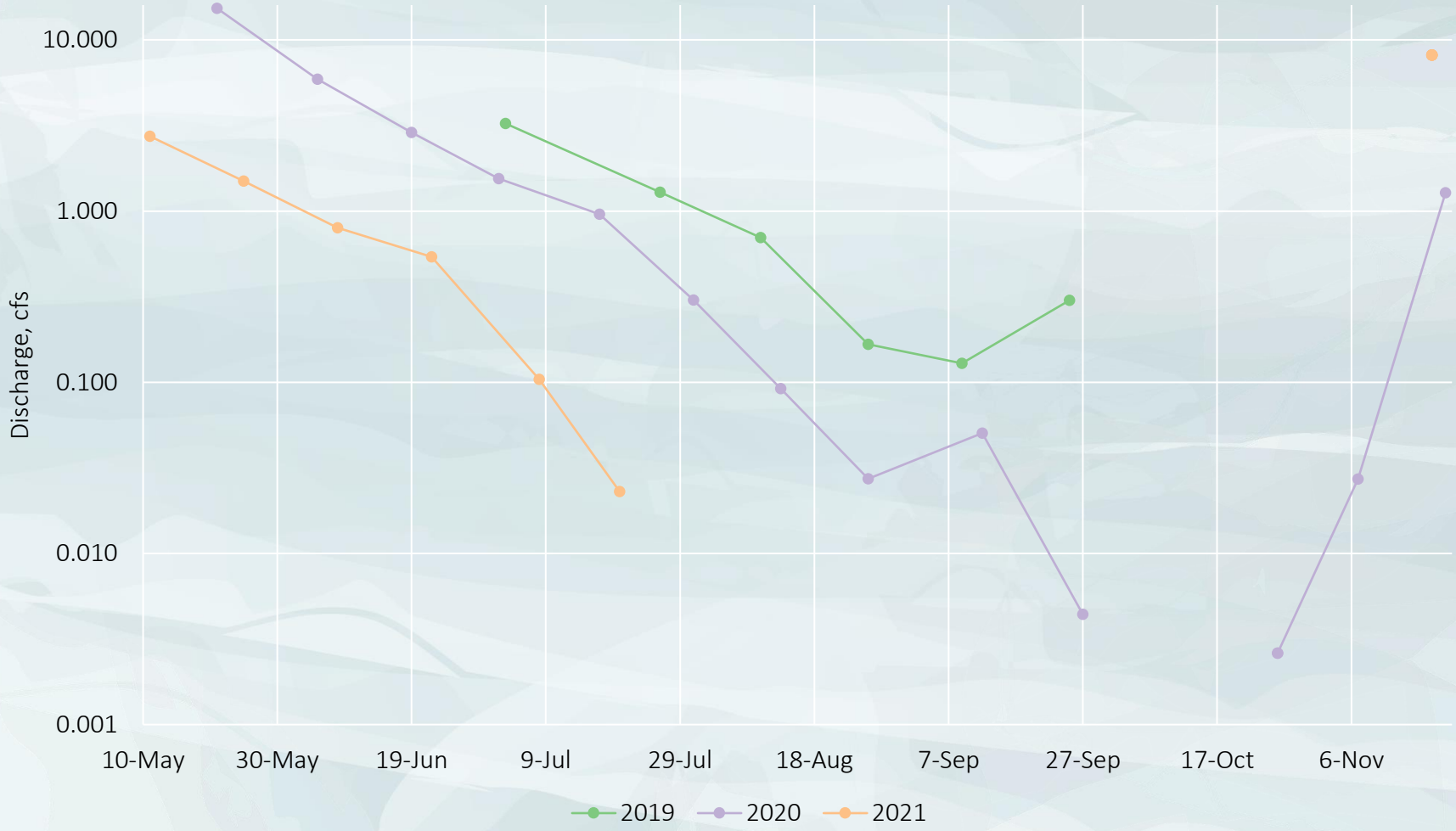
Little Sproul Creek



South Fork Sproul Creek



West Fork Sproul Creek

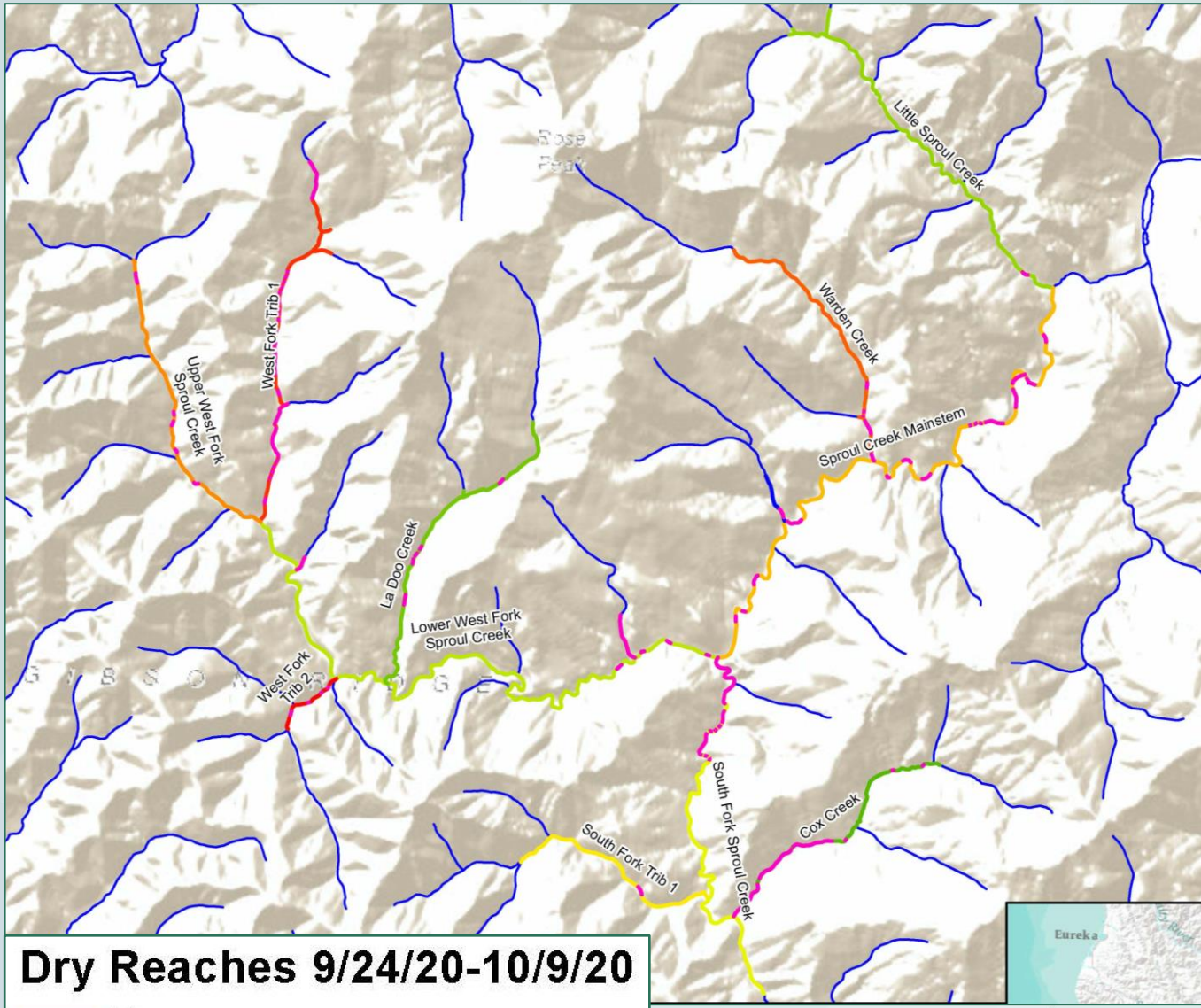


South Fork Sproul Creek

South Fork Sproul Creek – Lowest Flows

Sproul Creek Flow Enhancement Assessment

- Field assessment conducted in September 2020 to identify scale and extent of dry season flow impairment
  - Mapped wet/dry reaches along major watercourses
  - Significant flow impairment (dry reaches)
  - 2021 significantly dryer than 2020



