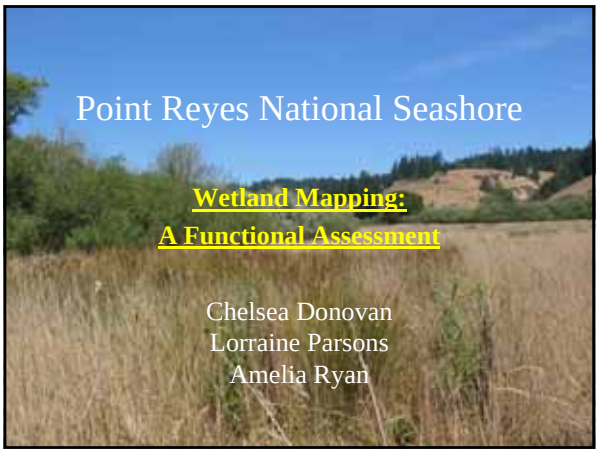


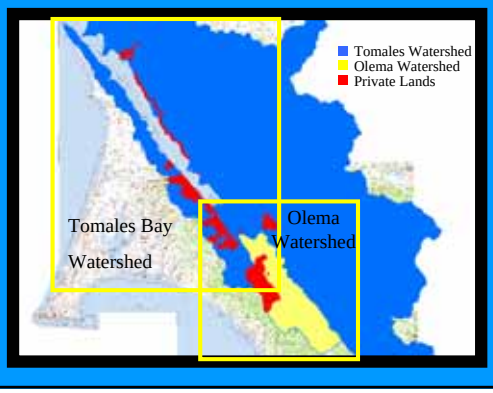
Why

- **Enabling legislation**
  - **Executive Order 11990-42 Fed. Reg. 26961**
  - **NPS Director's Order #77-1**
  - **Coastal Zone Management Act - 16 USC 1451**
  - **NPS Organic Act**
  - **NEPA**
  - **Section 404 of the Clean Water Act**
- **Targeting Wetland Restoration Potential**
- **Prioritizing Wetland Restoration**

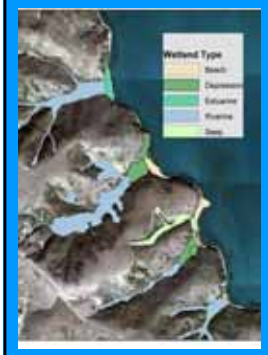
Objective

- Phase I
  - Accuracy Assessment of Existing NWI Maps
  - Intensive Mapping of Abbott's Lagoon
- Phase II
  - Complement wetland mapping with a functional assessment

Study Site



Functional Methodology



- U.S.A.C.E HydroGeoMorphic Classification
- U.S.F.W.S. Cowardin Classification System
- E.P.A California Rapid Assessment Method
- PRNS Local Impacts

Cowardin and HGM

Cowardin	HydroGeoMorphic
1. Landscape Position	1. Geomorphic Setting
2. Habitat Type	2. Water Source
3. Hydrologic Regime	3. Hydrodynamics
↓	↓
Vegetative Structure Species Composition	Functionality

California Rapid Assessment Method

- Standard State Wide Methodology
- Identify ambient conditions of wetlands
- Rapid, scientifically defensible, and repeatable
- Quantify anthropogenic stress, management actions, and natural disturbance
- Quantify relationships between stress, function, and condition
- Cost effective

PRNS Functional Mapping

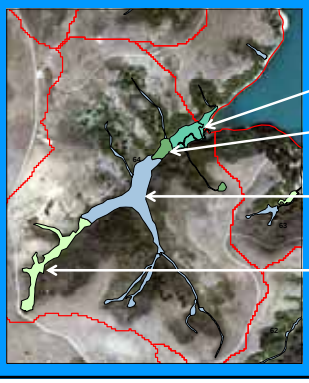
HGM + Cowardin + CRAM + Local Indices =

Point Reyes National Seashore Wetland Functional Assessment

Step 1

Sub-Watersheds

Step 2 - Watersheds Broken into Systems

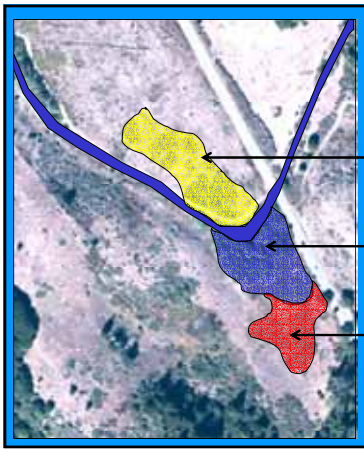


Estuarine

Depression

Riverine

Seep



Step 3 Polygon

Emergent
Seasonally Saturated

Emergent/Scrub Shrub
Seasonally Saturated/Flooded

Emergent
Seasonally Saturated/Flooded

Floodplain Scrub Shrub vs. Emergent

Functional Assessment

- Hydrological Function
- Ecological Function
- Stressor Indices
- Grazing Impacts
- Gully Assessment
- Channel Characteristics

