



NID

Water for Life

Plan for Water Stage 3: Watershed Management

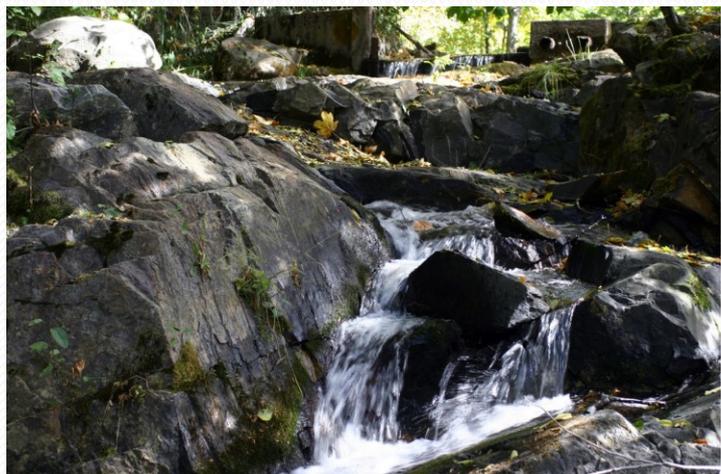
May 10, 2022



Proudly serving Nevada, Placer and Yuba counties for over 95 years

NID Mission Statement

The District will provide a dependable, quality water supply; continue to be good stewards of the watersheds, while conserving the available resources in our care.



Water comes from watersheds



From Peak to Valley

What does watershed management look like at NID?





NID

Water for Life



Overview

- To develop a common understanding of NID's source watersheds
- We use adaptive management on District-owned forests and wildlands, applying best practices to improve the resiliency and sustainability of source watersheds.