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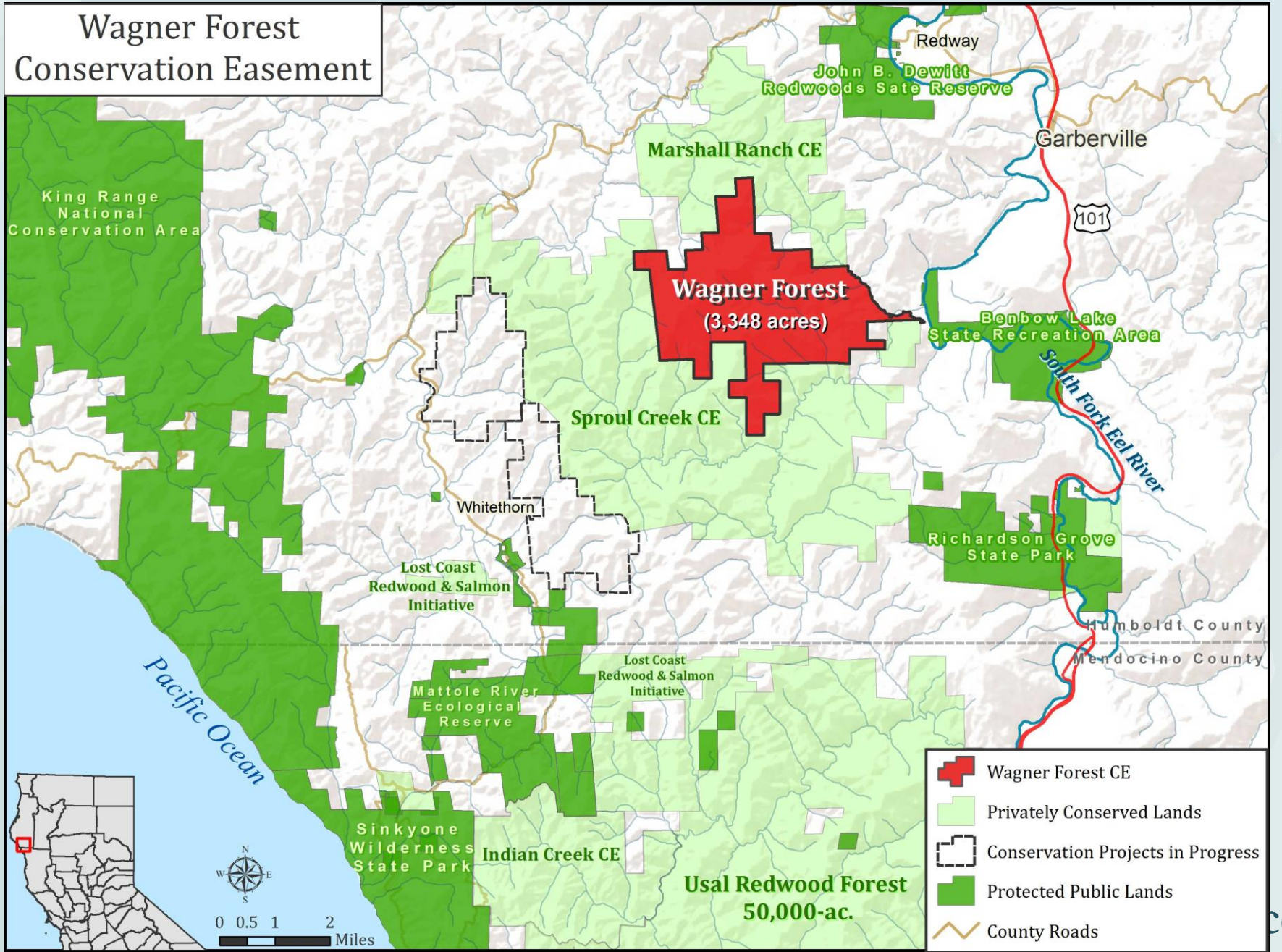
Sproul Creek Flow Enhancement Assessment



Sproul Creek Flow Enhancement Assessment

- Additional LiDAR and field assessment in 2021 to further identify flow enhancement opportunities
- Applying knowledge gained from projects in Mattole River headwaters, Redwood Creek and other regions

Assessment Implications: Why the severe impairment of dry season flows?

