Russian River Regional Monitoring Program

Comprehensive Basemap of Surface Waters and Riparian Areas

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SAN FRANCISCO ESTUARY INSTITUTE

- **Research institute** with over 80 staff working in the Bay Area and California
- We **deliver visionary science** to revitalize nature

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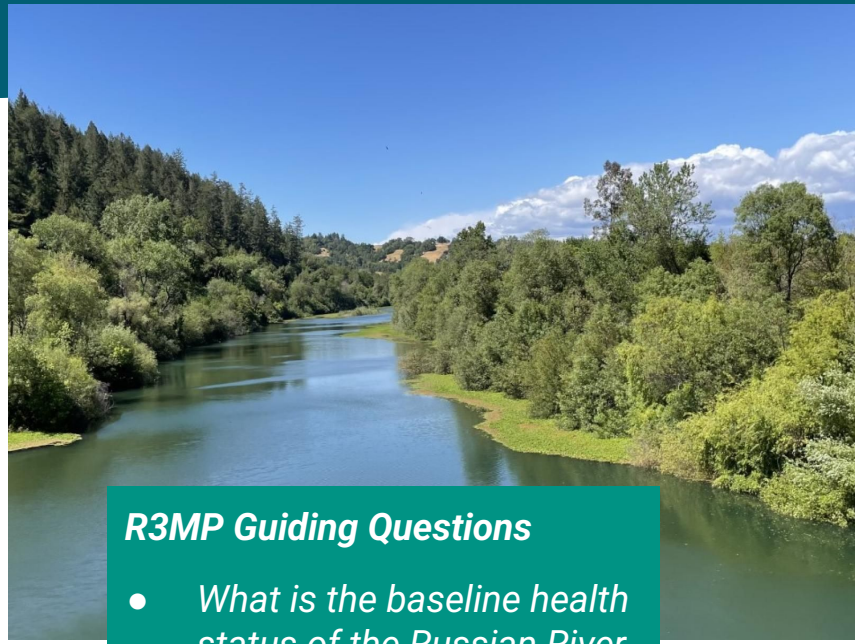
Agenda

- Overview of Russian River Regional Monitoring Program (R3MP)
- Mapping project objectives and tasks
- Public data display and access
- Regional coordination

Russian River Regional Monitoring Program

PURPOSE: **Coordinate regional entities** to support adaptive and coordinated environmental planning, regulation, and management of the Russian River Watershed to achieve and sustain its good health

GOAL: To **assess, forecast, and communicate** the health status of the Russian River Watershed in ways that are scientifically sound and that effectively inform environmental planning, regulatory and management decisions in the watershed context



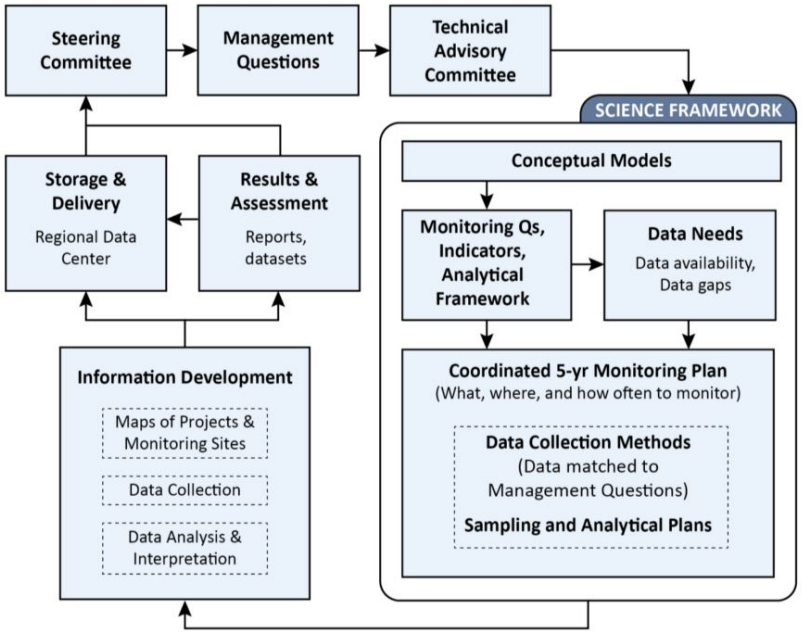
R3MP Guiding Questions

- *What is the baseline health status of the Russian River watershed;*
- *What are the trends in watershed health; and*
- *How can the health of the watershed be improved?*

Aligns with EPA Core Elements Framework

Informs the core elements by:

- serves as a coordinated regional monitoring and assessment program
- supports environmental regulatory decision making
- provides tools to support and track performance for voluntary restoration



R3MP Partners

- CA Department of Fish & Wildlife
- City of Santa Rosa
- Gold Ridge Resource Conservation District
- Marin/Sonoma Mosquito & Vector Control District
- Mendocino County Water Agency
- Mendocino County Resource Conservation District
- North Coast Regional Water Quality Control Board
- NV5
- Pepperwood Foundation
- Permit Sonoma
- Pinoleville Pomo Nation
- Russian River Confluence
- Russian Riverkeeper
- Russian River Watershed Association
- San Francisco Estuary Institute/Aquatic Science Center
- Sonoma County Ag Preservation + Open Space District
- Sonoma County Ag Commissioner
- Sonoma Water
- Sonoma Resource Conservation District
- Town of Windsor
- Trout Unlimited
- Tukman Geospatial

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Wetland and Riparian Area Monitoring Program (WRAMP)

Data management framework and standardized methods for monitoring, assessing, and adaptively managing aquatic resources within a watershed or landscape context

