# Coastal Prairie Restoration and Recovery of Endangered Western Lily (*Lilium occidentale*) at Table Bluff Ecological Reserve Humboldt County, California

**Northern California Botanists Symposium**

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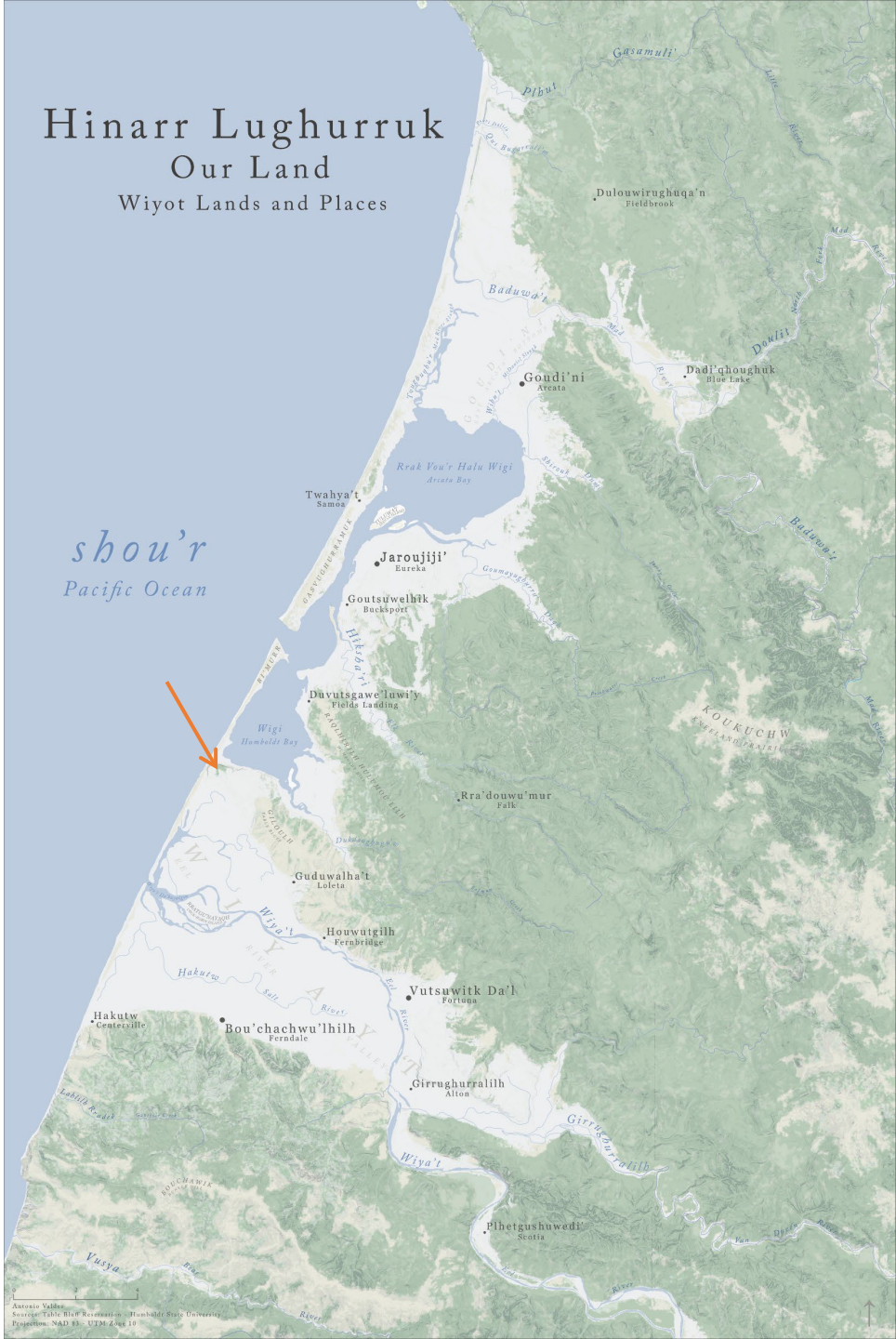
# Table Bluff Ecological Reserve Coastal Prairie Restoration Project

