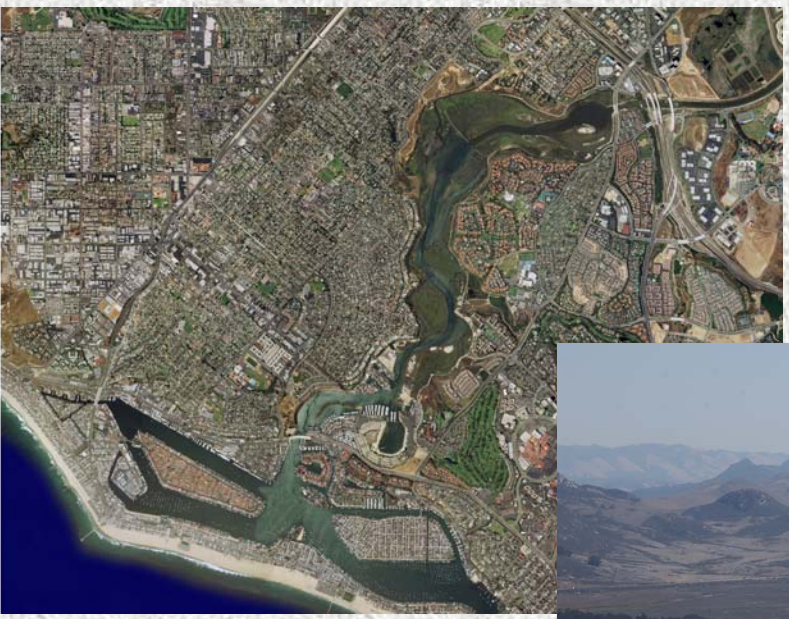
Wetland Assessment in California: Context and Progress Towards Method Development



Martha Sutula & Eric Stein, *So. Calif. Coastal Water Research Project*
Josh Collins, *San Francisco Estuary Institute*
Ross Clark, *California Coastal Commission*
Paul Jones, *US EPA Region 9*

Wetland Assessment

Context & Method Development

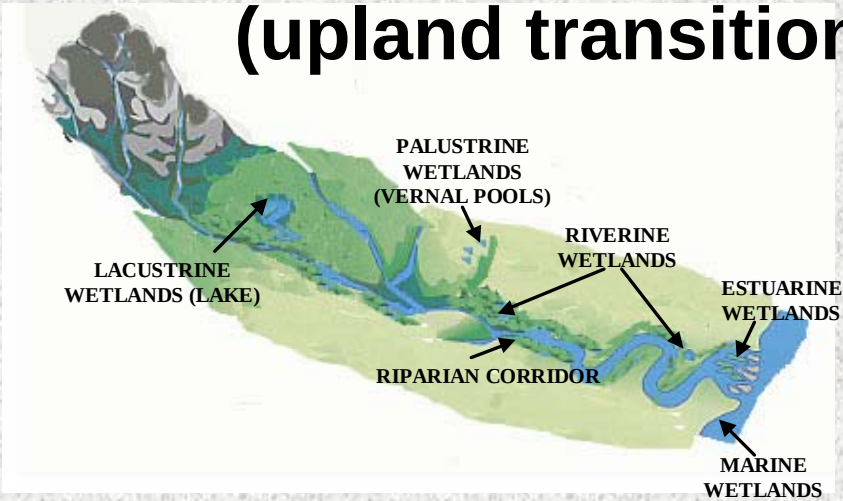
- **Need for Wetland Assessment in California**
- **Partnerships working towards Regional Wetlands Assessment Programs**
- **Conceptual Framework for Assessment**
  - **Three Tiers of Assessment**
  - **Methods Development (EMAP, SCREAM, CRAM)**
- **Opportunities for collaboration**

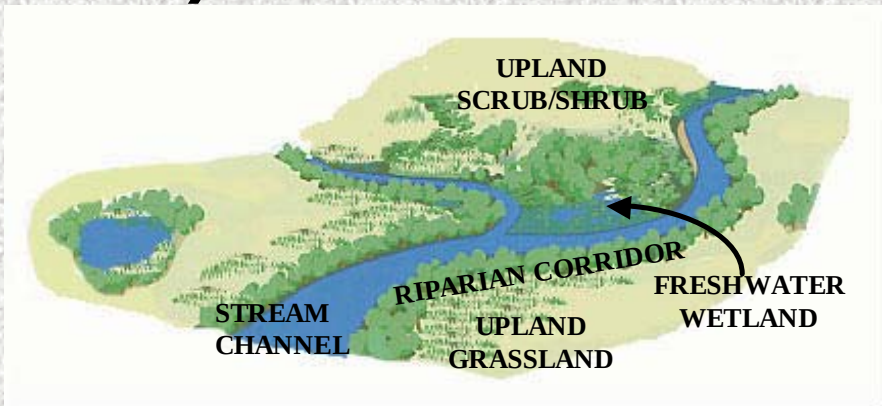
Definition of “Wetlands”

- **US FWS definition (Cowardin et al. 1979)**
  - **Broadly inclusive, including shallow water aquatic habitats such as wadeable streams**

……PLUS…..

- **Riparian areas adjacent to wetlands (upland transition areas)**



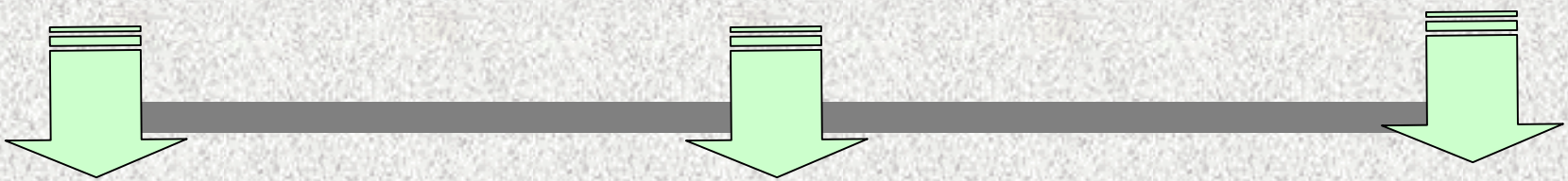


California Wetlands: Need for Assessment

Highest wetland loss rate in the nation

Active regional programs in wetland recovery

Rapidly urbanizing coastal zones (anthropogenic stress, wetland degradation/loss)



What is the abundance and distribution of wetlands?

What is the ambient condition and how is it changing over time?

What is the effect of restoration and mitigation activities?

Where should mgmt actions or recovery work be targeted?

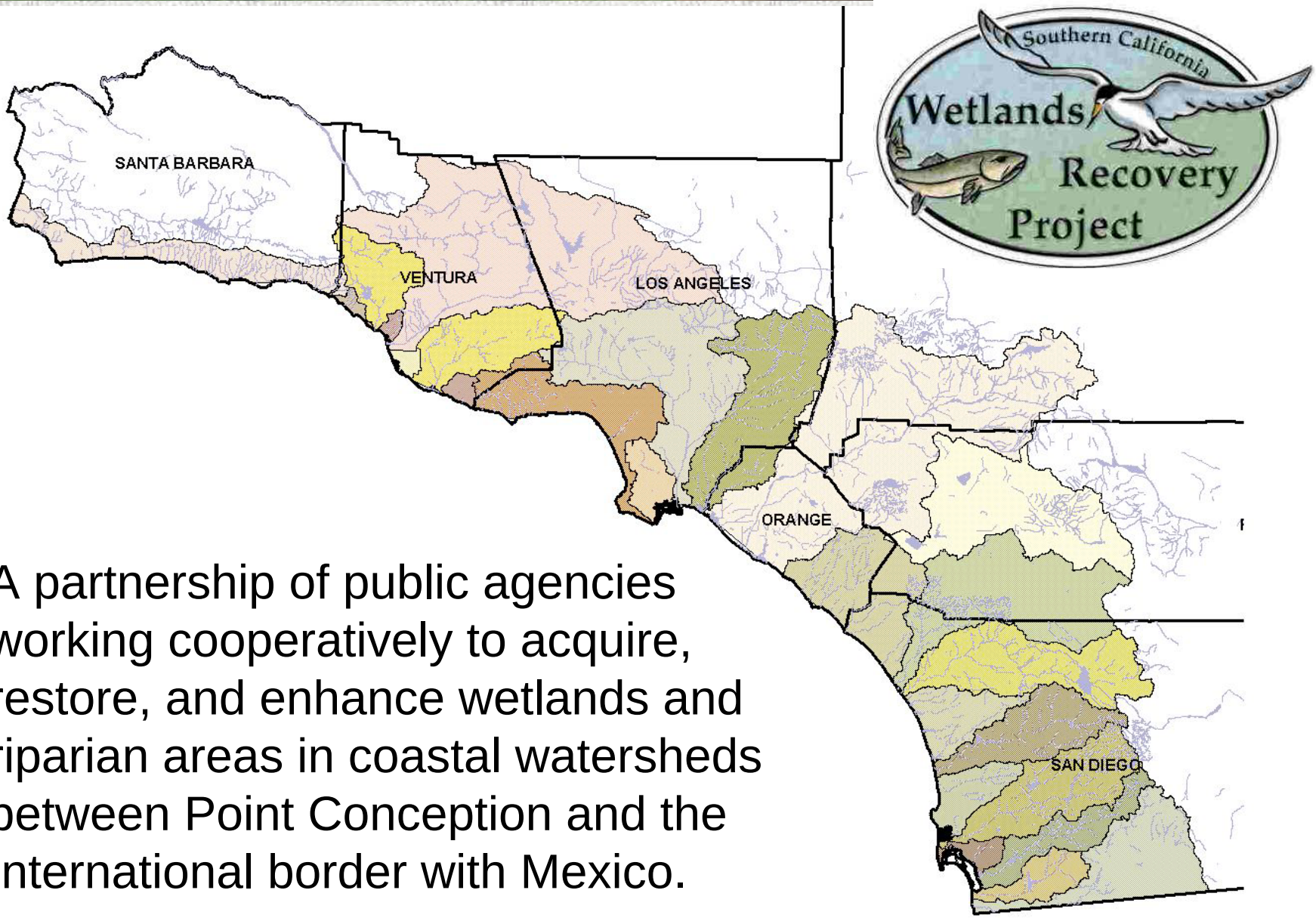
Status and Challenges of State and Regional Wetlands Assessment