- Sproul Creek typically much less impaired than Redwood Creek due to less human consumptive use
- However, 2020 and 2021 long reaches of Sproul Creek were dry, why?
- Climate and human induced disruption of typical watershed hydrologic processes:

1. Multiple years of Drought result in less precipitation filling hillslope bedrock aquifers (primary source of dry season base flow)
2. Longer Dry Seasons result in draining of hillslope bedrock aquifers
3. Legacy/Current Land Use

Legacy & Current Land Use

1. Consumptive water use (domestic, agriculture, road watering)
2. Roads and other land disturbance increase runoff rates and decrease infiltration
3. Second growth forests use more water than old growth
4. Gullies and lack of large wood in creeks lead to water draining out of the watershed quicker than under pristine conditions

- These issues are watershed-wide
- Site-specific projects addressing these issues not expected to result in measurable flow enhancement benefit

Long-term Flow Enhancement Approach & Priorities

1) Implement projects that provide most immediate instream flow benefit to sustain salmonids through **Direct Flow Augmentation**
2) Reduce dry season human consumptive use through **Storage and Forbearance**
3) Continue to experiment with **Passive Groundwater Recharge** and **Forest Management Projects** that improve natural hydrologic processes - determine efficacy and applicability of different approaches

Direct Flow Augmentation - Highest Near-term Priority

- Minimum of one project to be designed to 65% level through current WCB Grant
- Construction of large ponds – typically off-stream
- Capture winter runoff and release water during the dry season when most needed by fish
- Additional benefit of greatly improving fire resilience
- Difficult to find suitable locations due to topographic and biologic constraints
- Sproul Creek has very few suitable off-stream locations for significant water storage primarily due to topographic constraints but also timber management land use conflicts