LEVEL 1 LANDSCAPE ASSESSMENT

LEVEL 2 RAPID ASSESSMENT

LEVEL 3 INTENSIVE ASSESSMENT

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Aquatic Resource Mapping

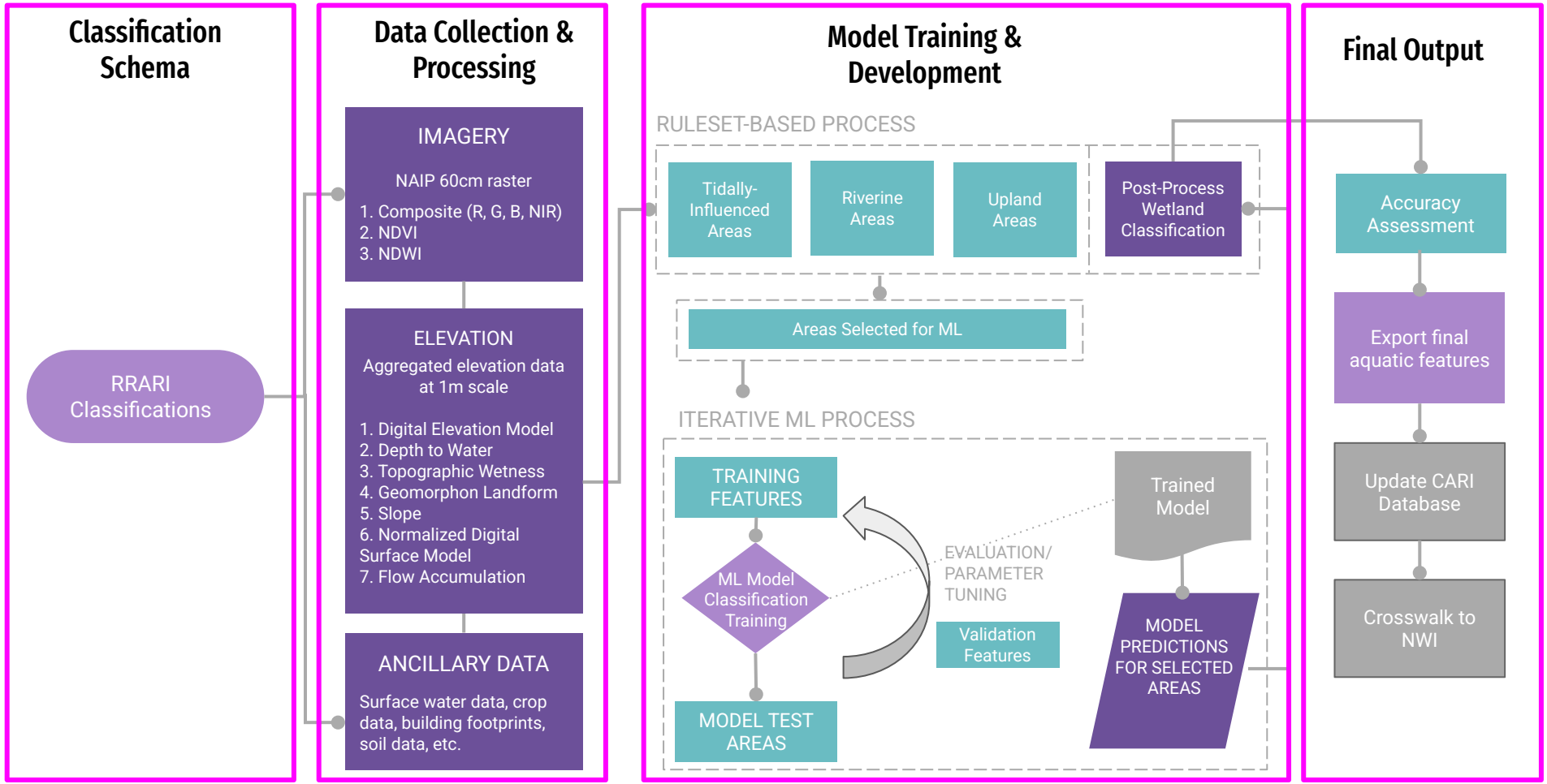
Produce a **new Aquatic Resource Inventory (RRARI)** for the Russian River Watershed and Sonoma County

- Produce a map consistent in detail across watershed and Sonoma county
- Develop regional classification
- Integrate new map into CARI and NWI
- Provide WRAMP and CARI stewardship trainings to the Mapping Workgroup

Mapping Methods

- Automate the process using remote sensing and employing **machine learning** and **ruleset-based** classification techniques
- Leverage **lessons learned** from other mapping efforts: Baylands Habitat Map 2020 (BHM) and San Diego Aquatic Resource Inventory (SDARI)
- Use of **repeatable techniques** that can be easily enhanced and used to assess and **track change over time**

MAPPING WORKFLOW

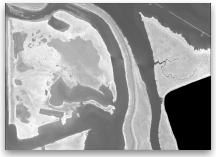


Automated and Repeatable Methods

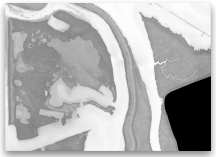
- Create map by using automated, consistent, and repeatable methods
- Use Object Based Image Analysis (OBIA), high resolution aerial imagery, LiDAR elevation data, and other sources to classify habitats
- Apply Ruleset-Based classification with transparent and updatable rules
- Process full study area by HUC12 (~100)