- No updated wetlands inventory
- Little ambient wetlands monitoring
- Projects monitored in disparate ways
- No single authority
- Monitoring seen as tax on conservation
- Budgets are tight and getting tighter

Meeting the Challenge …

We Are Uniting Regional Partnerships to Build A Standardized Approach to Assessing Wetland Status and Trends

So. Calif. Wetlands Recovery Project (WRP)



A partnership of public agencies working cooperatively to acquire, restore, and enhance wetlands and riparian areas in coastal watersheds between Point Conception and the International border with Mexico.

WRP Programmatic Goals

- Preserve and restore coastal wetlands
- Preserve and restore stream corridors and freshwater wetlands in coastal watersheds
- Recover native habitat and species diversity
- Integrate wetlands recovery with other public objectives (e.g. water quality, flood control)
- Promote education and compatible access
- Advance the science of wetland restoration and management

WRP Strategy

- Acquire property from willing sellers
- Restore and enhance wetlands where allowed by landowners and land managers
- Educate people about the best approaches to protecting and managing wetlands

WRP Partners: State and Federal

Federal Agencies

- Corps of Engineers
- U.S. Environmental Protection Agency
- Fish and Wildlife Service
- National Marine Fisheries
- Natural Resources Conservation Service

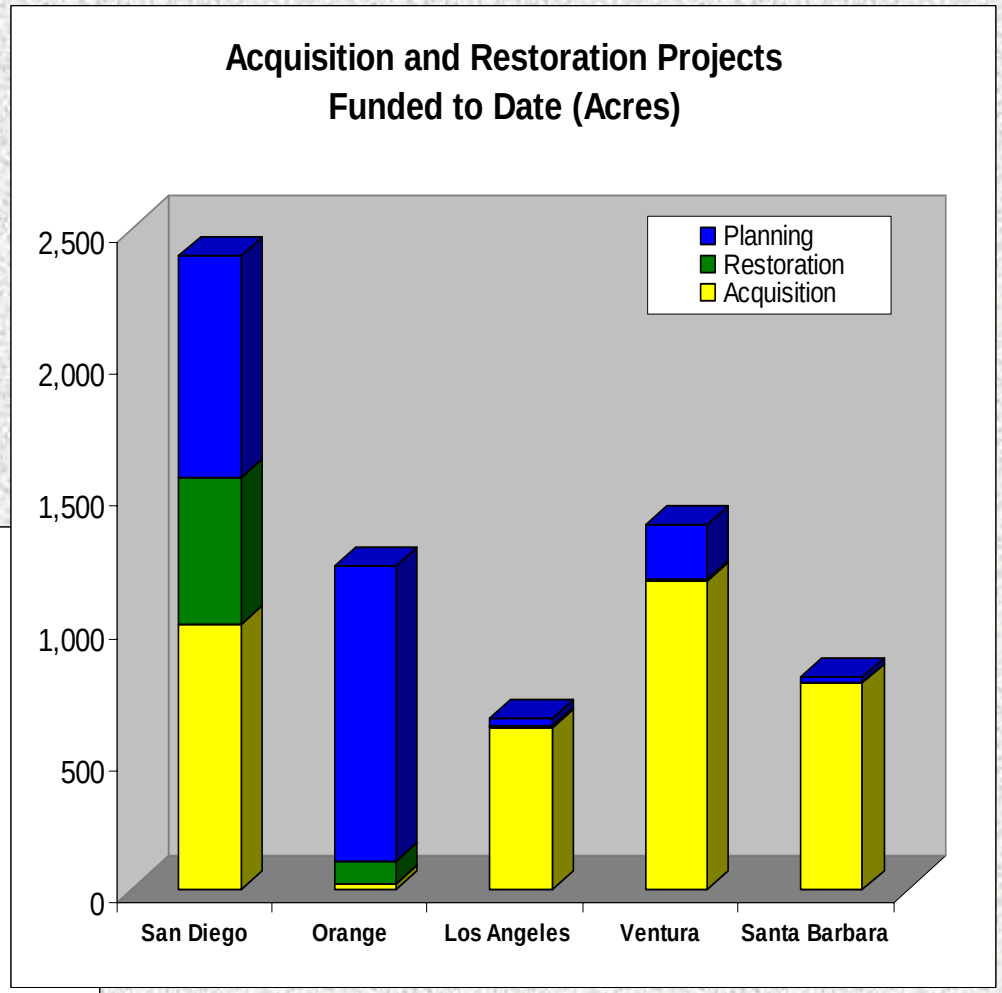
State Agencies

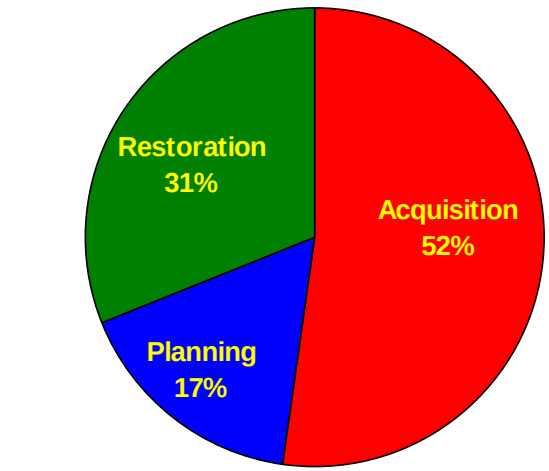
- Resources Agency
- Cal. EPA
- Coastal Conservancy
- Coastal Commission
- Dept. of Fish and Game
- State Lands Commission
- State and Regional Water Quality Control Boards

Projects Funded by WRP

34 projects funded to date

9 projects scheduled for 2003 funding





$62 million spent to date

How is Wetland Recovery Progressing in Southern California?