LiDAR Analysis to identify suitable sites for large scale flow augmentation

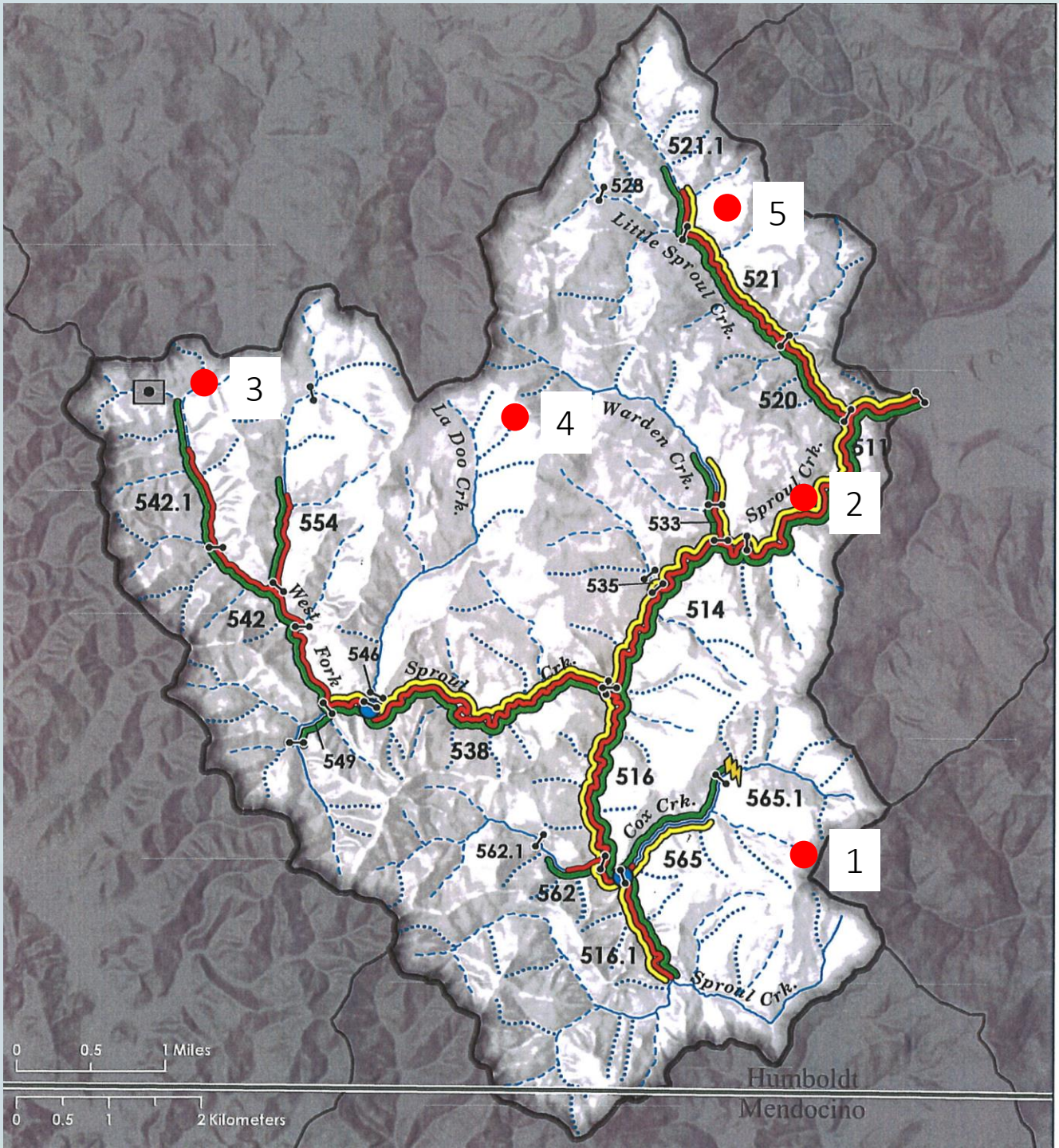
1) Office-based terrain analysis in GIS
   - Overlay with land cover
   - Define low slope areas
   - Identify landslides, gullies or other evidence of instability
   - Identify areas with potential for flow enhancement
   - Produce field maps with detailed topography

2) Site visits to suitable locations
   - Field truth LiDAR data
   - Identify other potential constraints