INPUT LAYERS

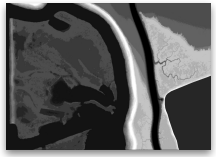
NAIP IMAGERY



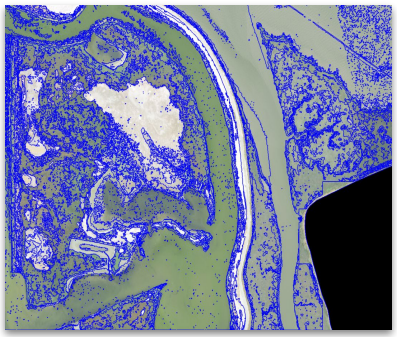
NDVI



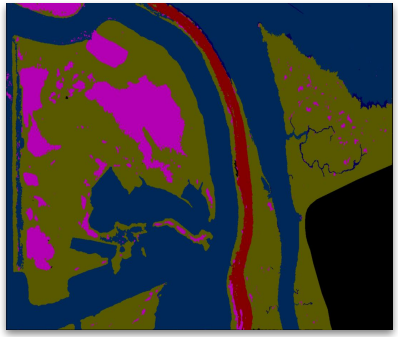
NDWI



DEM



SEGMENTATION



CLASSIFICATION

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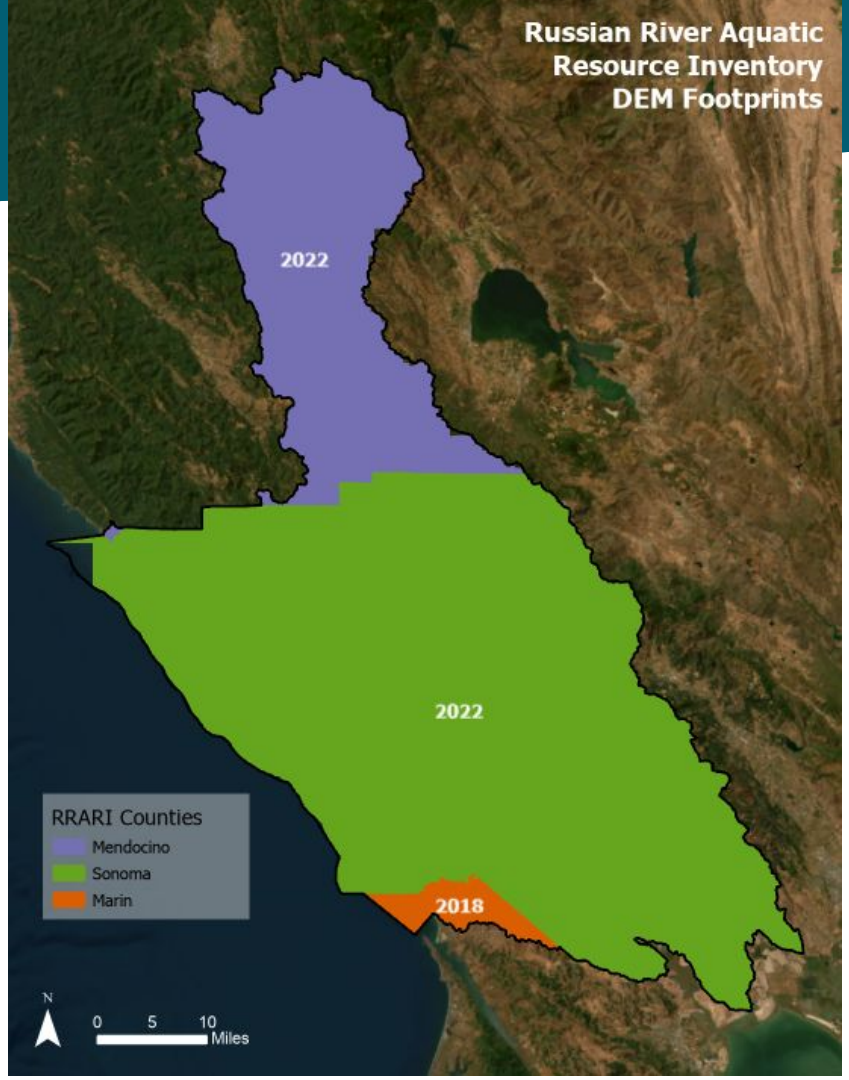
Updated Data

- Study Area extended
- LiDAR / DEMs
  - **Mendocino:** 2017 ➡ 2023
    42% of the study area
  - **Sonoma:** 2013 ➡ 2023
    48% of the study area
  - **Marin:** 2019
    10% of the study area
- Linework from NHD to 3DHP
- Align with broader North Coast initiatives