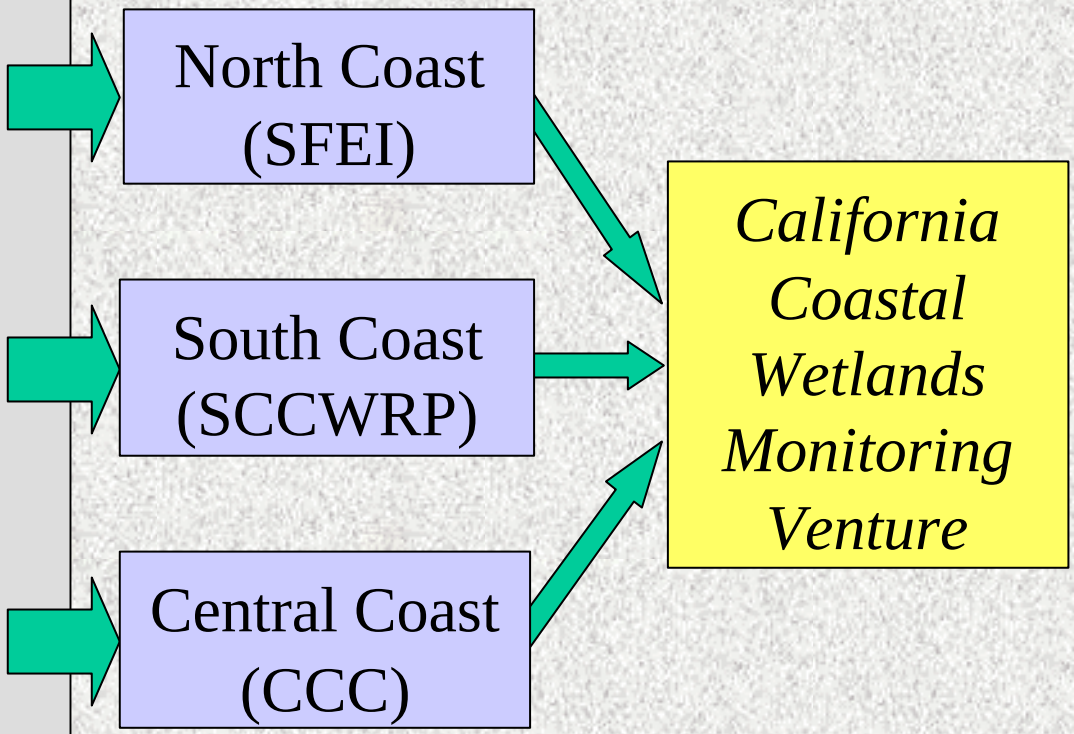
We do not know…

- What is impact of WRP $$?
- How is recovery offset by stress from anthropogenic activities?

<u>Regional wetlands monitoring is overdue</u>

….Working with Other State Partners to Develop Standardized Monitoring Program

- **USEPA CWA Section 104**
- **USEPA ORD**
- **USEPA EMAP**
- **USEPA STAR**
- **NSF**
- **California Sea Grant**
- **California State Board**
- **USGS Map/Gap Analysis Division**
- **NOAA Coastal Services Center**
- **SF & TR NERR**
- **USFWS NWI**



Venture Organization

Statewide Core Team

- SCCWRP
- SFEI
- USEPA
- ACOE
- CDFG
- SWRCB
- Reg. Water Boards
- CCC
- UCLA
- SFSU

Coordinates the overall process of technical development and implementation

Shares technical expertise and experience among regions

Integrates science and policy

Regional Teams

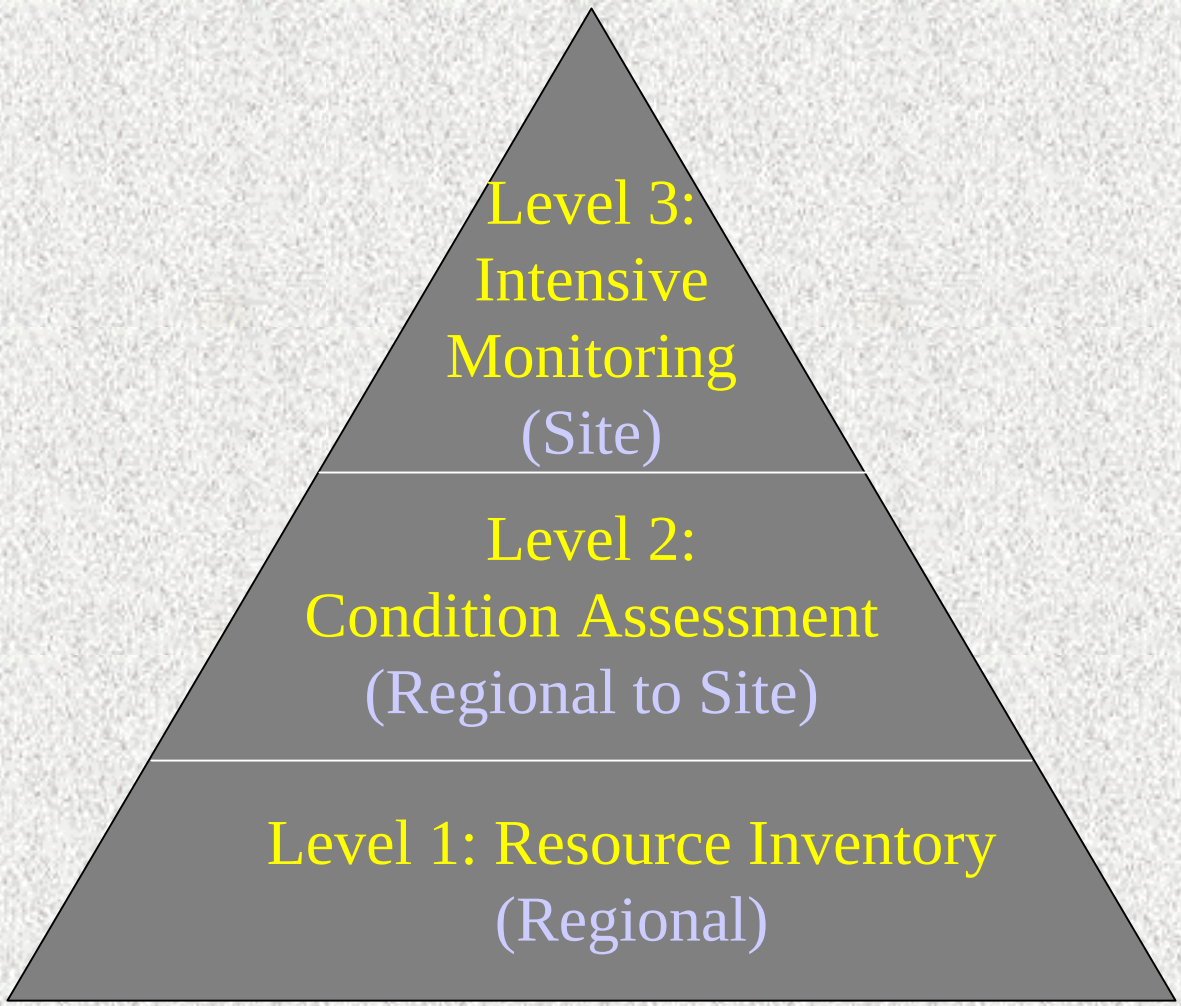
- CDFG
- USFWS
- Reg. Water Boards
- CNPS
- SCC
- Private Consultants
- WRP Science Panel and Managers Group
- WRP County Task Forces

Provides regional perspective

Helps with tool verification, calibration, and validation

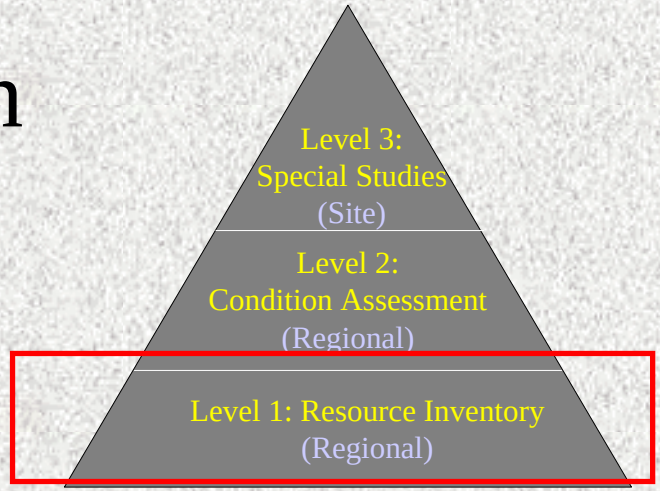
Helps with implementation

Three Tiers of A Comprehensive Wetland Assessment Program



3-Tiered Monitoring Approach

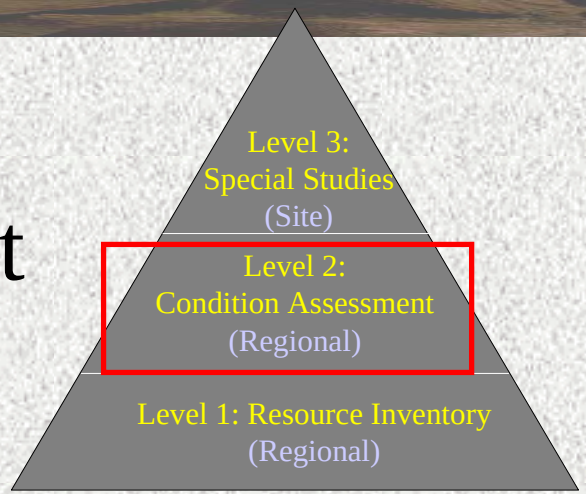
Level 1: Wetland & Riparian Resource Inventory