- Provide an overview of NID's Watershed Program and Environmental Resources Division



Sawmill Reservoir, Canyon Creek Watershed

WHERE DOES WATER COME FROM?

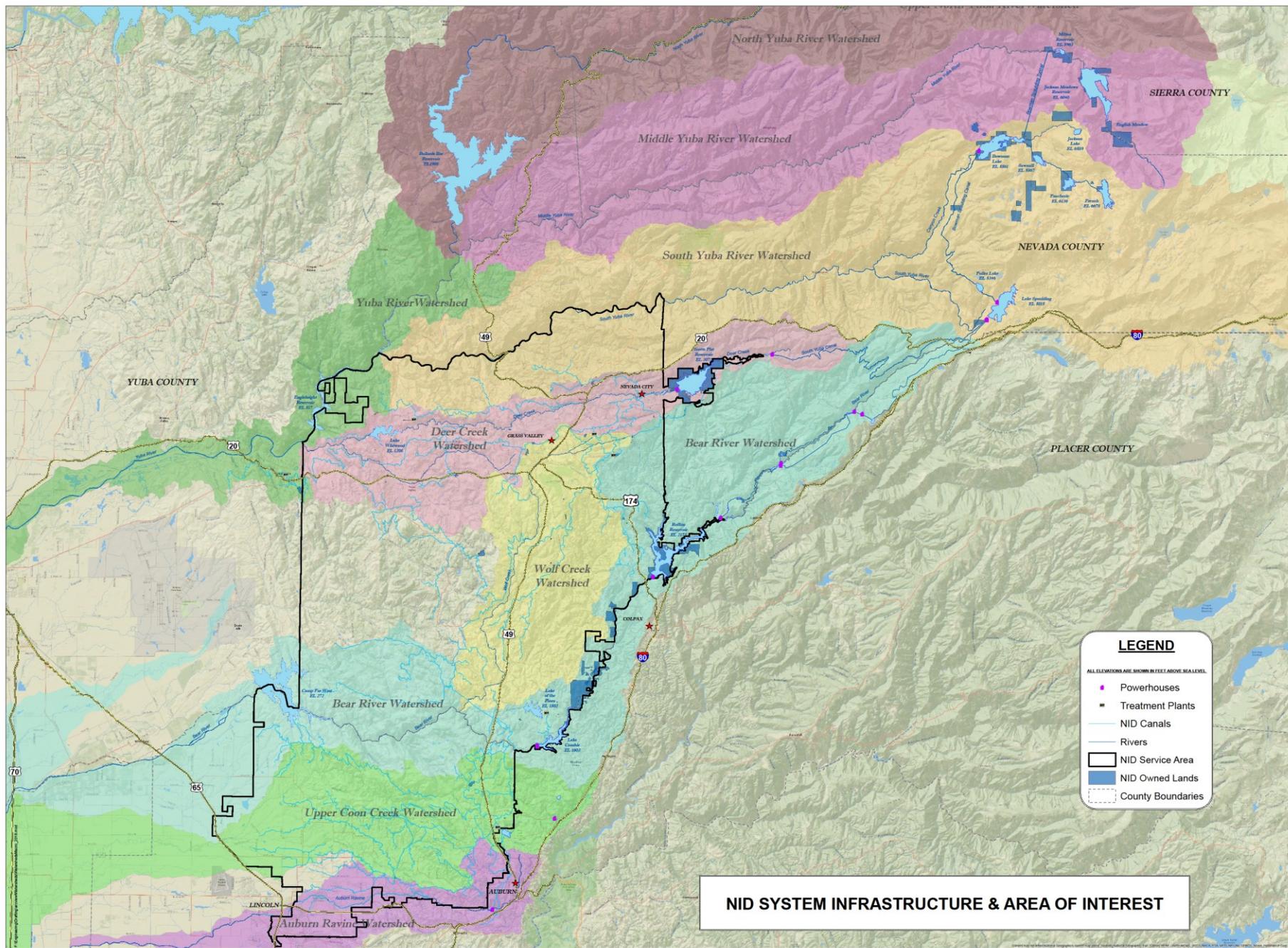
- Water comes from watersheds
- Watershed connect us and provide goods and services- supporting these processes is key.
- Watershed have a finite capacity to provide water for consumption, renewable resources, etc.
- Utilize interdisciplinary teams and work across boundaries and jurisdictions
 - Teams include staff, partners, consultants, local groups, agencies, Tribes and researchers to manage watersheds as interconnected systems.