Training Watersheds

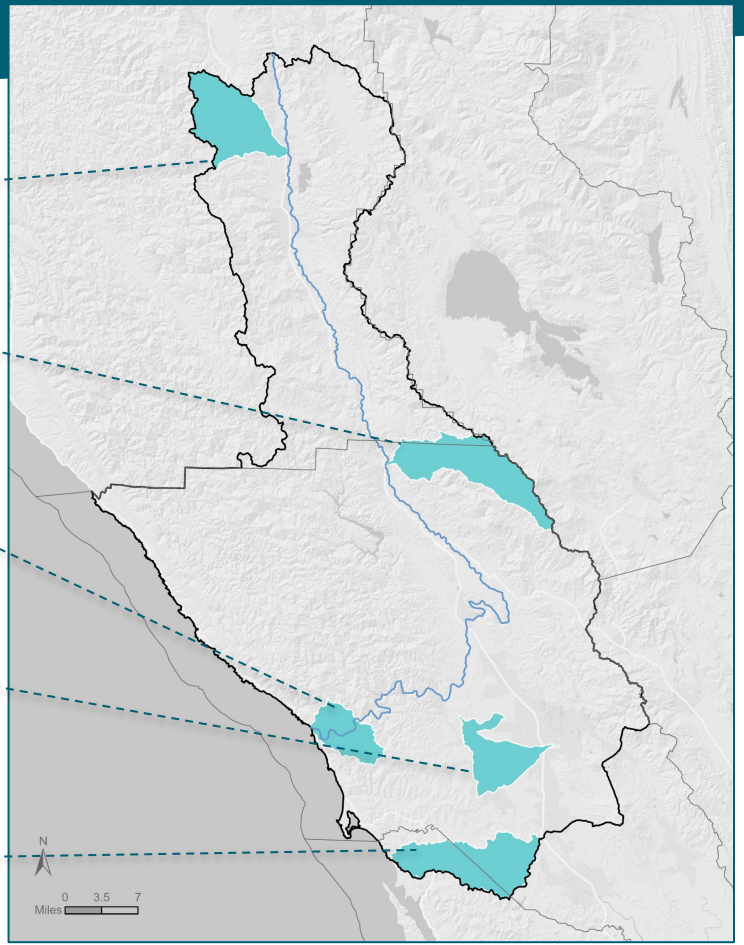
Forsythe Creek,
Mendocino County

Alder Creek-Big Sulphur Creek,
Mendocino/Sonoma County

Willow Creek-Russian River,
Sonoma County

Lower Laguna De Santa Rosa,
Sonoma County

Estero de San Antonio,
Marin/Sonoma County



Candidate Test Areas

Forsythe Creek,
Mendocino County
High Relief Watershed

Lower Laguna De Santa Rosa,
Sonoma County
Urbanized Watershed

Estero de San Antonio,
Marin/Sonoma County
Low Relief Watershed

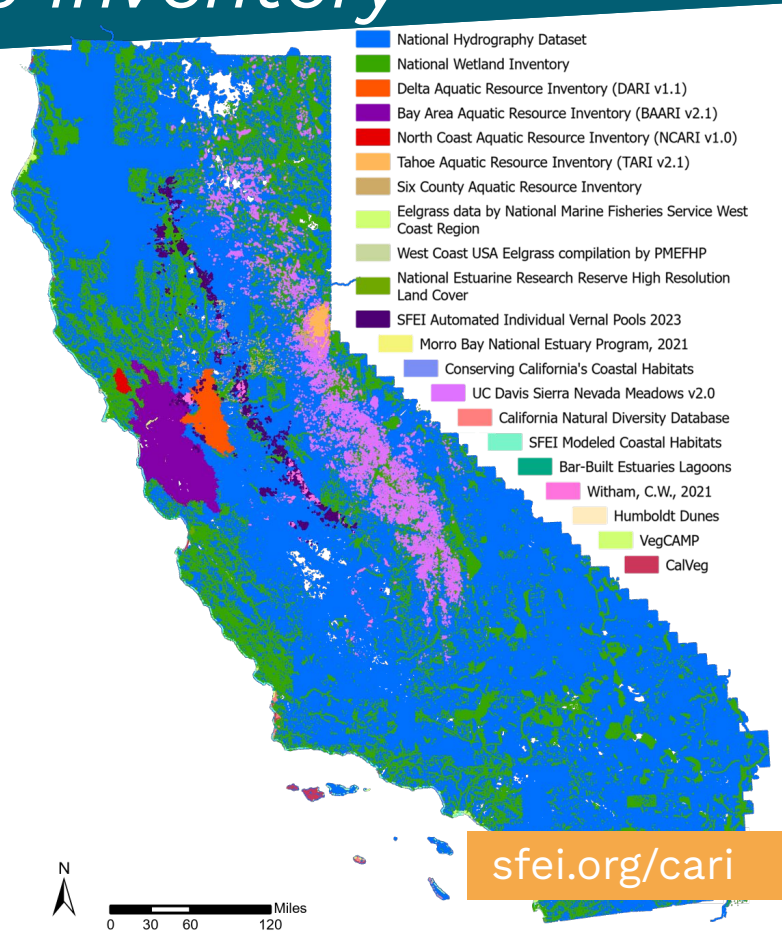
Finalize RRARI Map

- Modify model as needed based on testing results
- Process the full study area
- Perform accuracy assessment for test points throughout watershed
- Complete SOPs
- Develop crosswalk with NWI
- Prepare dataset as standalone GIS dataset and for integration into CARI

Integrate into CARI

California Aquatic Resource Inventory

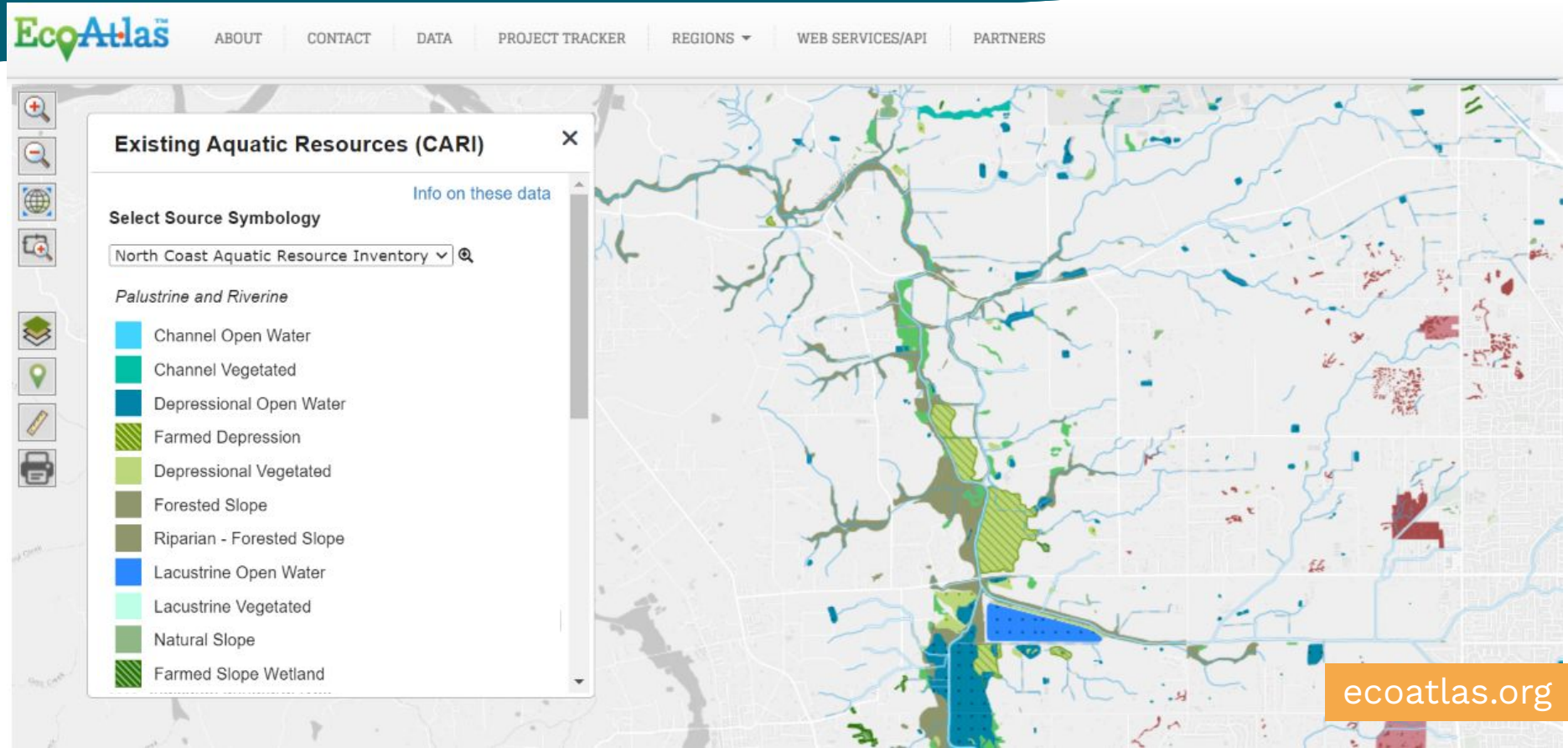
- Compilation of **best available maps** of wetlands, streams, riparian areas, coastal habitats
- **Automated scripts** compile/integrate national, state, and regional data sources
- Standardized to a **common classification** system and **crosswalked to NWI**
- Detail supports **local land use planning** and provides framework for condition assessments
- Visualize and **summarize in EcoAtlas**