- Grant Funded by the Wildlife Conservation Board
- California Department of Fish and Wildlife
- Mattole Restoration Council
- Wiyot Tribe

# Wiyot Ancestral Territory

- Table Bluff is a central location within Wiyot ancestral territory
- *Wigi* (Humboldt Bay) to the North
- *Wiya't* (Eel River) to the south
- Remains an important place for the Wiyot Tribe, nearby Table Bluff Reservation
- Wiyot Tribe an important project partner



# Table Bluff Ecological Reserve

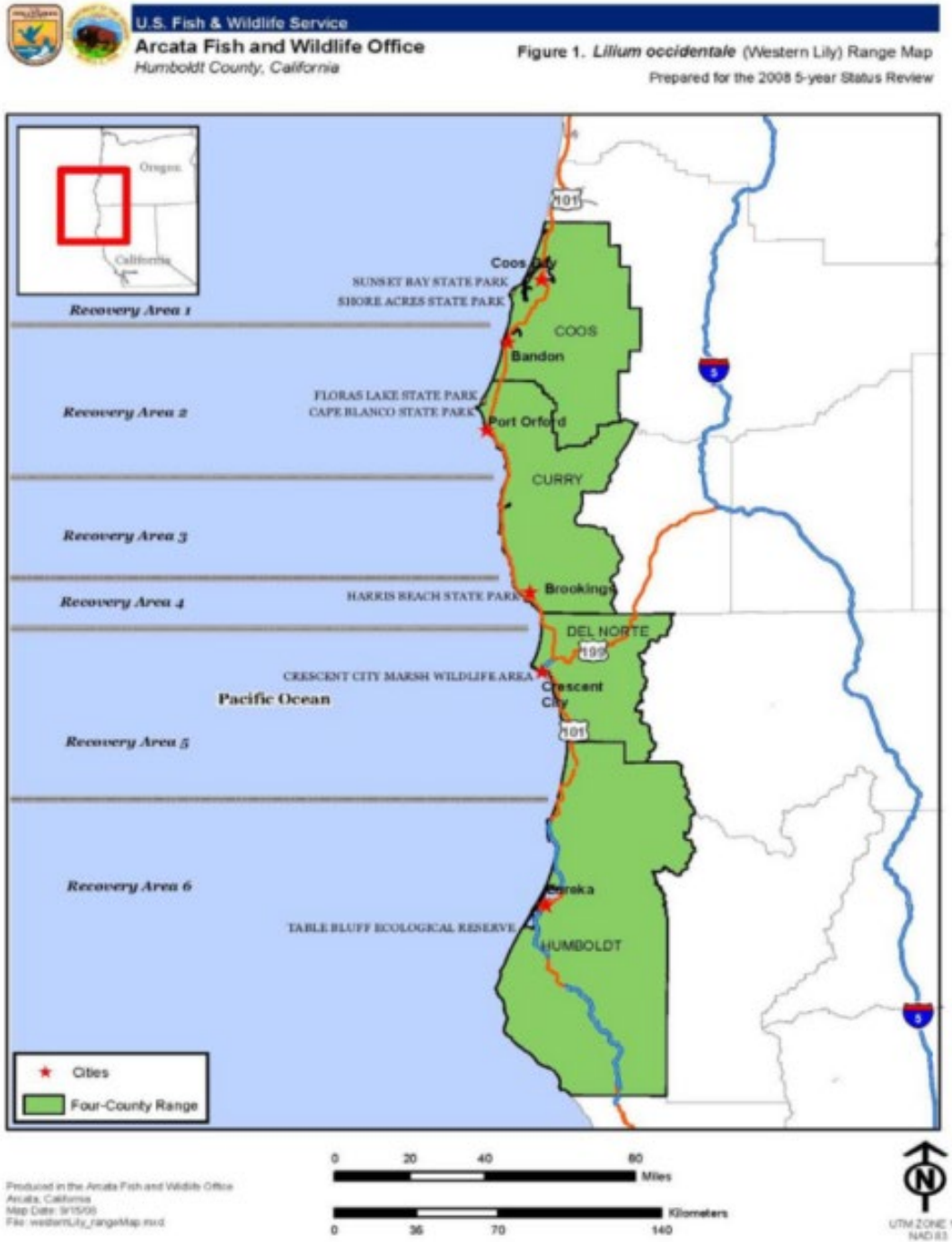
- Purchased by CDFW as part of the Ocean Ranch acquisition in 1986
- Reserve primarily managed for Endangered western lily (*Lilium occidentale*)

# Purpose

- to employ methods based on **science** and **Traditional Ecological Knowledge** (TEK) to **restore native coastal prairie** to benefit Federally and State Endangered **western lily** and the overall **ecological** and **cultural value** of the Reserve.