The Making of a River



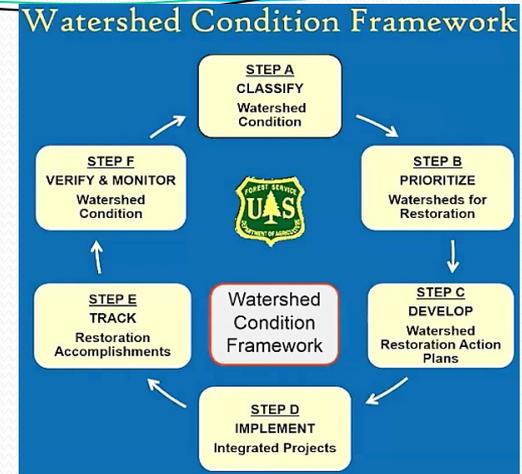
Image Credit: A. Vicente, U.S. Forest Service.



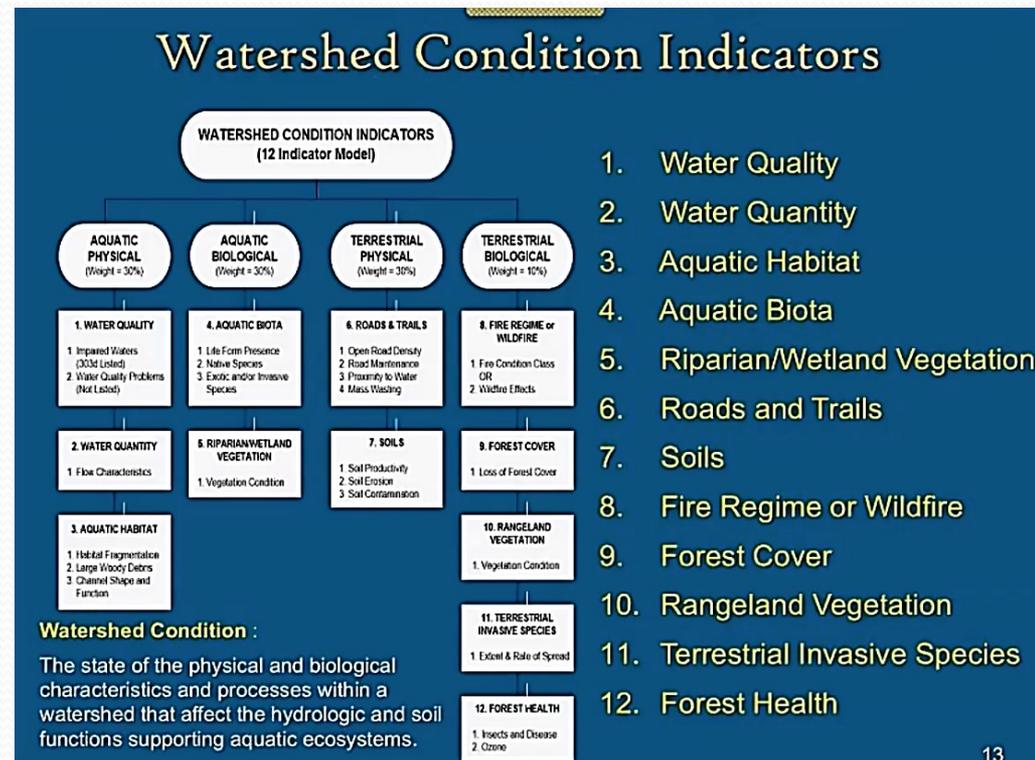


Watershed Primer

- **Watershed scale assessment and planning are needed to determine...**
 - Watershed health and condition
 - Risks to source watersheds
 - Actions to mitigate risks and improve watershed health and function



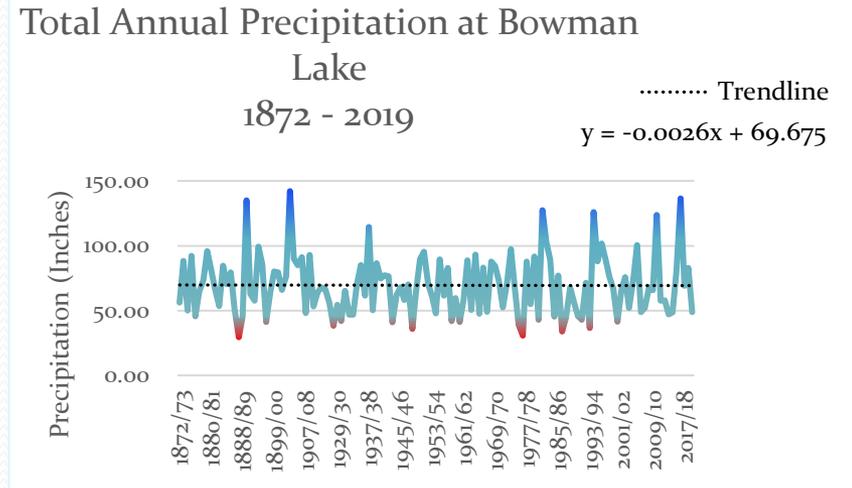
- **USFS Watershed Condition Assessment Framework**
 - Assessment methods and plans from other agencies available for guidance
 - NID uses precipitation data, snow survey data, evaporation rates, and unimpaired runoff levels we collect at reservoirs to project flows each year into the Upper Division High Elevation Reservoirs knowing we utilize 165,000AF each year ... this is changing with a warming climate