- Wetland Inventories
  - status and trends in the *regional distribution and abundance* of wetlands
  - sample frame for regional *probabilistic* ambient monitoring
- Online GIS servers for public access to inventory and watershed data

3-Tiered Monitoring Approach

Level 2: Condition assessment



- Developing a rapid assessment method to assess wetland condition
- Working with EMAP to piloting innovative sampling designs for regional surveys of ambient condition
- Developing landscape assessment methods (SCREAM model and EMAP landscape indicators)

Level 2: California Rapid Assessment Method (CRAM)

Develop a method for assessing wetland condition that can be routinely used for evaluation and monitoring purposes

Features

- relatively rapid (~3 hours)
- scientifically defensible
- understandable to a broad range of expertise
- customized across 6 wetland hydrogeomorphic classes
- applicable to wetlands and streams throughout the state of California
- has a regional perspective

Level 2: California Rapid Assessment Method (CRAM)

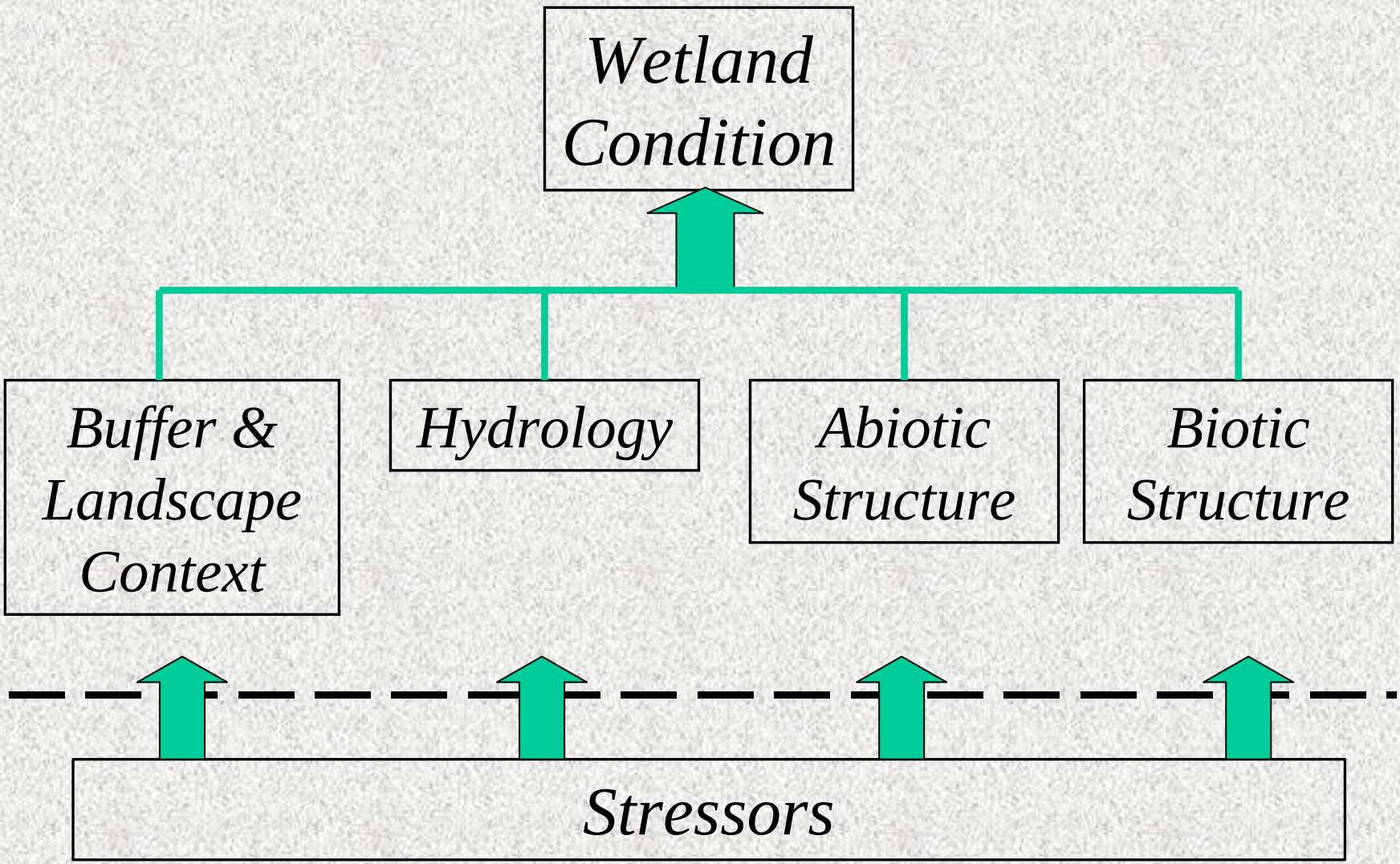
Potential Uses

- Regional monitoring & assessment
- Compliance monitoring
- Impact evaluation/stressor analysis
- Evaluation of restoration success
- Assessing relative importance of wetlands in the watershed

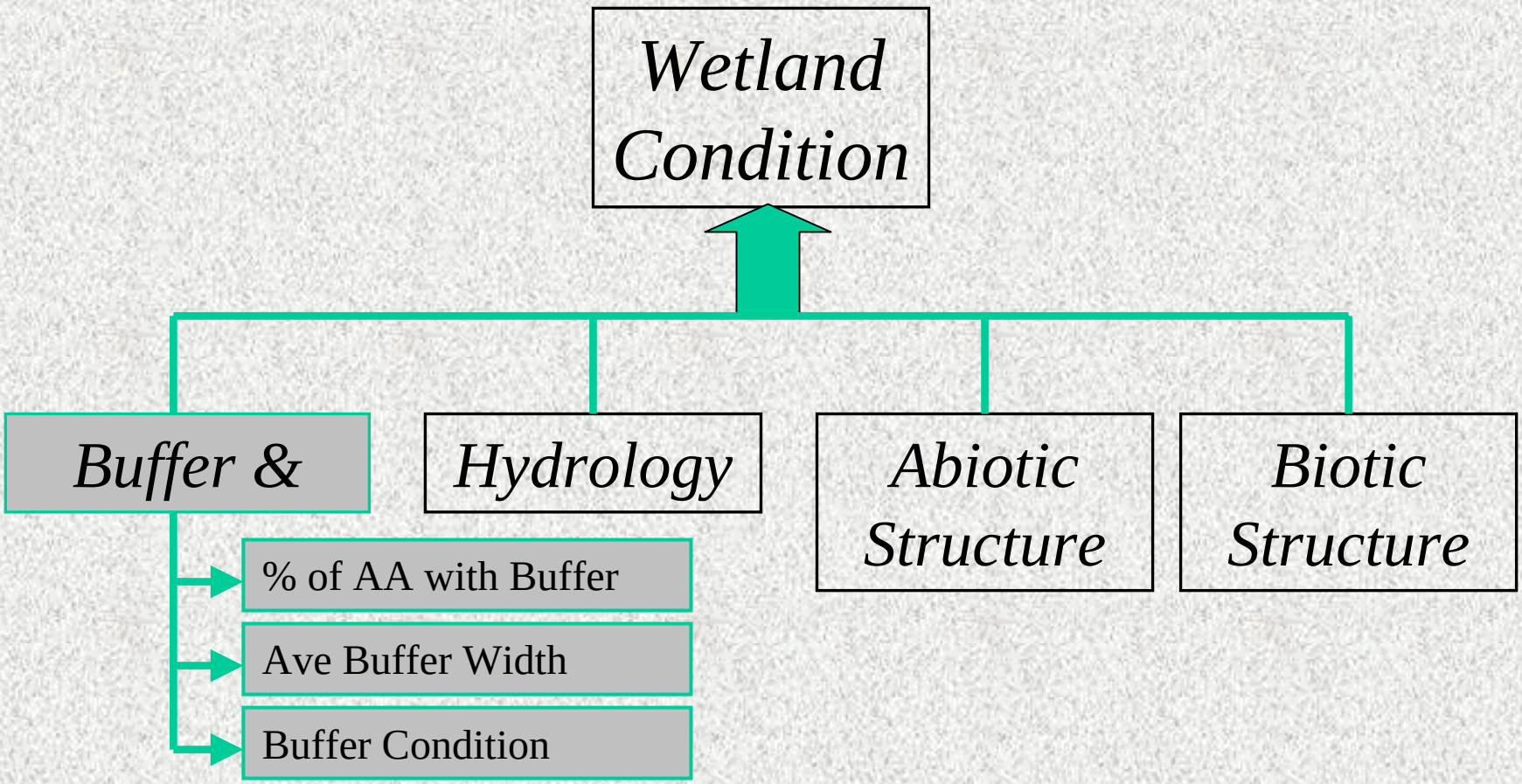
Existing Programs that Could Be Supported By CRAM

- SWAMP
- NPDES (Stormwater)
- 401/404/1600 pre-project evaluation and compliance
- Regional Programs (NCCP, WRP, etc.)