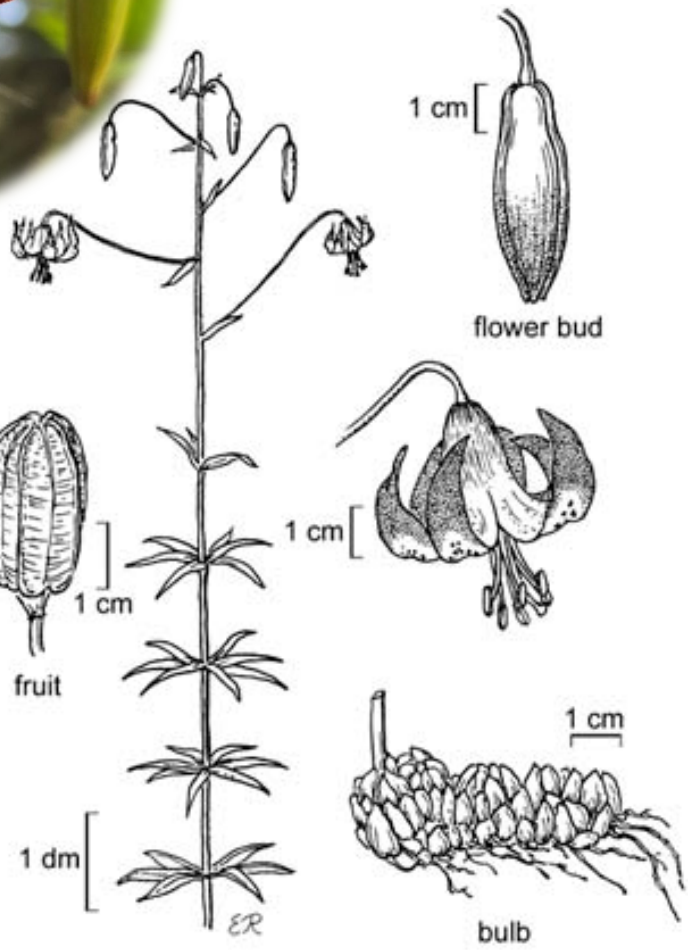

# Western lily Habitat and Range

- Typically associated with mesic to wet early successional coastal prairie and scrub habitat
- Occurs along the coast between Table Bluff and Coos Bay, OR
- CDFW owns two of the largest population sites
  - Crescent City Marsh
  - Table Bluff Ecological Reserve



# Plant Morphology

- Pendent red flowers with speckled contrasting green-to-gold star at the center
- Recurved tepals
- Stamens remain straight rather than spreading
- Elongate unbranched bulb
- Primarily reproduces by seed
- May reproduce asexually from broken-off bulb scales
- Long-lived bulb, up to 25 years or more!
- Up to 2.5m height!




Lilium occidentale

# Crescent City Marsh Wildlife Area

# Table Bluff Population

- Southern extent of range
- Table Bluff supports one of the largest populations
- Threatened by Sitka spruce (*Picea sitchensis*) and brush encroachment
- Low percent reach reproductive stage in shaded habitats

# Forest Openings and Edge Habitat


Ecologically and culturally important coastal prairie

# Culturally Significant Plants

- Many uncommon culturally significant plants occur on the Reserve, likely tended by native people
- Includes many geophytes—plants that have underground carbohydrate storage structures and underground growing points
- Occur in coastal prairie and early successional scrub habitats

Small Camas
(*Camassia quamash* ssp. *breviflora*)

California Hazel
(*Corylus cornuta* ssp. *californica*)