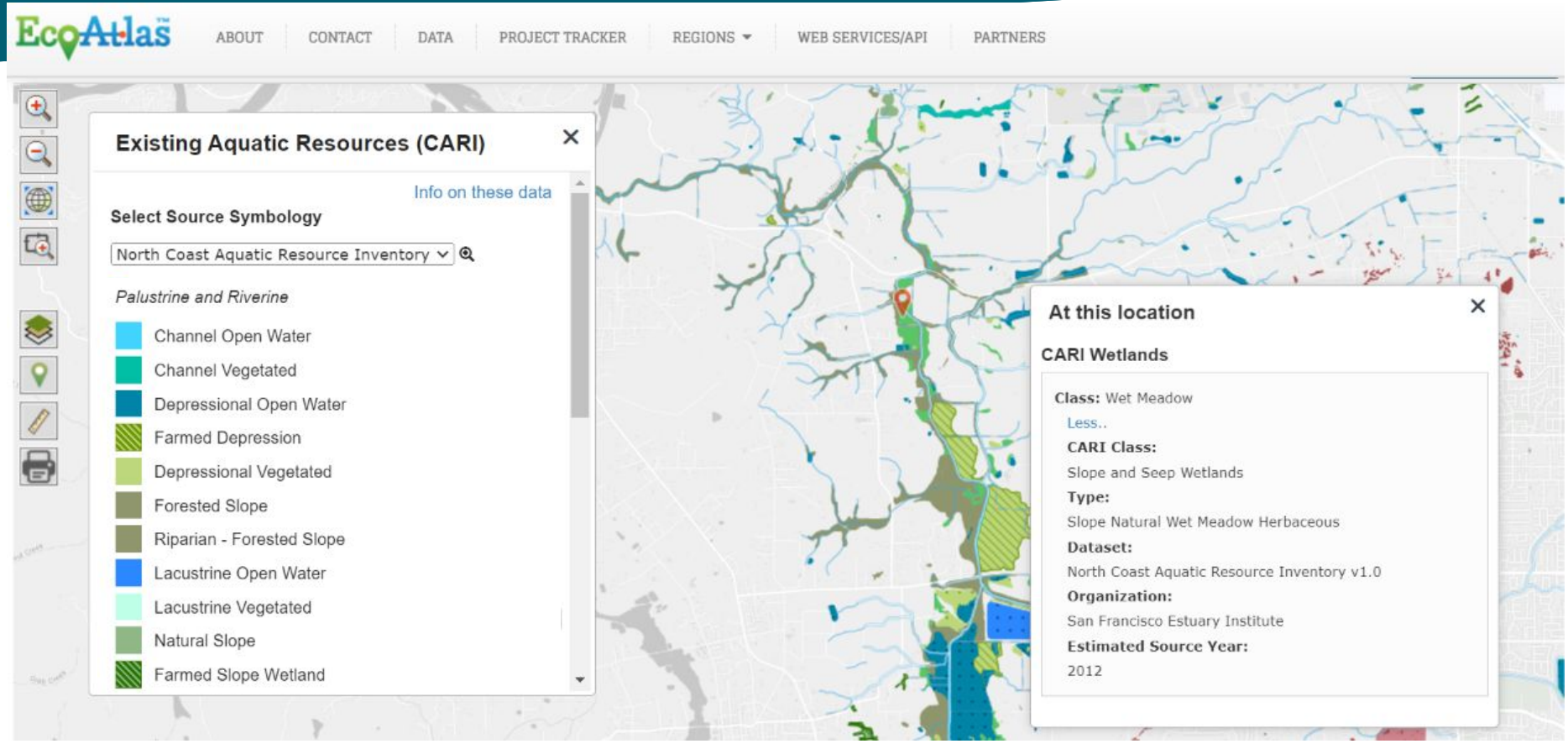
What is EcoAtlas?