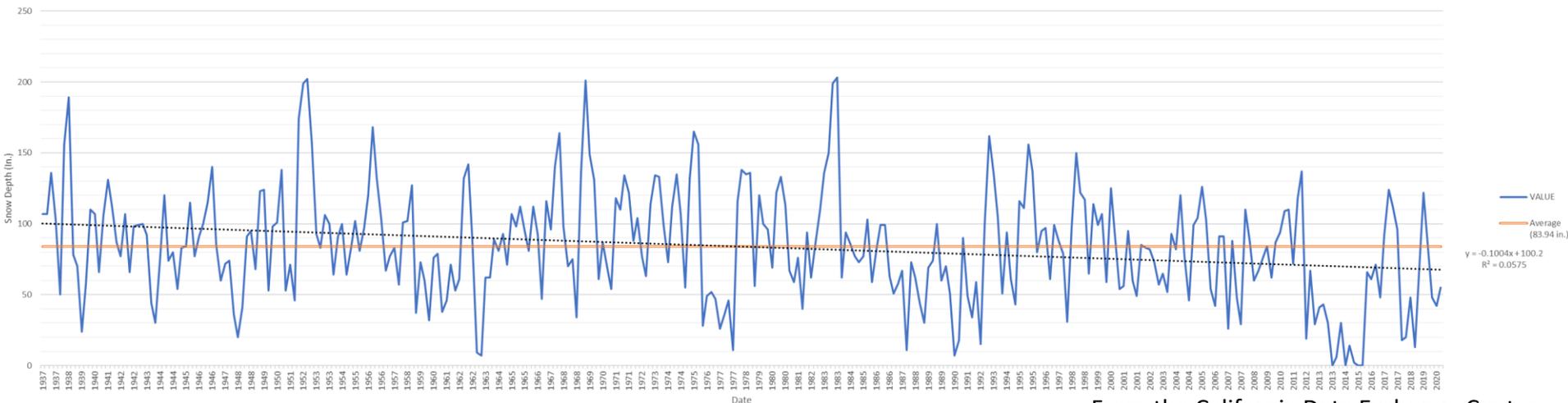
Water Budgets & Balance

- Understanding water budgets in each source watershed as foundation for water resource planning
 - How much water is collected? How much is required to be delivered? Where is water utilized in the system?

$$\text{STREAMFLOW/RUNOFF} = \text{RESIDUAL}$$
- A water budget is an accounting of the rates of water movement and the change in water storage in all or parts of the atmosphere, land surface, and subsurface.



Total Snow Depth (In.) at Huysink Station Donner Summit 1937 - 2022



From the California Data Exchange Center

Google Earth Aerial Tour

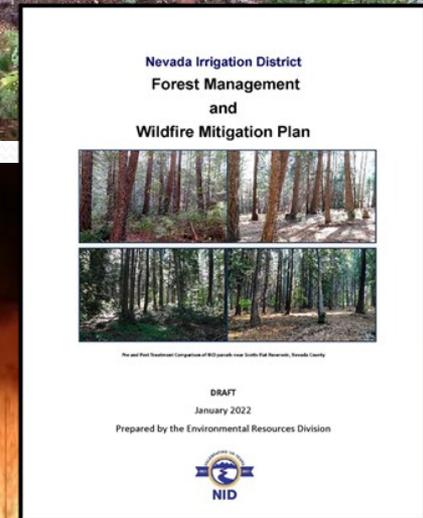
OUR GOAL:

To Create Resilient Forests and Headwaters

Ensure secure water supply through integrated adaptive management- assess, prioritize and implement, monitor... start over.

Objectives of forest management activities include:

- Improved Hydrologic Functionality and Water Availability, Delivery and Quality
- Improved Snowpack Accumulation
- Wildfire Risk Reduction
- Forest Health and Resiliency Improvement
- Hazard Tree Removal
- Carbon Sequestration Rate Increase
- Increased Pest and Disease Resilience
- Improved, Restored, or Maintained Wildlife Habitat



Rim Fire, 2013.

Looking ahead → a new normal

A warming climate is affecting the headwaters region of California, and we are experiencing these changes first-hand.

Sierra Nevada headwaters region is vulnerable, and reductions in snow-based water are expected to intensify in the future.

Wildfire is an increasing threat to watersheds in the Sierra Nevada and throughout California due to forest conditions, human behaviors and our warming climate.



A Warming Climate in the Sierra Nevada

California characterized as one of the most “climate-challenged” regions of North America that will require swift, collaborative efforts to become more climate-resilient. (California’s Changing Climate, 2018).

129 million dead trees on 8.9 million acres, 85% in the Sierra Nevada. Wildfire now occurring year-round, **Nevada County is a high risk community.** (USFS and CAL FIRE, 2017).

Sierra Nevada is headwaters for California providing **60% of the water** supply for the state. (Sierra Nevada Conservancy).

Significant reductions in snowmelt-derived water resources due to wintertime warming of 1-2°C increasingly likely. Human activities have caused approximately a 1.0°C (1.8°F) increase of global warming since pre-industrial levels. (UC Irvine Mountain Snowpack and IPCC special report, 2018).

Watershed Stewardship by NID

- Forest Management
 - Hazard Tree Removal
 - Timber and vegetation management & disposal
 - River Fire Remediation
- Meadow Restoration
- Grazing for fuels management; future opportunities to potentially return prescribed fire as a fuels management tool
- Watershed education and outreach, water conservation.
- Planning and coordination



Forest Management

- **Wildfire Risk Reduction through fire fuels removal**
 - Strategic removal of overstocked understory vegetation
 - To reduce the risk of wildfire ignition and spread around key infrastructure, valuable watershed features, and adjacent residential zones.
 - Utilizing mastication, hand-crews, chipping, etc.