CRAM Conceptual Framework: Condition and Stressors



CRAM Conceptual Framework: Condition Attributes and Metrics



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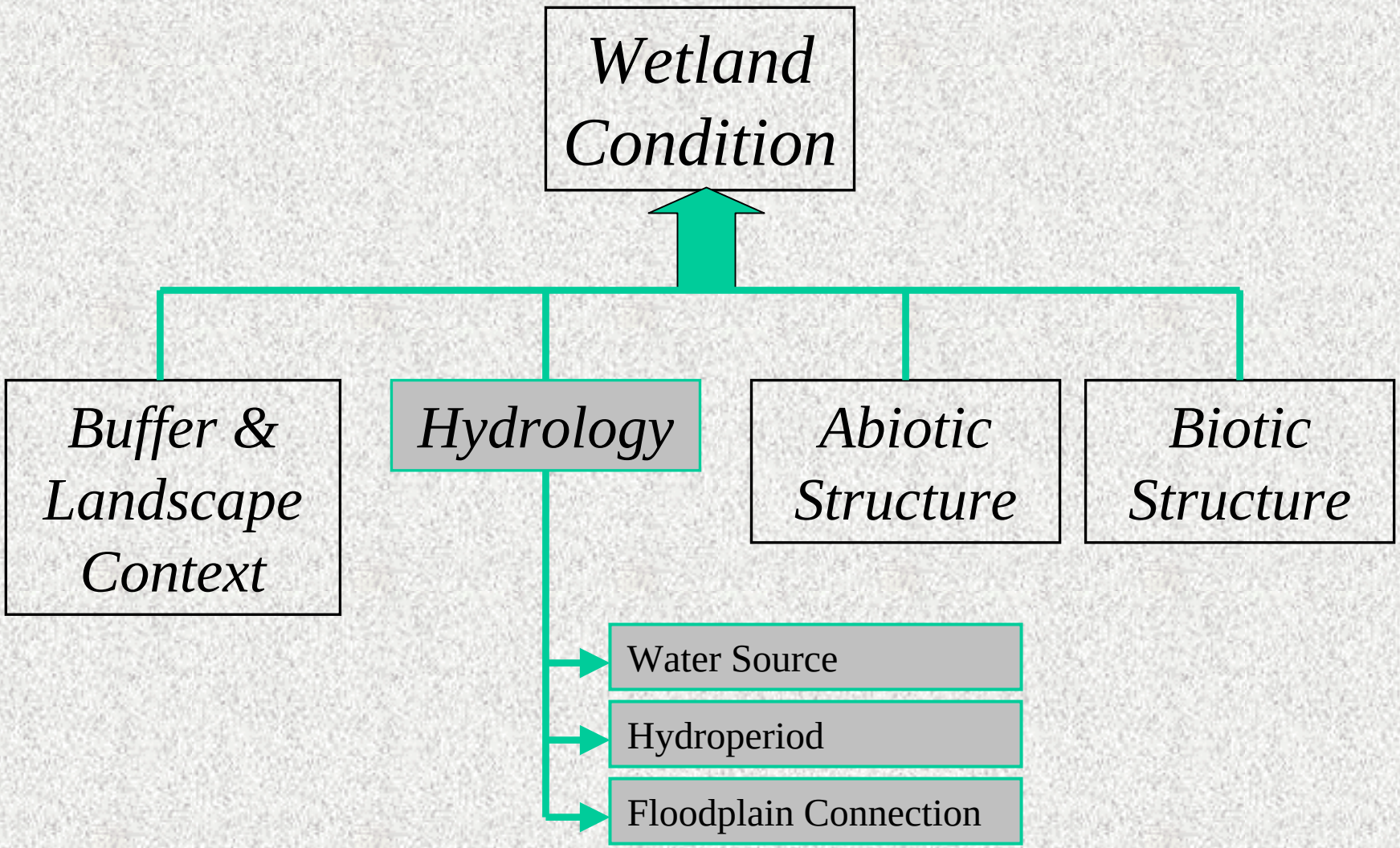
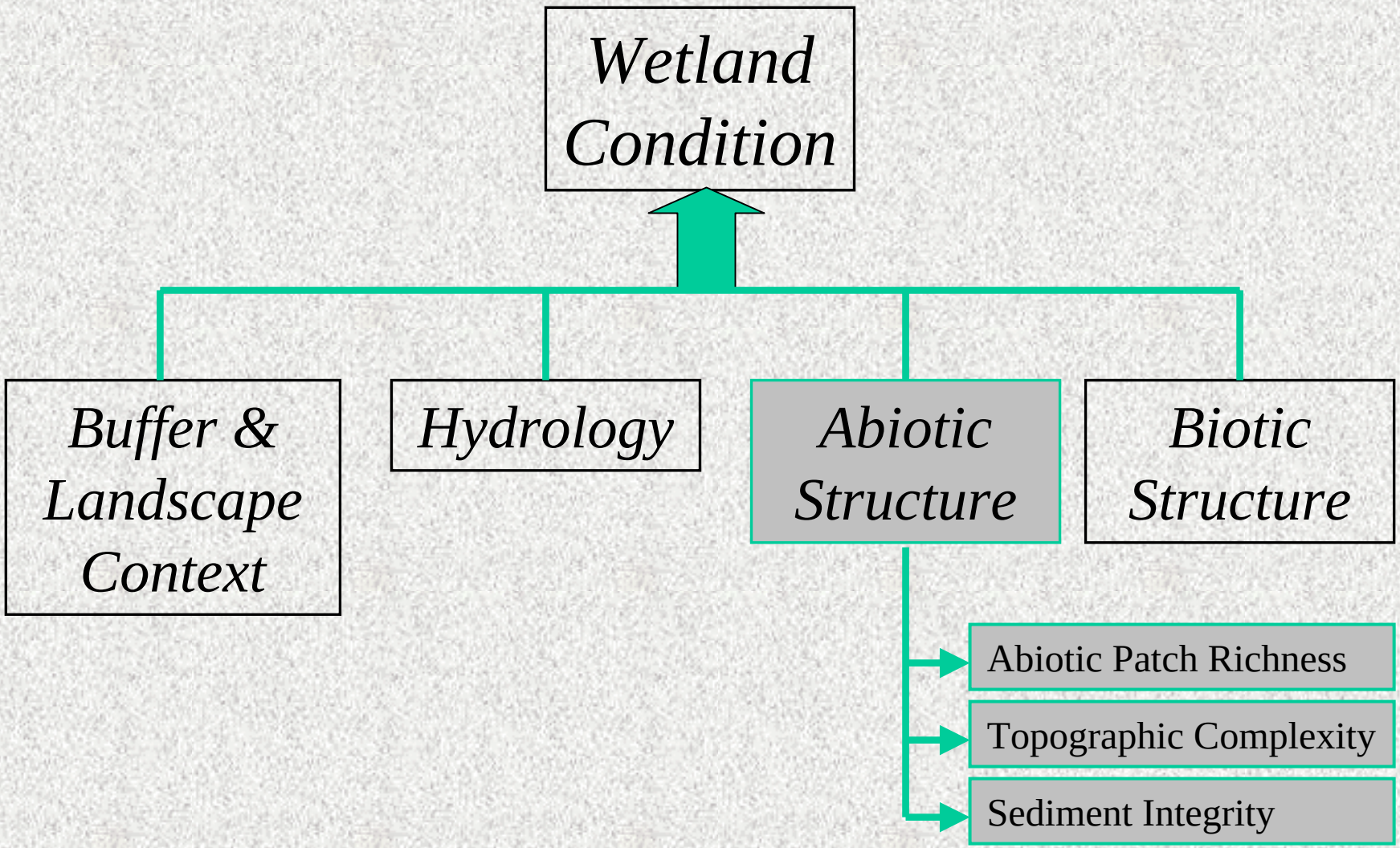
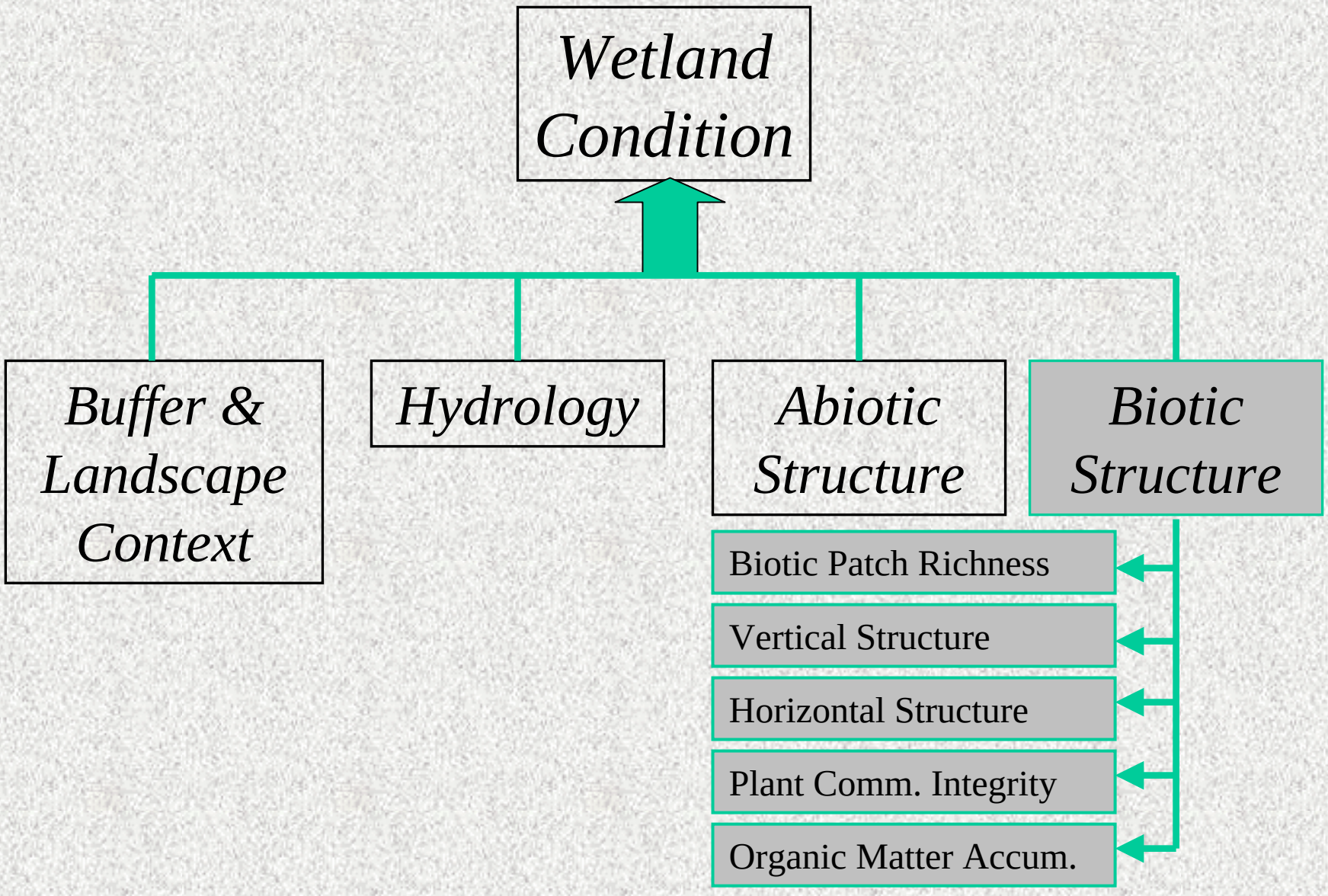