Functional Assessment

Hydrological Function	Freshwater Surface Flows
	Tidal Surface Flows
Ecological Function	Tidal Surge/ Flood Attenuation
	Water Quality
	Carbon Production and Export
	Groundwater Recharge
	Plant Community
	Wildlife - Aquatic Component
	Wildlife - Terrestrial Component

Adapted from CRAM

Flood Attenuation Metrics

Entrenchment Ratio
(Riverine)

bankfull width
bankfull height

Adapted from Rosgen

Flood Attenuation Metrics

Flood Land Connection
(Riverine & Estuarine)

High - Waters have unrestricted access to adjacent uplands

Low - All waters are contained within artificial banks, levees, or sea walls.

Adapted from CRAM

Flood Attenuation Metrics

Distance
(Riverine & Estuarine)

Increased distance represents reduction in wave energy.

Adapted from Rosgen

Flood Attenuation Metrics

Topographic Complexity
(Riverine, Estuarine, Depression, Seep, Lacustrine)

High - Variety of slopes containing mounds and pits

Low - Uniform with no topographic features

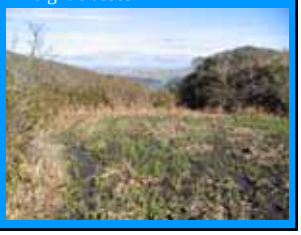
Adapted from CRAM

Flood Attenuation Metrics
Vertical Biotic Structure
(Riverine, Estuarine, Depression, Seep, Lacustrine)

Tall >1m, Med 0.3-1m, Short <0.3m

High - Supports 3 height classes

Low - Less than 1/4 supports 3 height classes



Adapted from CRAM

Flood Attenuation Metrics
Soil Substrate Condition
(Riverine, Estuarine, Depression, Seep, Lacustrine)

High - Soils are intact with abundant organic matter

Mid-Low - Soils exhibit sparse organic litter and are disturbed by filling or compaction

Adapted from CRAM

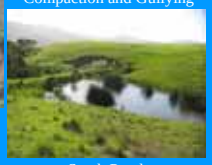
Local Stressors

- Channel Degradation
- Gullying/Headcutting
- Compaction
- Non-point Source Pollution
- Point Source Pollution

Anthropogenic Impacts

Ranching Practices

Compaction and Gullying



Stock Ponds

Roads and Trails

Non-point Source Discharge

Culverts

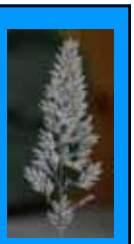
Point Source Discharge

Natural Impacts

Tule Elk

Compaction

Italian Thistle



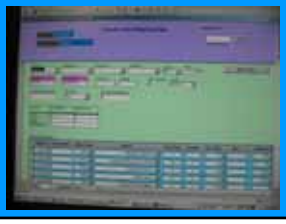
Velvet Grass

Non-native Vegetation

Penny Royal

PDA - Electronic Datasheets

- **Zire 21 Palm Pilot**
- **Pen Dragon software compatible with MS Access**
- **PRNS/GOGA Plant List**



Wetland Acreage

Wetland Type	Tomales Acres	Olema Acres	Tomales Percent	Olema Percent
Riverine	254	350	61%	71%
Seep/Spring	47	35	11%	7%
Depressional	98	110	23%	22%
Estuarine	19	0	5%	0%
Total	**418**	**495**	**100%**	**100%**

Stressor Scores

Tomales Bay Watershed

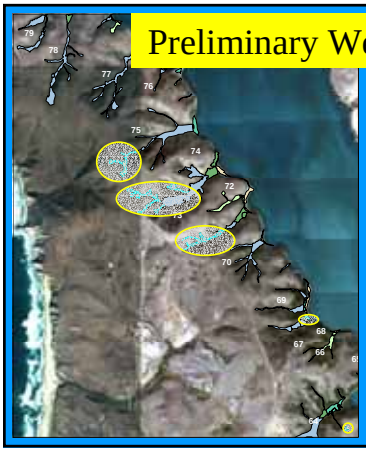
Wetland Types	Stressor Range	Stressor Average	Stressor Median	Stressor STDEV
Riverine	0-29	9.8	8.5	6.9
Seep	0-34.5	10.0	6.5	8.9
Depressional	1-30	10.4	10.0	6.2
Estuarine	2.5-22	10.3	10.0	5.0

Preliminary Functional Results

Tomales Bay Watershed

Wetland Types	Functional Range	Functional Average	Types Below 5th Percentile
Riverine	63.3-108.4	94.1	9%
Seep	48.0-76.0	64.5	11%
Depressional	56.6-76.8	68.1	16%
Estuarine	69.9-100.5	86.8	7%

Preliminary Wetland Targets



Wetlands in the Lower 5th Percentile