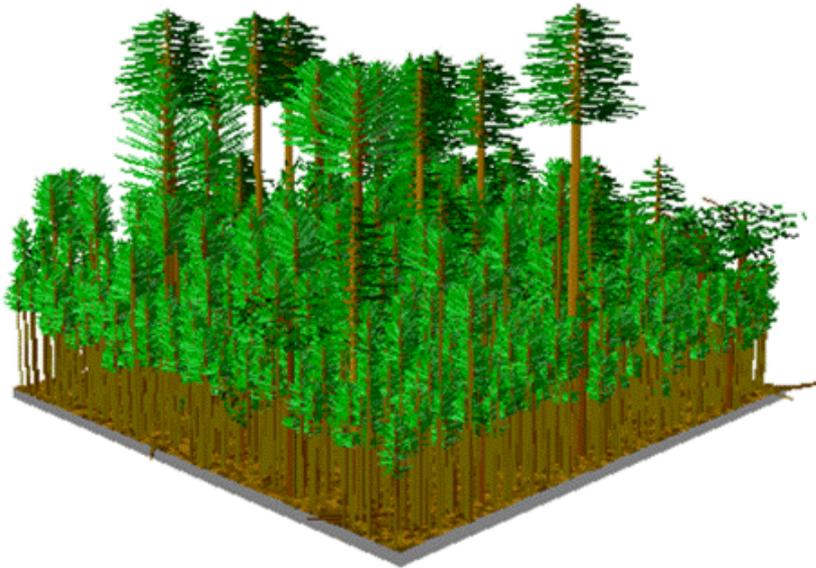


Modeled Wildfire Impacts:

USFS Forest Vegetation Simulator

Peninsula Campground 2019 Pre-Treatment
Trees Per Acre: 2700

Stand=Peninsula_15091415_Pre Year=2019 Inventory conditions



Peninsula Campground 2019 Post-Treatment
Trees Per Acre: 139

Stand=Peninsula_15091415_Post Year=2019 Inventory conditions



River Fire Burn Scar:

NID 115-ac. parcel, Lower Meyer Road



Forest Management cont.

Hazard Tree Removal

- In collaboration with other departments, remove hazard trees and limbs annually.
- Removal of hazard trees reduces risk to infrastructure, adjacent landowners and the health and safety of campground visitors in addition to further reducing the risk of wildfire



Forest Management cont.

Selective Thinning (Harvest)

- Requires a timber market
- Remove merchantable timber to reduce resource competition within residual stand, increase disease resistance, and reduce fire fuels.
- Additional benefits to water resources by reducing forest density and subsequently evapotranspiration; and climatic benefits of increasing carbon sequestration.

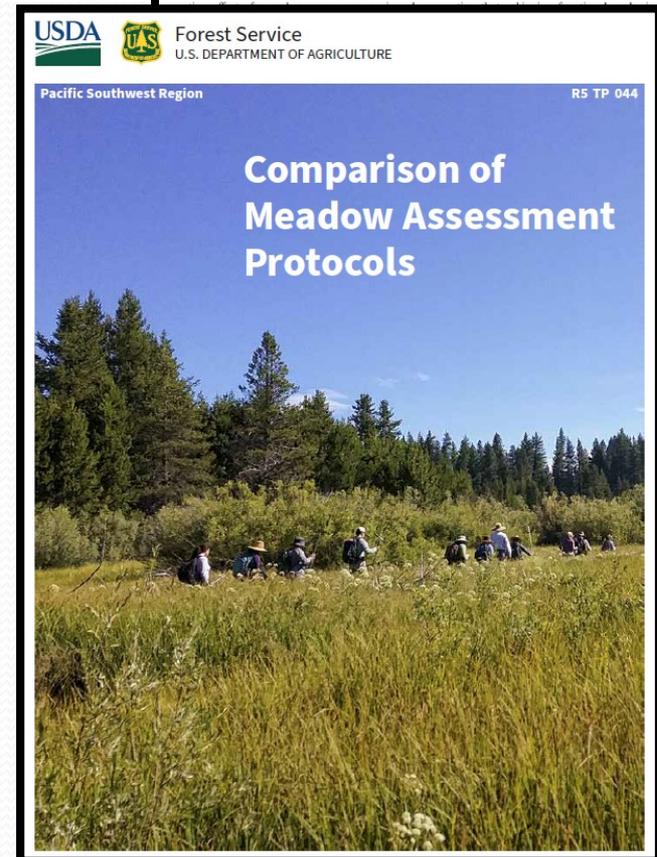
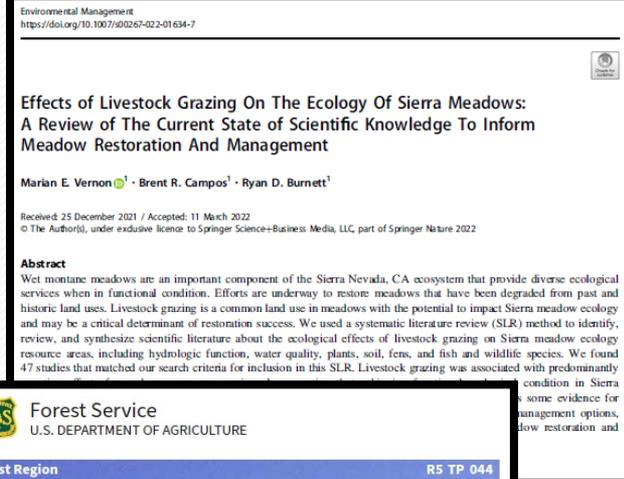