CRAM Conceptual Framework: Condition Attributes and Metrics



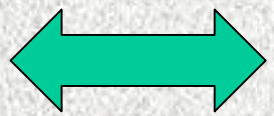
CRAM Conceptual Framework: Condition Attributes and Metrics



CRAM Attributes and Metrics

Metrics scaled for each wetland class

Attributes		Metrics
Buffer and Landscape Context		Percent of AA with Buffer
		Average Buffer Width
		Buffer Condition
		General Landscape Context
Hydrology		Sources of Water
		Hydroperiod
		Floodplain Connection
Structure	**Abiotic**	Abiotic Patch Richness
		Topographic Complexity
		Substrate Condition
	Biotic	Biotic Patch Richness
		Vertical Structure
		Horizontal Structure
		Total Plant Species Richness
		Plant Litter
		Exotic Invasive Plant Cover



Stressors

Overall Condition

CRAM Development

Development Steps

- **Initial method development**
- **Field verification & refinement**
  - Assess the general ability of metrics to discern high vs. low condition wetland
- **Field calibration & refinement**
  - Develop scaling/scoring of metrics
- **Field validation & refinement**
  - Test the efficacy of the method to predict condition, fine-tune metrics
- **Education, outreach, training**

Phasing

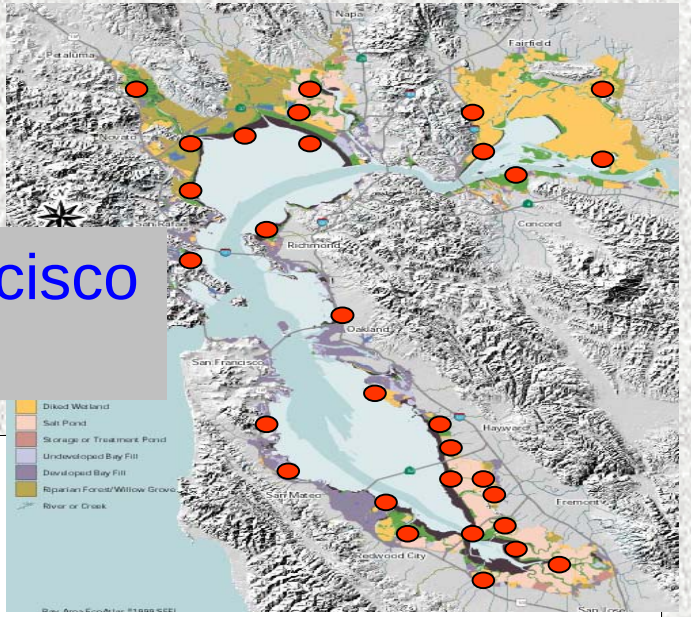
- Initial development for **coastal regions**
- Later phases will provide regional modification for inland watersheds

Potential Calibration Measures

- Percent of catchment subject to hydrologic control
- Percent invasive species
- Richness or diversity of plant communities
  - Species-area curves
  - Recruitment of natural species
- Biologic indices
  - Plants
  - Amphibians
  - Macroinvertebrates
- Contaminant sources in the contributing watershed
- Entrenchment ratio
  - Width of floodprone area relative to width of channel
- Quantification of topographic or structure complexity