# Post-Colonization History

- Colonized in the mid-1800s
- Tilled for agricultural use: carrots, turnips, potatoes, legumes
- Grazed by sheep and cattle
- Non-native trees and other plants introduced
- Lighthouse 1892-1982

Old Table Bluff Radio Station and Lighthouse Site, Imper, 2011

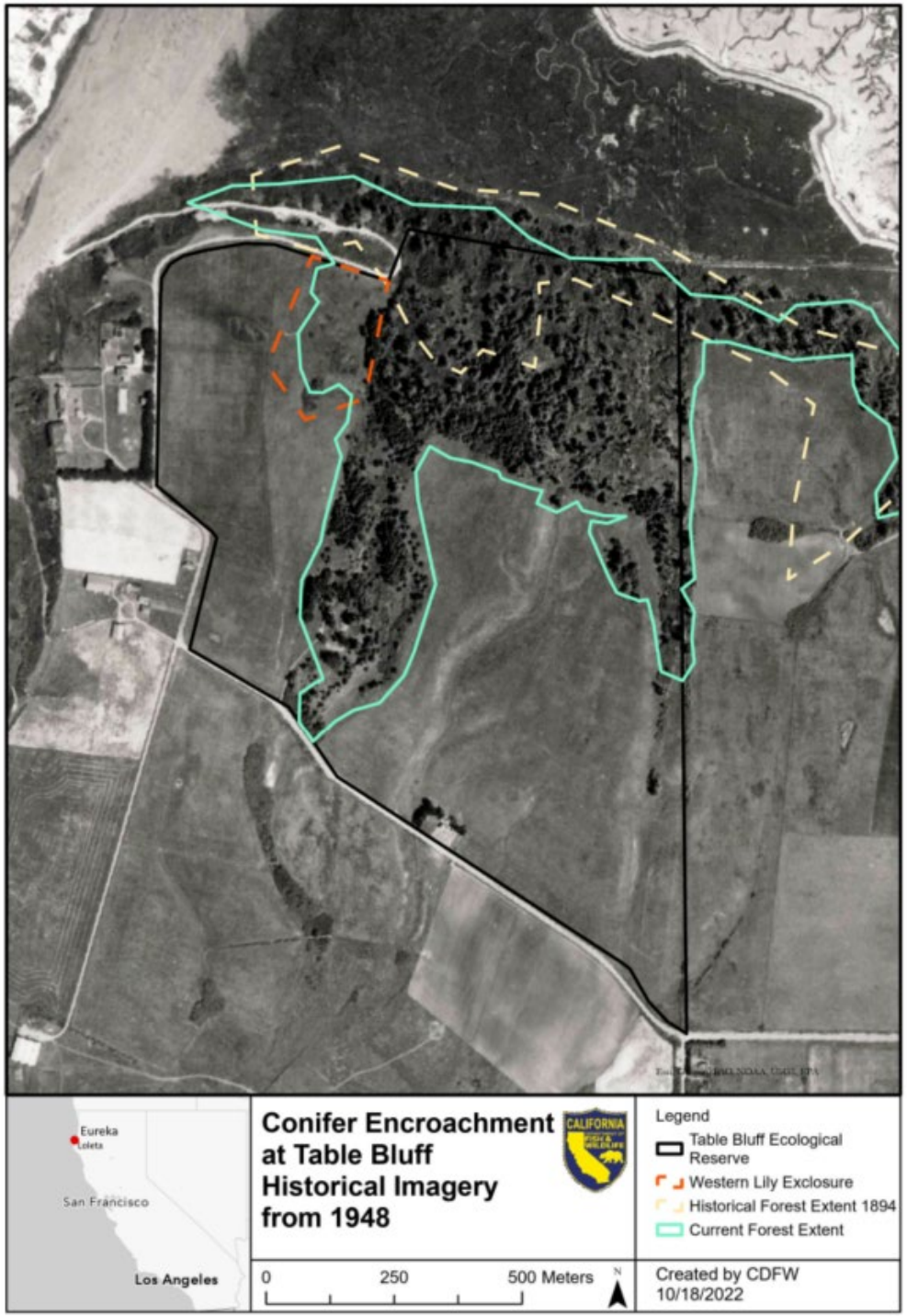
Ericson (1893?) Title: Light Station, Table Bluff.