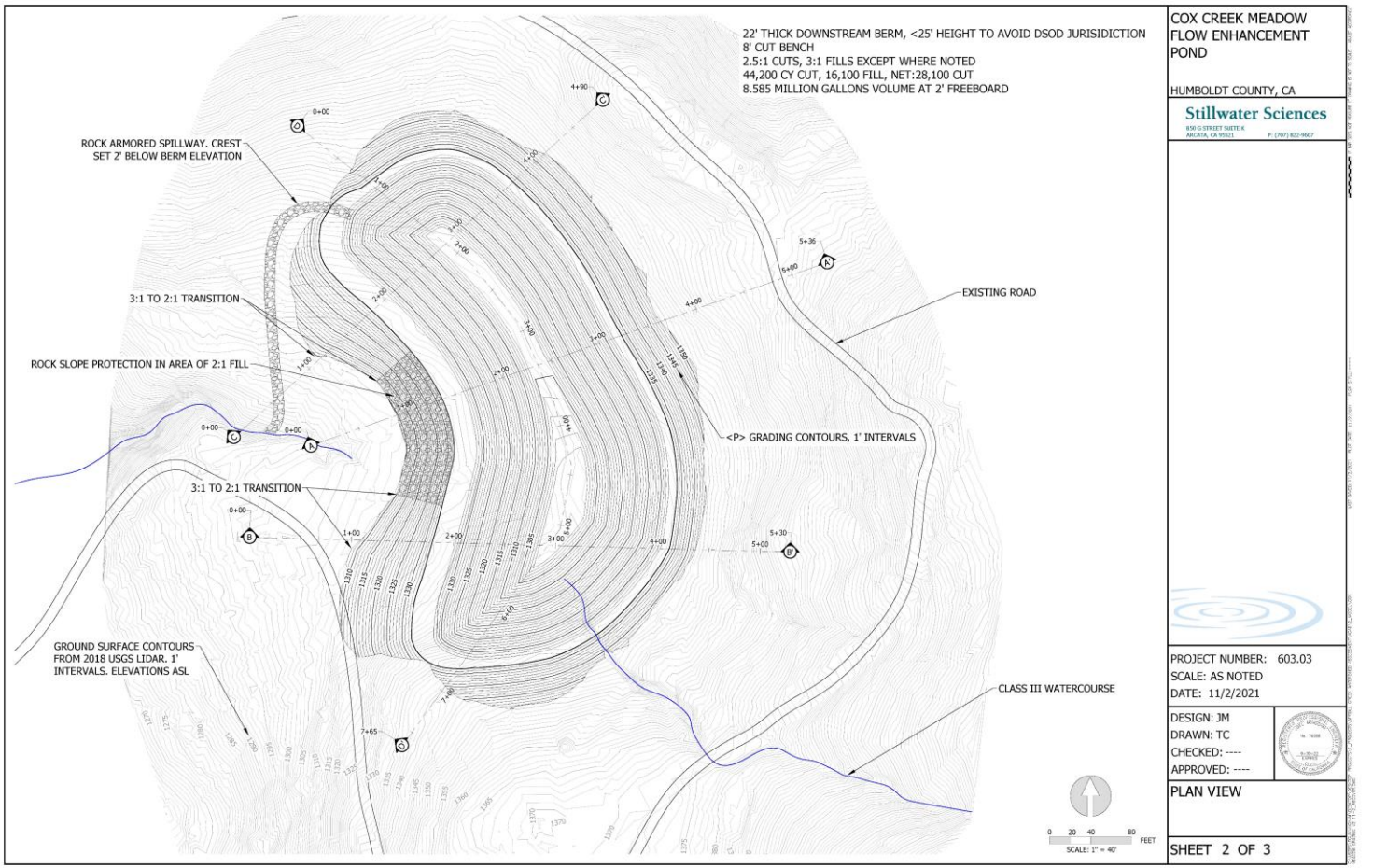
3) Preliminary grading in CAD to determine water storage potential at each site

Direct Flow Augmentation Opportunities

1) Cox Creek Meadow (GDR)
2) Old Mill Site (GDR)
3) West Fork Sproul Onstream (GDR)
4) La Doo Meadow (Wagner)
5) Little Sproul Meadow (Marshall)