Additional calibration measures will be developed during the verification phase

Level 2: Probabilistic Ambient Survey of Wetland Condition and Stress



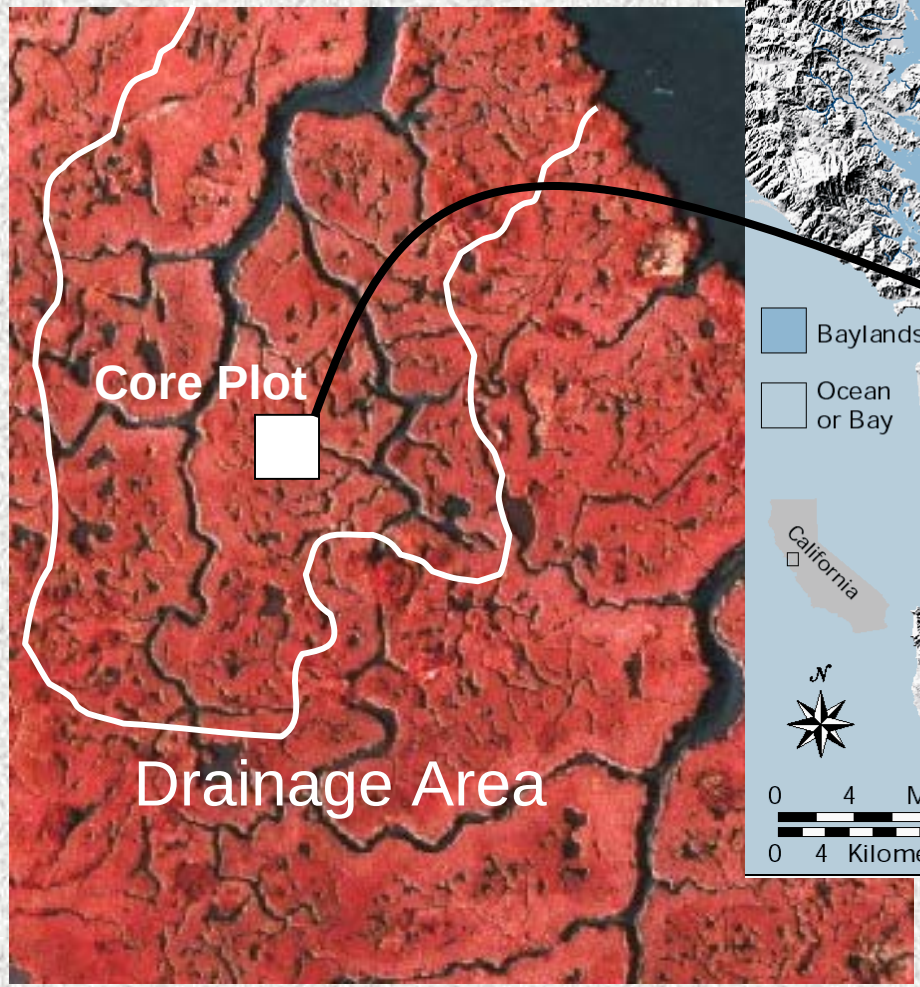
San Francisco Bay

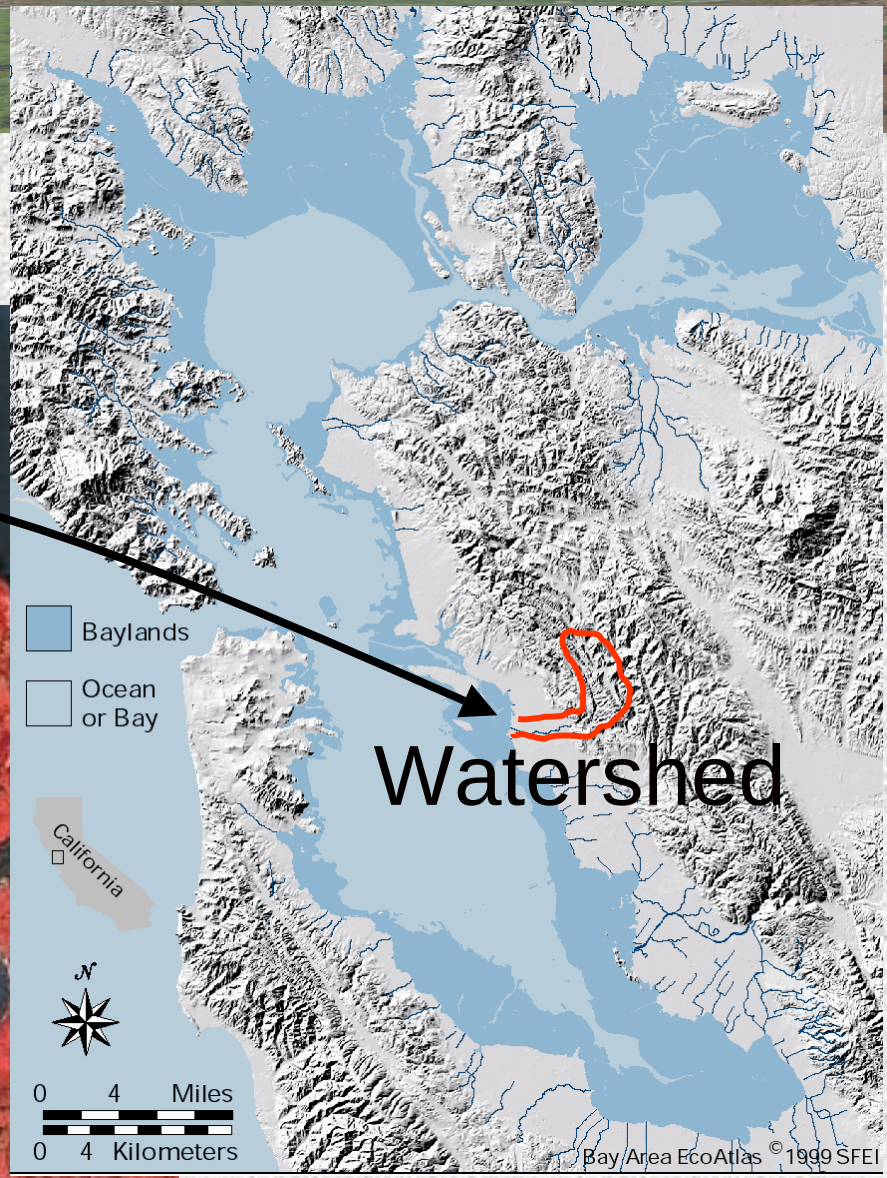
Southern California

EMAP 2002 Intertidal Wetland Pilot:

- Vegetation
- Fauna
- Contaminants
- Habitat fragmentation
- Landscape-level stressors

Nested Systems





Preliminary Findings of WEMAP Wetland Intensification

Watershed development has led to unnaturally complex tidal marsh shapes …

with an overabundance of upland edge …

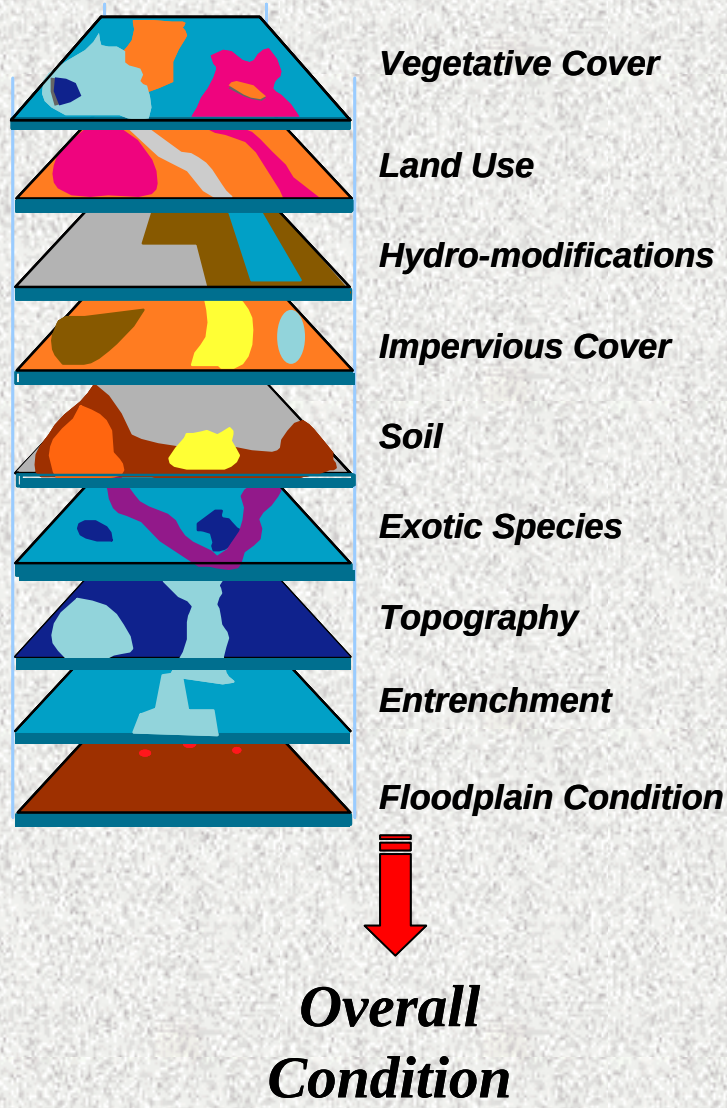
that has been degraded due to adjacent increases in human population density …

resulting in local decreases in native plant species diversity.