Shuster (10/14/47) - Title: Eureka long shot

2005 – Courtesy California Coastal Records Project

# Coastal Prairie Encroachment and Degradation

- Forest and scrub habitats have encroached since earliest mapping and imagery
- Native coastal prairie likely widespread in past
- Remnant 0.1-acres of native coastal prairie within the western lily exclosure today
- Early successional habitat maintained by mild disturbance such as fire and/or native grazing
- Habitat impacted from excessive soil disturbance from tilling and too little leading to conifer encroachment

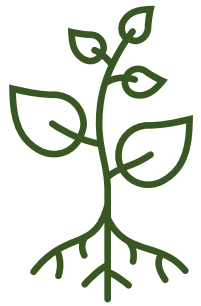


# CDFW and USFWS Management

- Table Bluff ER Management Plan (1989)
- Extensive studies of grazing, soils, and other factors affecting western lily
- Small scale thinning in 90s-00s
- USFWS analysis optimizing spruce removal to benefit western lily (Imper and Som 2012)
- Grazing during winter dormancy period
- Fencing out deer from browsing on western lily
- Expansion of the population by planting seeds and bulbs


Credit: Dave Imper, USFWS, Western Lily Status Review Presentation 2009, Slide 26

# Project Goals

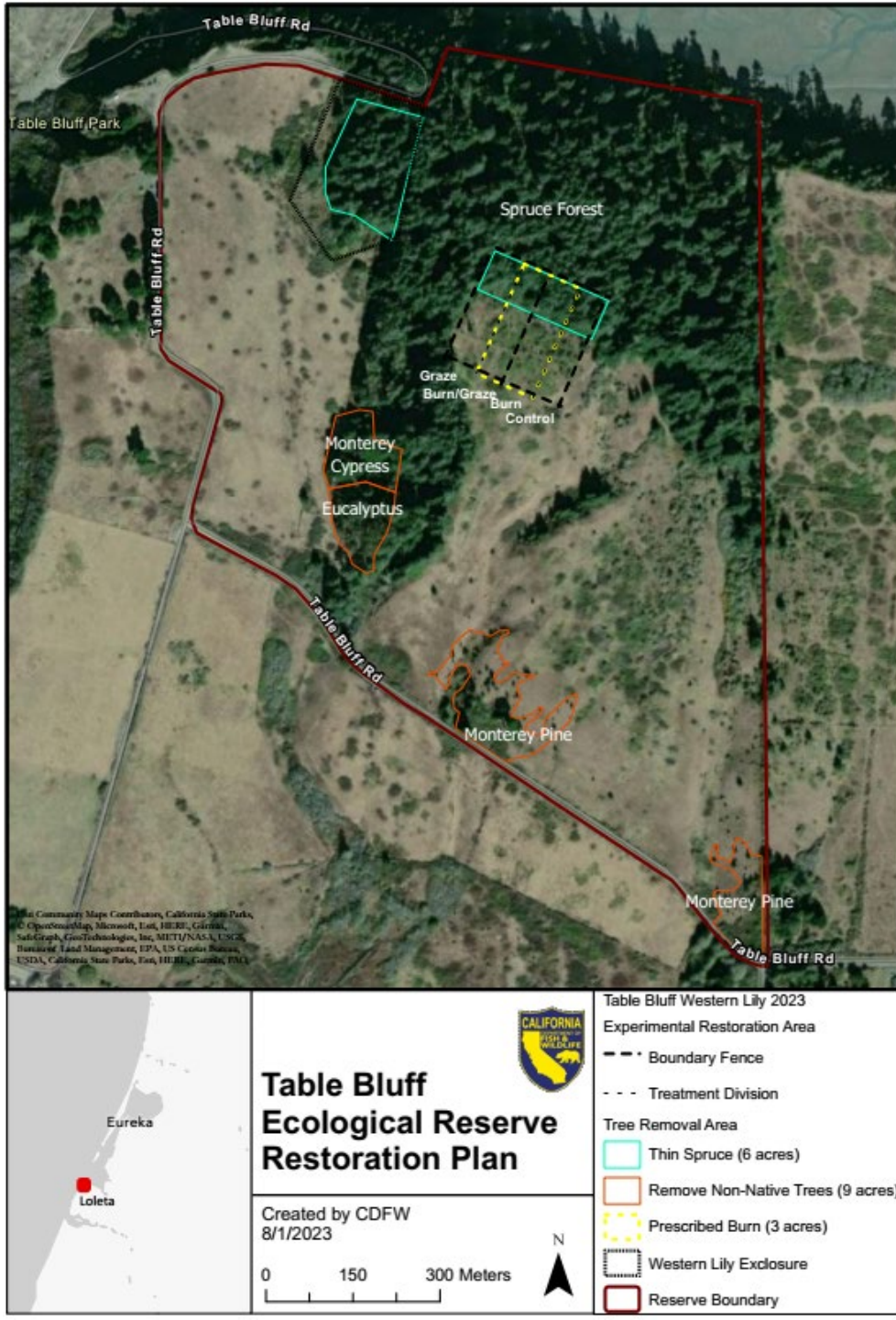


1. Enhance the Endangered western lily population
2. Restore native coastal prairie mosaic
3. Enhance plant populations of cultural significance to the Wiyot Tribe
4. Create and implement science and TEK-based long term management plan

# Step 1 – Open the Canopy

- Thinned native Sitka spruce to create openings around western lily in Fall-Winter 2023

- Removed non-native trees
  - Blue gum (*Eucalyptus globulus*)
  - Monterey cypress (*Hesperocyparis macrocarpa*)
  - Monterey pine (*Pinus radiata*)
- Removed invasive shrubs
  - Himalayan blackberry (*Rubus armeniacus*)
  - English ivy (*Hedera helix*)
  - English holly (*Ilex aquifolium*)




Dense overhead canopy blocks sunlight…
Invasive Himalayan blackberry and overhead shrubs shade and outcompete native coastal prairie species
Flags mark where western lily used to grow…

# Helicopter Operations

- Avoided soil disturbance from yarding out the logs
- Approximately 100 trees flew directly to Table Bluff Reservation to provide firewood for elders
- Over 100 trees were flown to the estuary to create fish habitat and bird perches in the estuary