Cox Meadow Site



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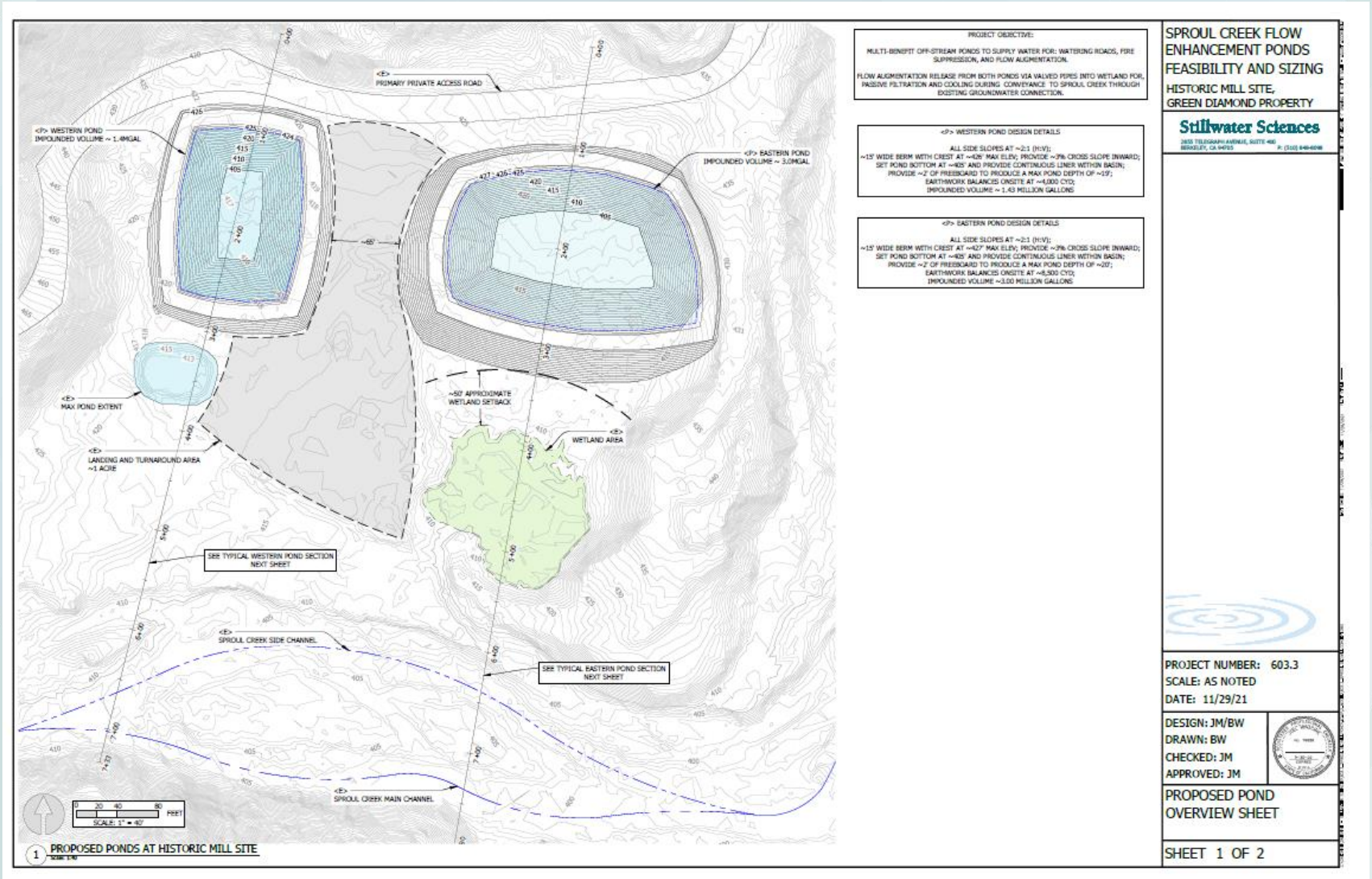
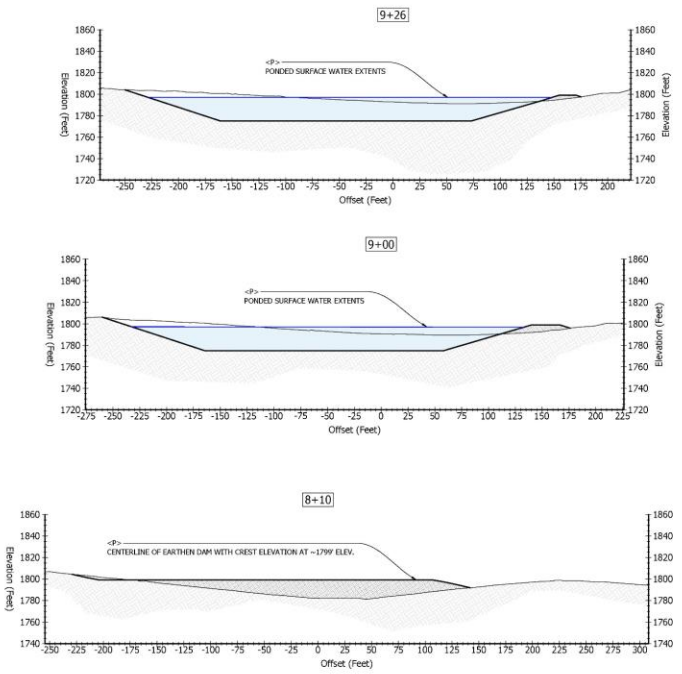
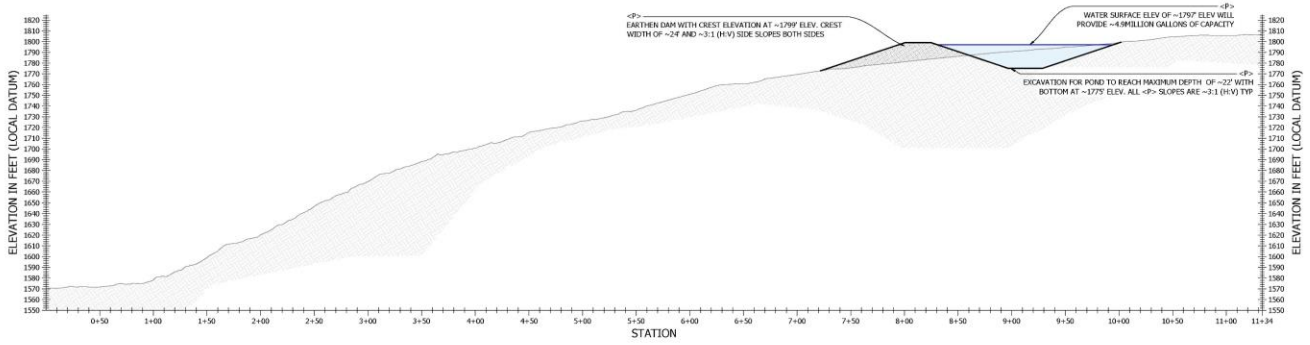
Old Mill Site