Level 2: Landscape Assessment Tools

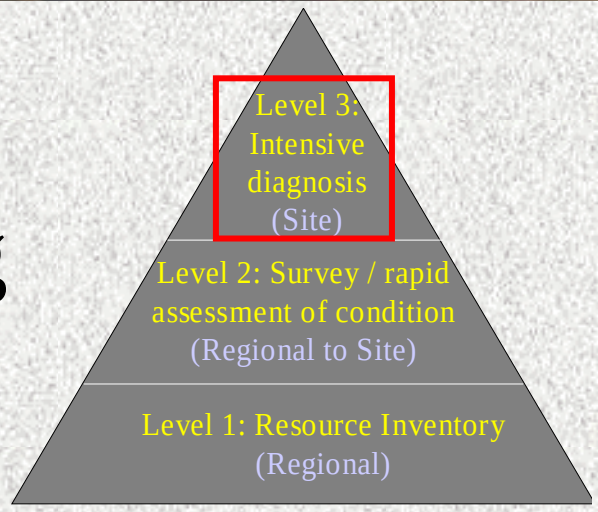
So. California Riparian Ecosystem Assessment Method

- Partnership with NOAA CSC
- Landscape-scale, GIS-based assessment approach = can achieve regional coverage
- Evaluates condition of riparian areas based on water quality, hydrology and habitat support
- Method development and testing in 5 pilot watersheds
- Will be used for monitoring, assessment, and decision support



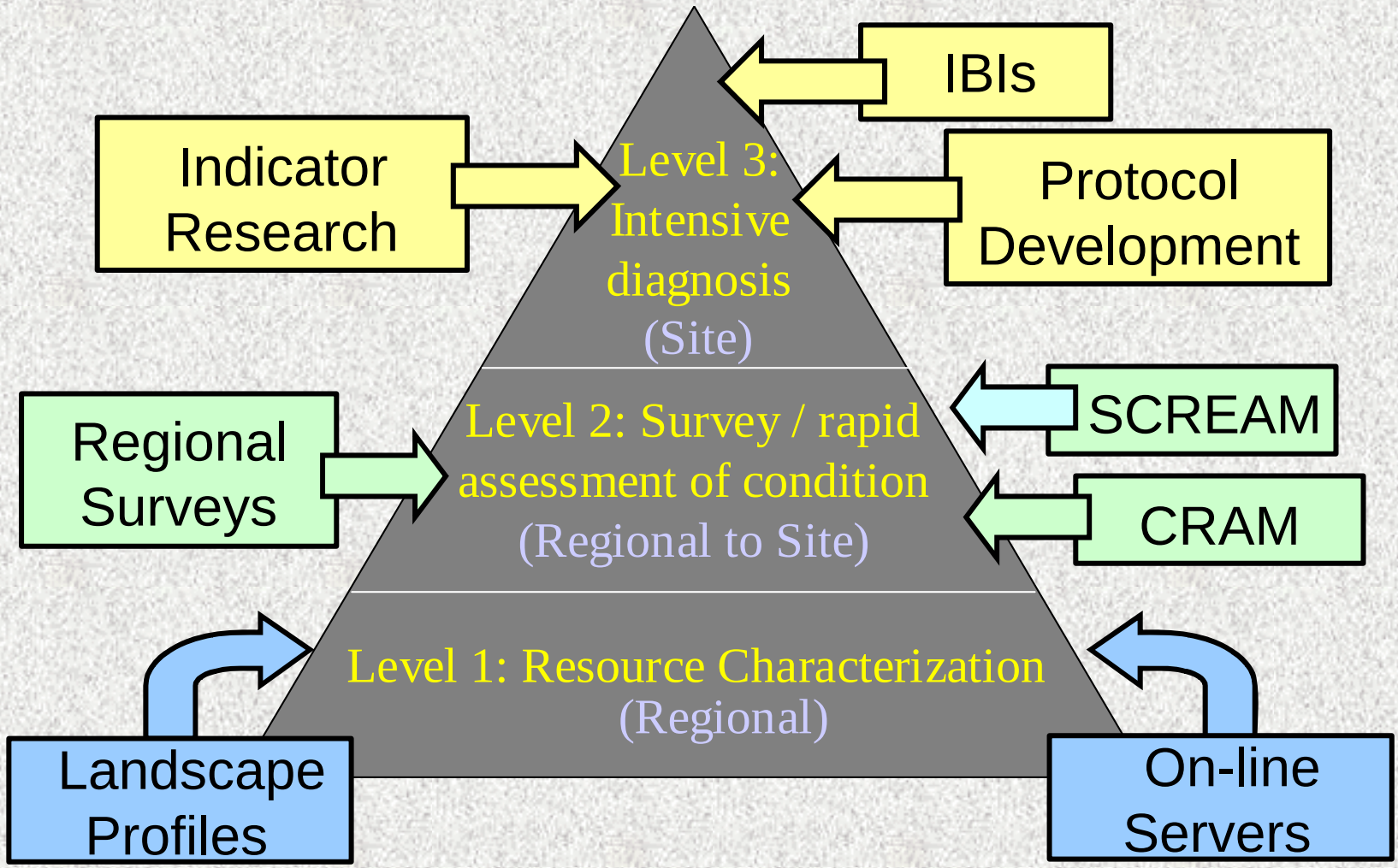
3-Tiered Monitoring Approach

Level 3: Intensive Monitoring

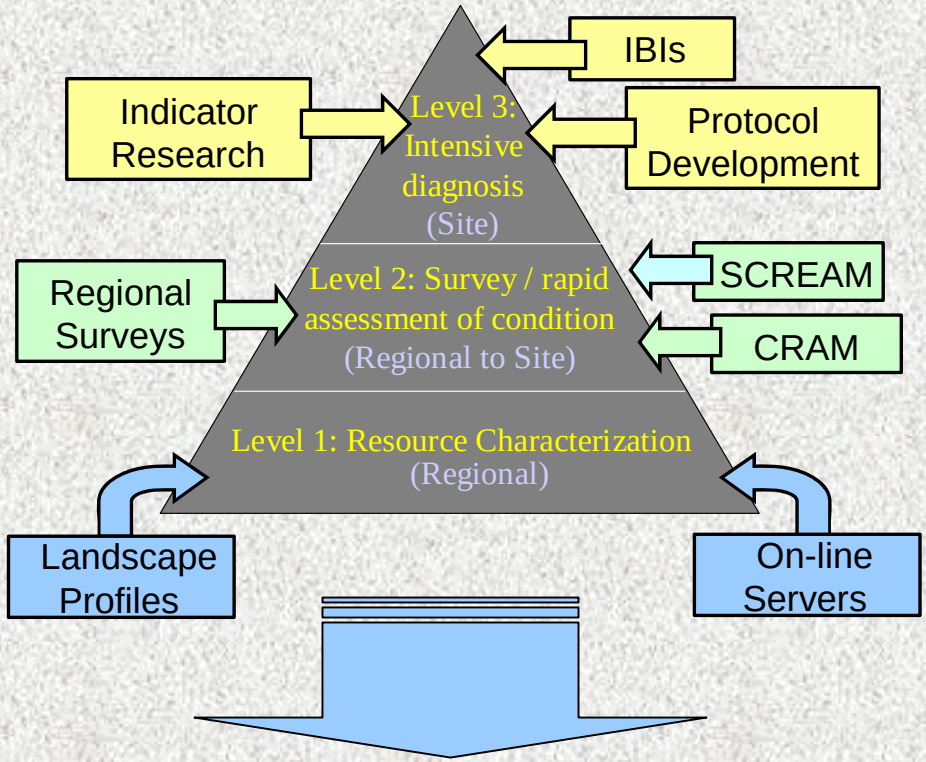


- Develop (if necessary) or use standardized protocols for intensive monitoring and validation of CRAM and SCREAM
  - Vegetation, macroinvertebrate, amphibian IBIs
- Development of minimum monitoring and electronic reporting requirements for restoration projects
- Working with PEEIR (EPA STAR) to trial new indicators

Building Wetland Assessment Toolkit



Developing Wetlands Regional Monitoring Program



- SF Bay Area- Existing RMP for Trace Substances, but working to include wetlands
- So. California- WRP Science Panel working on detailed conceptual framework of WRMP

Opportunities for Collaboration

- Validation of rapid assessment and landscape methods with other bioassessment methods (IBIs)
- Use of wetland rapid assessment tools to augment surface water quality monitoring
- Improve interagency coordination with respect to wetland and water quality monitoring

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