Watershed Primer cont.



Meadow Assessments

- Properly functioning Sierra meadows provide diverse ecological services, including flood attenuation, sediment filtration, groundwater storage, water quality improvements, extended dry season base flows (DeLaney 1995; Hammersmark et al. 2008; Woltemade 2000)
- Functional meadow hydrology = hydrologic connectivity both laterally across the floodplain and vertically between surface and subsurface flows
 - Can increase groundwater recharge, late-season stream flow, raise the water table, increase C-sequestration, and attenuation and delay of peak flows
 - (Ratliff 1985; DeLaney 1995; Hammersmark et al. 2008; Loheide et al. 2009; Ramstead et al. 2012).
- Montane meadows provide strategic treatment areas for water resource management on a watershed scale.



Meadow Restoration

- English, Austin, Shotgun, and Middle Meadows
- Restoration and enhancement of hydrologic function of rare montane meadow environments is effective and important
- Act as natural water storage features- late season cold water supply
 - Rare habitat
 - Natural sediment attenuation
- Increase resiliency of these key watershed features to effects of wildfire and climate change (drought and decreasing snowpack)



English Meadow Restoration

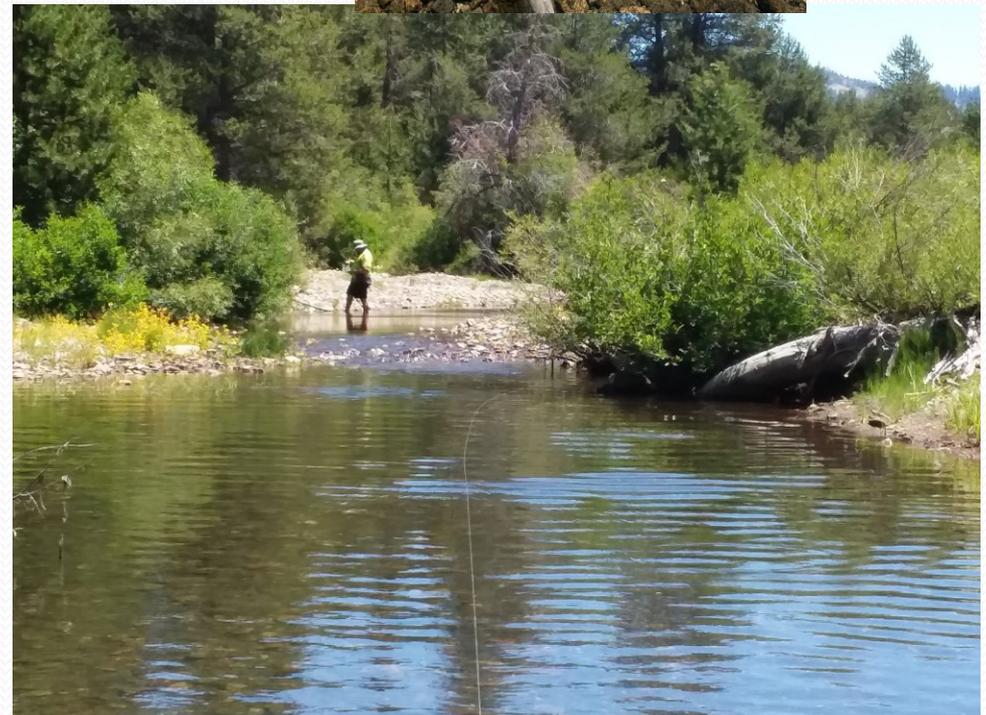
- Headwaters of Middle Yuba River
- Inundated 1857 English Reservoir
 - Constructed to Support Hydraulic Mining
 - Dam was Ruptured in 1883
- Rapid draining and other human impacts have impaired the meadow's ability to retain moisture throughout the year
- High erosion potential



Meadow Restoration cont.