# Step 2 – Reinstate Disturbance

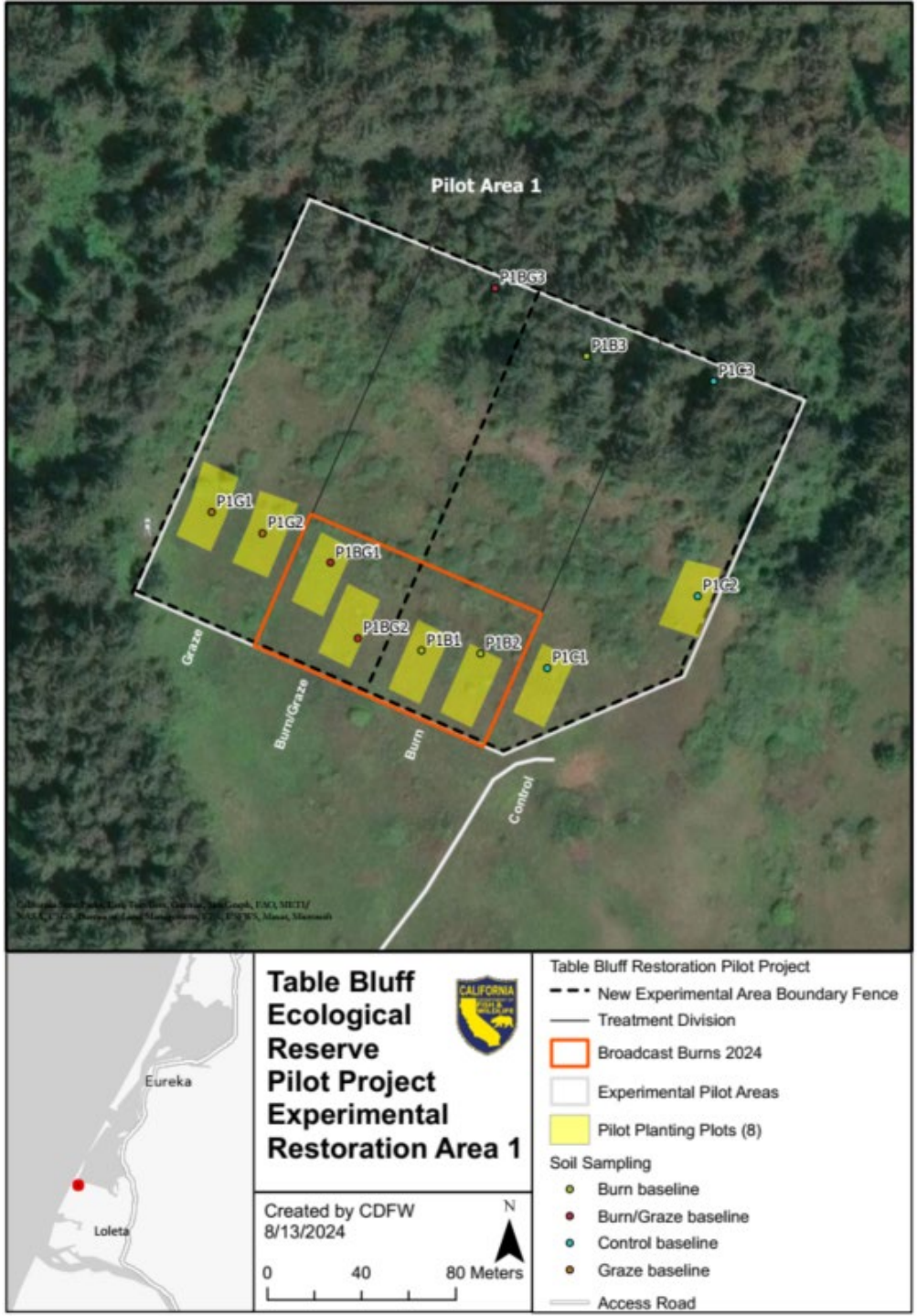
- Seasonal grazing during winter dormancy period
- Previous cattle grazing experiments showed benefits
- Goat grazing in 2012 was highly effective
- Need browsers for brush—switched to goats in 2024
- Added sheep to the mix this winter

# Western Lily Inventory

- Before thinning, flowering counts were down to 10% of peak
  - >1000 reproductive in 2013
  - 98 reproductive in 2022
  - 90 reproductive in 2023
- 147 reproductive in 2024 after thinning and seasonal grazing
- 63% increase from 2023
- Hoping for this trajectory to continue
- Sunshine→ photosynthesis → sugar→ flowering→ reproduction

# Step 3 – Experimental Pilot Project

- Experimental planting in plots to test success of native species and treatments
- Wiyot Native Plant Nursery and Mattole Restoration Council propagating natives
  - Coastal prairie plugs and seeds
  - Culturally significant plugs and seeds
  - Western lily
- Monitoring treatments
  - Burn/Graze/Burn + Graze/Control
  - Till/No-Till planting preparation
  - Mulch/No Mulch
- Fencing to protect western lily from deer
- Informative for restoration onsite as well as similar projects on the North Coast!



# Experimental Prescribed Burn
# September 2024

# Step 4 – Science-based and TEK-based Planning and Restoration

- Incorporate Pilot Project results
- Incorporate results of Wiyot Tribe's Ethnobotanical Study
- Restore ~100 acres of former pasture to a mosaic of coastal prairie and scrub with culturally important plants
  - Implement disturbance (grazing/fire) to maintain and enhance early successional habitat and species
  - Planting and seeding native species where appropriate
  - Supplement previous western lily propagation if suitable

# Thank you!

And thank you to our valued partners—

- Mattole Restoration Council
- Wiyot Tribe
- U.S. Fish and Wildlife Service

Our funder—

- Wildlife Conservation Board

And many supporters!

- California Native Plant Society
- California State Coastal Conservancy
- California Native Grassland Association
- Friends of the Dunes
- Hedgerow Farms
- Dave Imper, retired botanist still working on native plant conservation!

# Questions?

For more information, contact us:

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