Scientifically produced toolset to visualize the abundance, diversity and condition of aquatic resources within a landscape

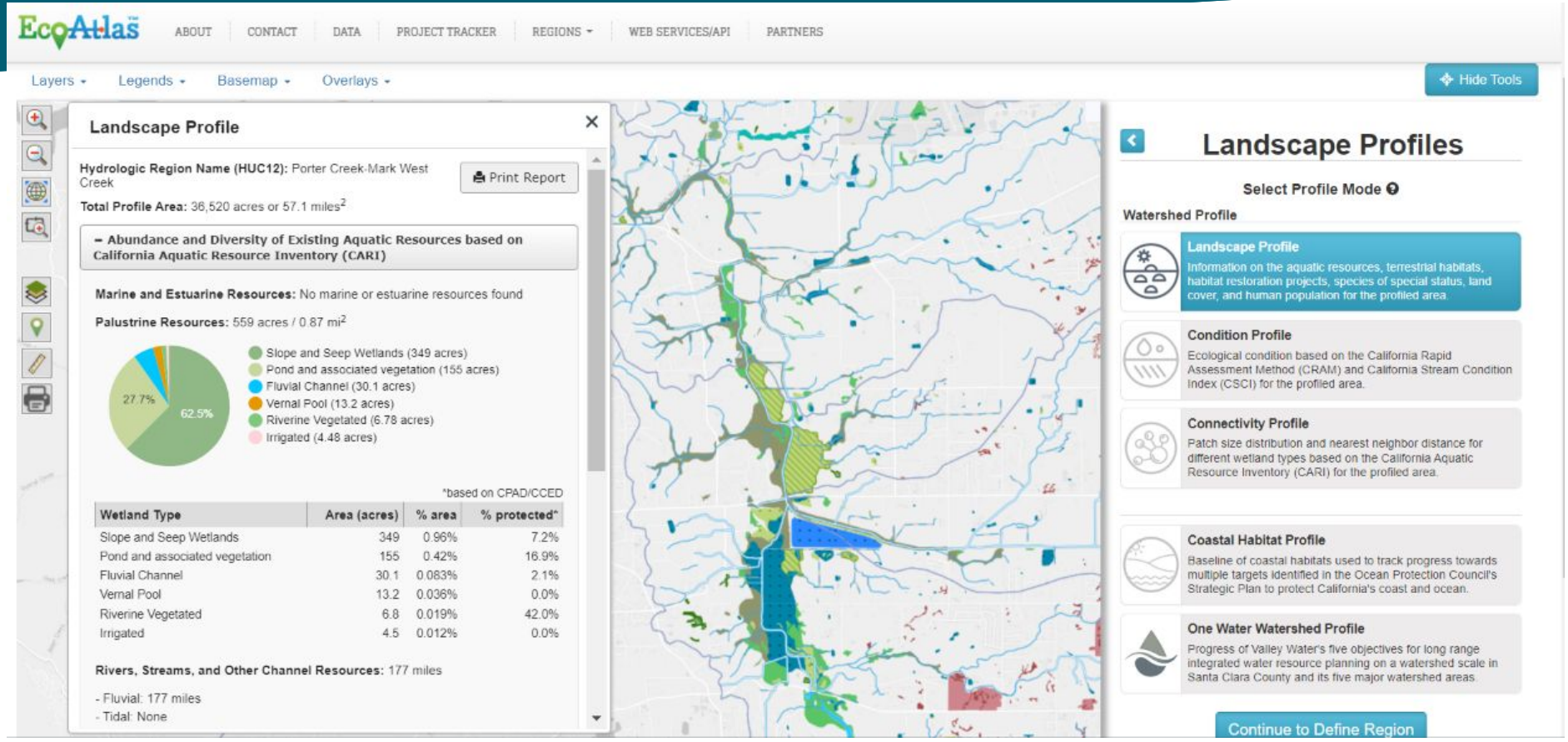
Visualize in EcoAtlas



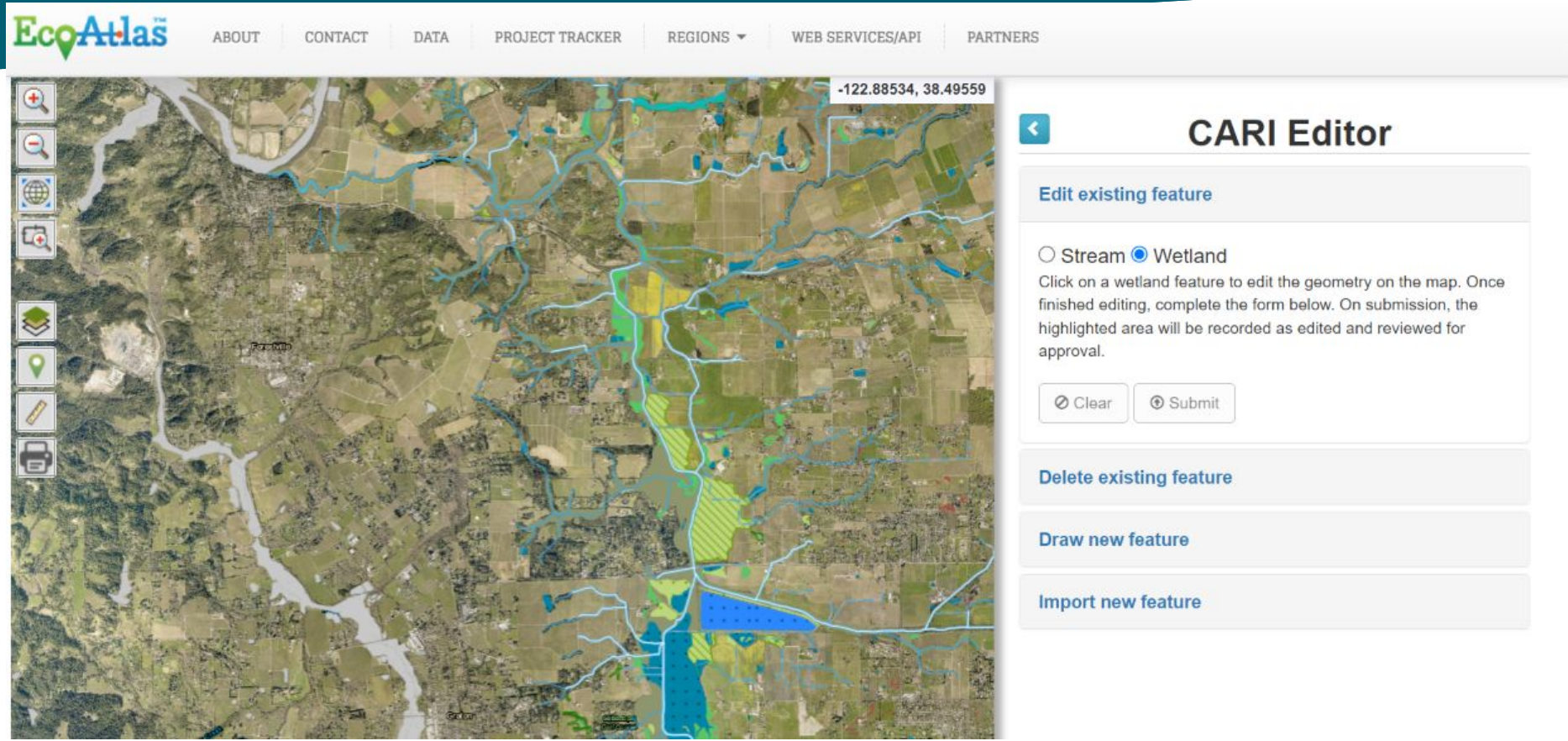
Visualize in EcoAtlas



Summarize with Landscape Profile Tool