English Meadow Restoration and Floodplain Enhancement Project Objectives

- Reconnect Middle Yuba River channel to historic floodplain by raising the thalweg with woody structures sourced on site
- Fill of excavated ditches and head-cutting tributaries to slow and absorb surface runoff, retaining moisture in soils and reduce further erosion
- Bank stabilization and erosion reduction, sediment attenuation
- Fire fuels reduction via understory treatment to protect montane meadow habitat from severe wildfire



English Meadow Floodplain Enhancement and Restoration Project Design



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NEVADA IRRIGATION DISTRICT
 NEVADA COUNTY -- PLACER COUNTY
 GRASS VALLEY, CALIFORNIA

Map 2: Impacts Within Waters of the U.S. / Waters of the State
 Drawn By: C. TOWNSEND Date: 8/27/2021 Scale: 1:7000 Sheet: 2 of 2



Meadow Restoration cont.



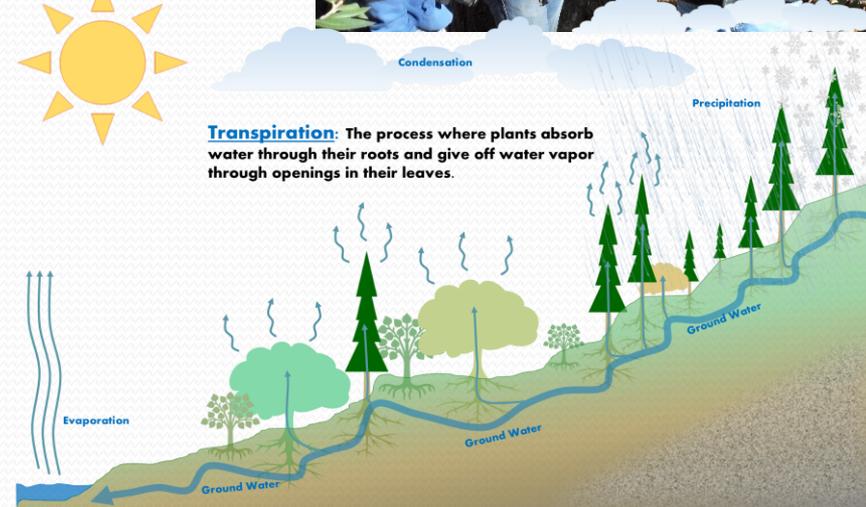
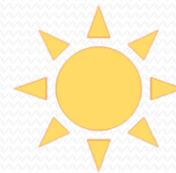
Grazing for Fuels Management

- Upper Division Grazing
 - English and Canyon Creek (see photo) Grazing Allotments
 - Administered by USFS
 - Cattle Range includes NID property
- Lower Division Grazing
 - Grazing on some District parcels to manage grass and reduce wildfire risk
 - Magnolia Parker Ranch, Clifford Road currently
 - Potentially other District properties