La Doo Meadow Site





WAGNER POND DESIGN

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Stillwater Sciences
850 G STREET SUITE K
ARCATA, CA 95521
P: (707) 822-9607

PROPOSED POND DESIGN DETAILS

GROSS CAPACITY ~4.9 MILLION GALLONS
W/ CREST AT ~1799' AND ~2' OF FREEBOARD

~22.5KCYDS CUT
~9.7KCYDS FILL
~12.8KCYDS OF EXCESS SPOILS

PROJECT NUMBER: 603.03
SCALE: AS NOTED
DATE: 10/4/21

DESIGN: JM
DRAWN: TC/BW
CHECKED: JM
APPROVED: JM

WAGNER POND OVERVIEW

SHEET 1 OF 1

West Fork Sproul On-stream Site

Next Steps

- Site visit to three highest priority sites to assess constraints
  - Cultural Resources
  - Biological Resources (wildlife and botany)
  - Geologic/Geomorphic/Hydrologic
- Get TAC Input
- Select highest priority site and prepare 30% Plans and Report

Storage and Forbearance

- Provide financial support to landowners to install tanks
- Landowners agree to stop diverting water during the dry season
- Successful program in the Mattole River headwaters implemented by Sanctuary Forest
- ~35 participating landowners with projects implemented over the past ~20 years
- Significant funding for this type of project expected over the next 5 years
- Difficult to get momentum for funding and implementation

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Passive Groundwater Recharge

- Off-stream groundwater recharge ponds – difficulty to control timing of instream flow benefits – water leaks out too fast!

Passive Groundwater Recharge

- On-stream projects to slow flows and increase groundwater storage – Log Weirs, Beaver Dam Analogues and Stage “0”
- Multi-benefit projects also improve habitat for fish

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Passive Groundwater Recharge

- Stage “0” channel grading – lots of experimentation in the Mattole!

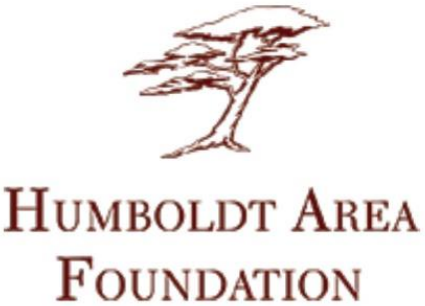
Forest Management

- Thinning – Pilot project underway in the Mattole
- Sustainable Timber Harvest – opportunities for studies to link forestry practices with dry season flows
- Controlled burning
- Multi-benefit, also greatly improves fire resilience

Final Observations

- Flow enhancement is a challenge! Significant improvements will require sustained effort by all stakeholders
- Focus on multi-benefit approaches capable of delivering results across varying time scales
- Learn from existing/future projects and adapt approach accordingly

Support Provided By:



Questions and Discussion