Submit Map Updates



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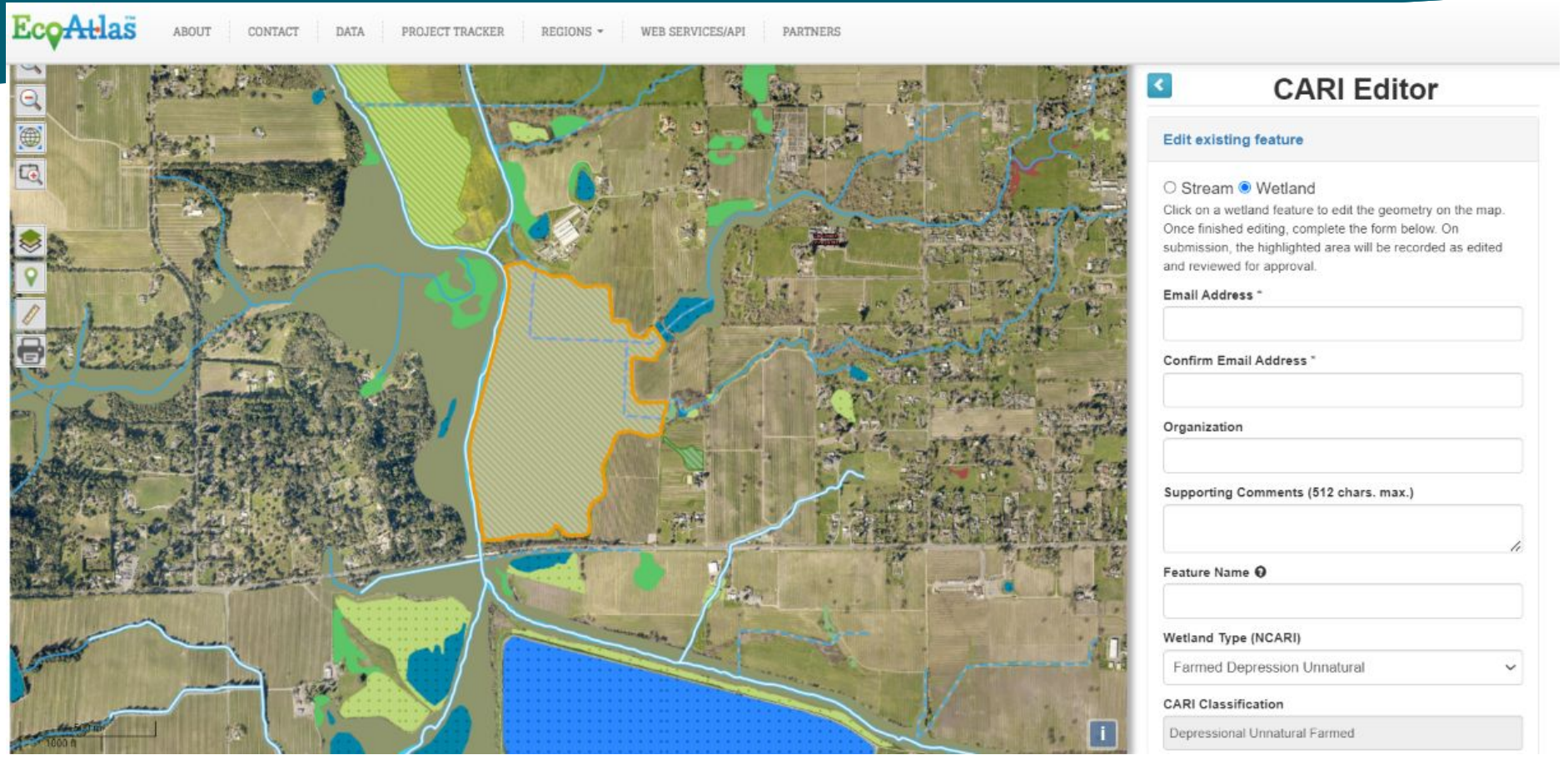


Riparian Mapping

Apply **Riparian Zone Estimator Tool** (RipZET) functional riparian delineation tool where riparian width is driven by adjacent hillslope gradient and vegetation height