Watershed Education and Outreach

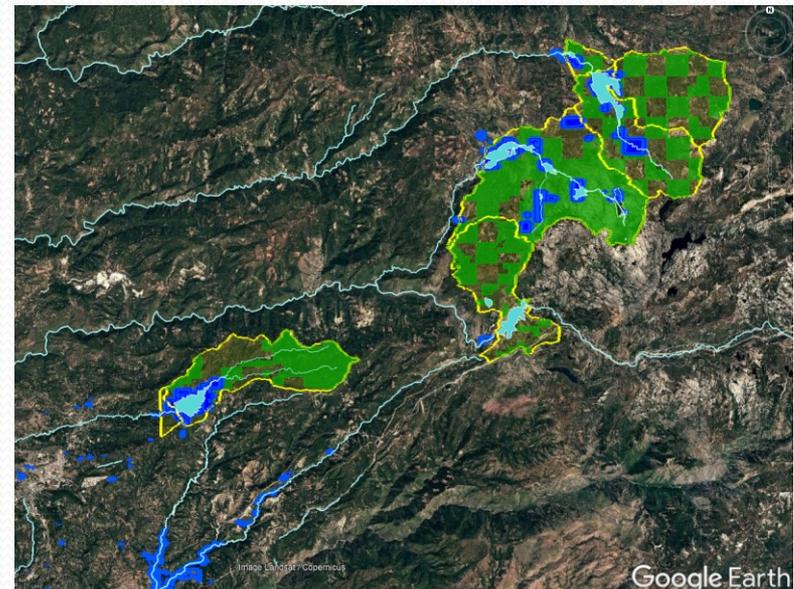
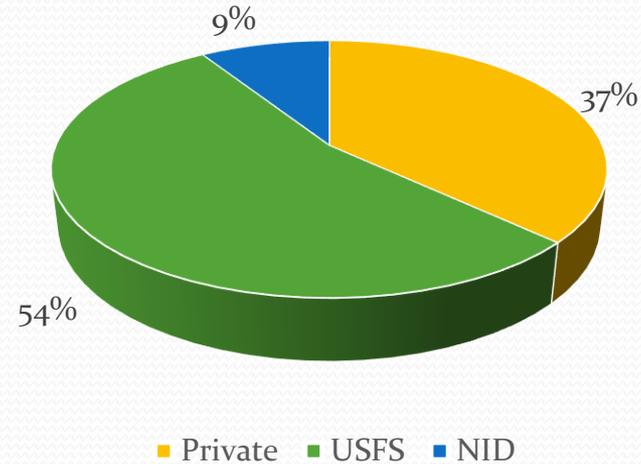
- Site visits to project areas with school groups and by request
- Nevada County STEAM Expo
- Civic Spark AmeriCorps Interns
- Partnerships with local k-12 schools and organizations
 - Sierra Streams Institute: Our Forests Program: NID partnered with SSI to bring 3rd, 4th, and 5th grade students to utilize forested property to learn about life cycles/stages, forest ecology, and biodiversity.
 - Ongoing partnership
 - Watershed model GV Charter
 - Watershed Summer Camp at Scotts Flat



Regional Collaboration

- NID has a limited land ownership within the greater watershed
- Most of NID's owned properties are submerged beneath reservoirs
 - Treat strategic buffers around reservoirs and infrastructure
 - To have a notable effect on watershed scale forest health and resilience to drought and climate change, interagency partnerships must be explored.
- USFS Master Stewardship Agreement
- Tribal Consultation & Project Collaboration
- CABY and other local and regional partnerships
- Membership organizations focused on watershed issues, including: ACWA, NACWA, etc.

Percent Ownership of 70,000 Acres of Collection Watershed Lands



Watershed Activities in 2022

- **SNC Scotts Flat Fire Fuels Reduction Grant Project**
 - 300 acres completed April 2022
 - Reduce wildfire risk / Improve forest health / Enhance hydrologic activity
 - Total Grant Budget: \$980K (100% Reimbursable)
- **CAL FIRE CFIP Magnolia Rd / Parker Ranch**
 - 151 acres for fire fuels treatment on NID property near Magnolia Road
 - Site Preparation Jan.- April 2022
 - Project Implementation spring and fall 2022
 - 2022 Budget: \$298K (75% Reimbursable)
- **SNC Wildfire Recovery Grant (recommended for funding)**
 - 150 Acres of River Fire Burn Scar Treatment
 - Mastication & hand crews
 - Estimated Cost: \$770K (Cost share with NID, \$570k Reimbursable)
- **WCB English Meadow Restoration and Floodplain Enhancement Grant \$1.25M**
 - 380 acres combination fire fuels reduction and restoration treatments
 - 2022 Budget: \$770K (100% Reimbursable)



Watershed Activities in 2022 cont.

- **Administrative & Planning Activities**
 - Drafting Forest Management Plan
 - Grant Writing / Management / Reporting
 - CMMS Implementation
- **River Fire Mitigation and Rehabilitation**
 - Monitor post 2021-22 winter impacts on treatment areas, identify priorities
 - SNC Wildfire Recovery and Forest Resilience Grant Project
- **Hazard Tree / Forest Health / Fire Fuels**
 - Campground Hazard Tree Removal and Cleanup
 - Defensible Space adjacent to private property
- **Watershed Education & Regional Partnerships**
 - Civic Spark / AmeriCorps
 - Sierra Streams Institute – Our Forests Field Program
 - CABY - RWMG
 - USFS Master Stewardship Agreement
 - Tribal consultation and collaboration on English Meadow Restoration Project
 - STEAM Expo (Pending)





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Thank You!