- Run hillslope and vegetation modules for study area
- Compare RipZET and other riparian mapping methods in test areas
- Provide recommendations for future riparian mapping

sfei.org/projects/ripzet

Riparian Mapping

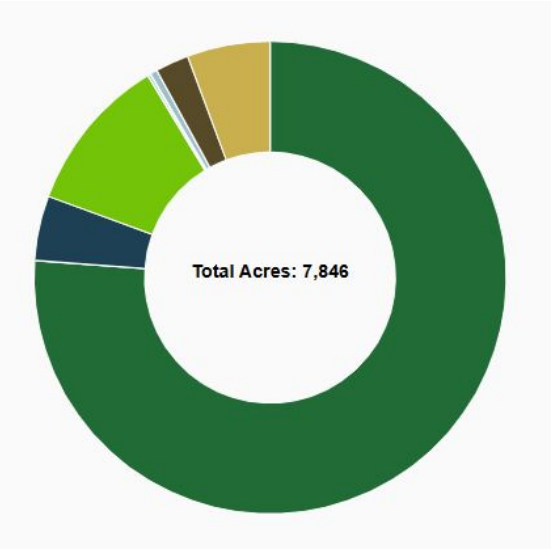
- Conversations with Permit Sonoma to build on prior efforts and address **needs for riparian ordinance**
- Approach ideas for **comparing mapping methods** in test areas thus far
  - RipZET (hillslope and vegetation module)
  - Ag & Open Space floodplain mapping
  - SEC regional curve and buffer
  - Simple buffer
  - Vegetation mapping (VegCAMP)

Riparian Mapping

- Worked with partners to secure funding for additional work
- Work will begin once channel line mapping complete
- Will seek advice and review by Mapping Workgroup members and R3MP TAC

Regional Coordination Needs

- Greater transparency on what everyone is doing in the watershed
- Common base map of aquatic resources
- Access to information:
  - Monitoring data
  - Restoration projects
  - Data summaries
- Track regional progress towards goals



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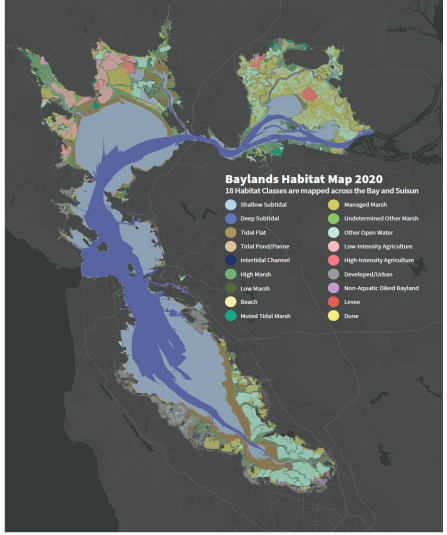
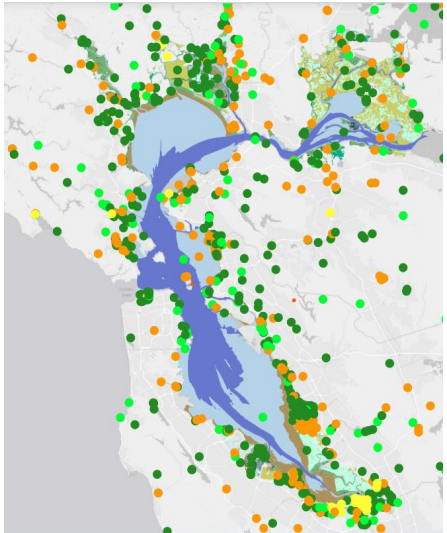
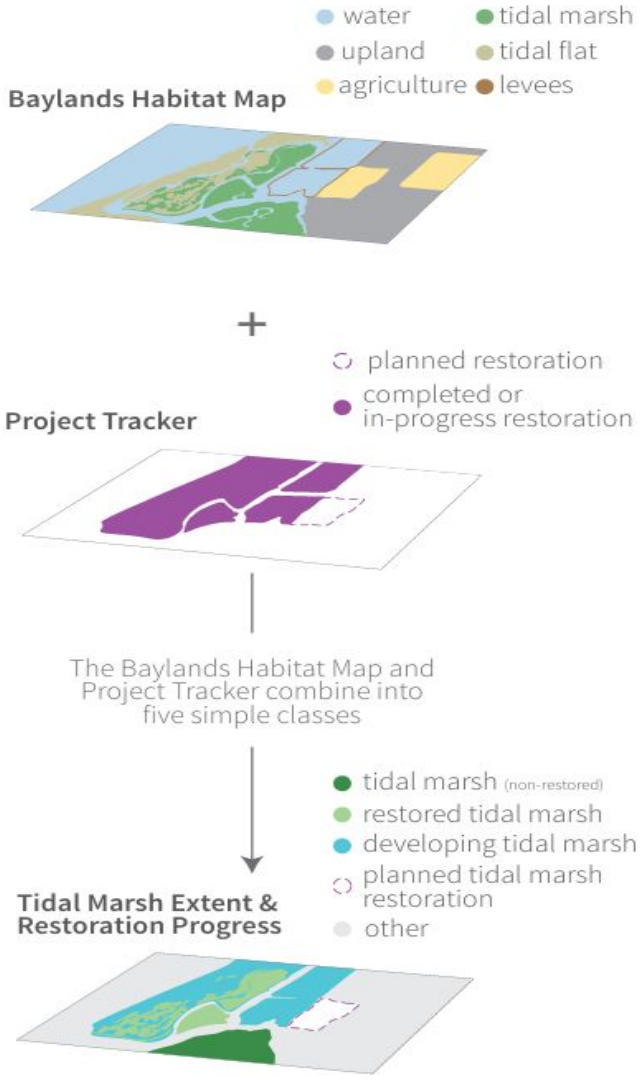
WRMP

Track change in tidal marsh extent and progress towards **regional restoration goals**







Closing Notes

- New LiDAR data and linework for study area
  Benefit: *Using more recent imagery and linework will make the map a more trusted and useful resource.*
- Evaluating mapping/modeling options for mapping riparian extents across Sonoma County
  Benefit: *Single consistent updated channel layer for the County will better support decision making for their riparian corridor protection ordinance.*

Closing Notes

- Using WRAMP Level 1-2-3 framework
  Benefit: *Provides data management framework and standardized methods for monitoring, assessing, and adaptively managing aquatic resources within the Russian River Watershed.*

- Using automated mapping methods
  Benefit: *Enables detecting and tracking habitat change across time and leveraging methods being developed by the SF WRMP.*

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Thank you

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