

# How to Effectively Mitigate for Wetland Impacts



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# Wetland mitigation in California

## Study Questions

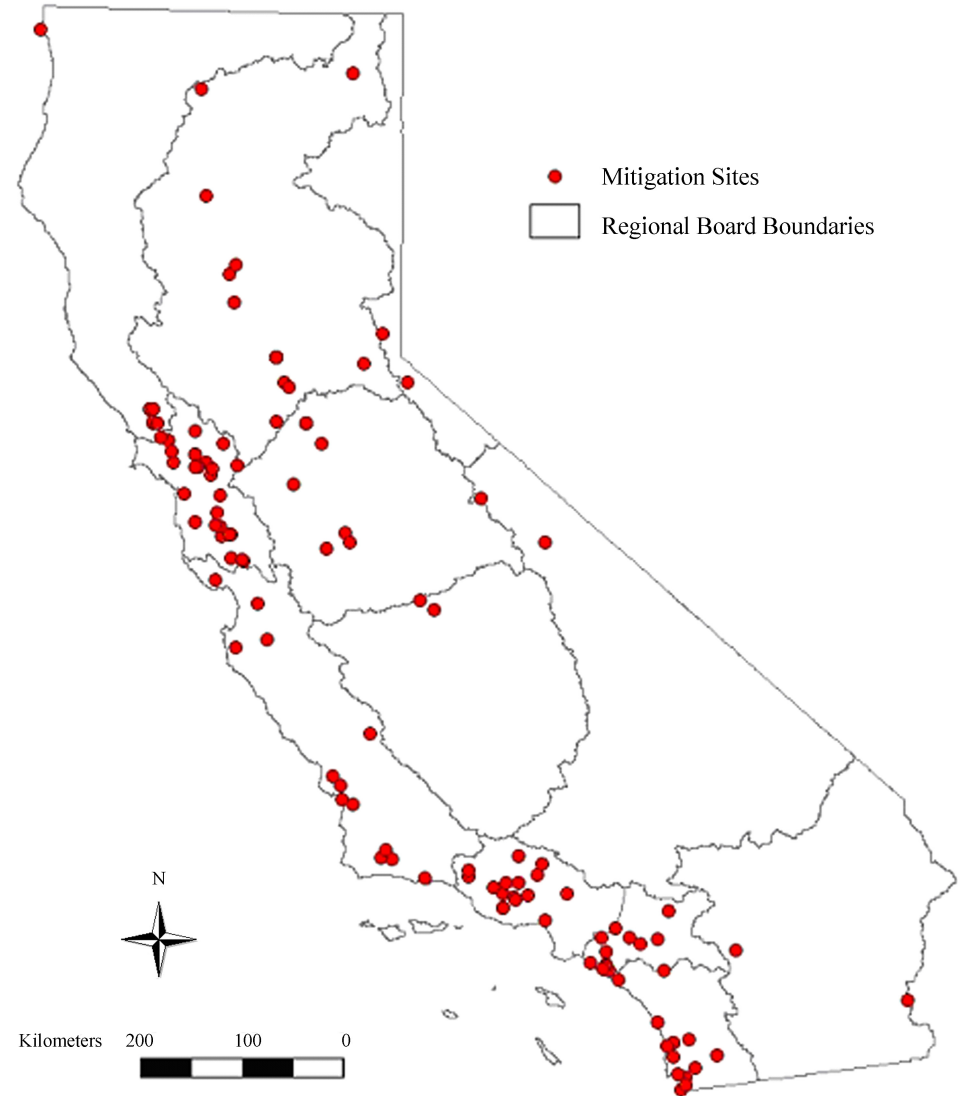
- Are compensatory mitigation projects complying with their permit conditions?
  - Has no net loss of acreage been achieved?
- Do compensatory mitigation wetlands function like natural wetlands?

# Study Overview

- File review
  - Conditions extracted from all permits (401,404,1600) and **mitigation plans**
- Field study
  - Compliance with permit conditions (including acreage)
    - Compliance reported for conditions from all permits
  - Ecological conditions using California Rapid Assessment Method (CRAM)

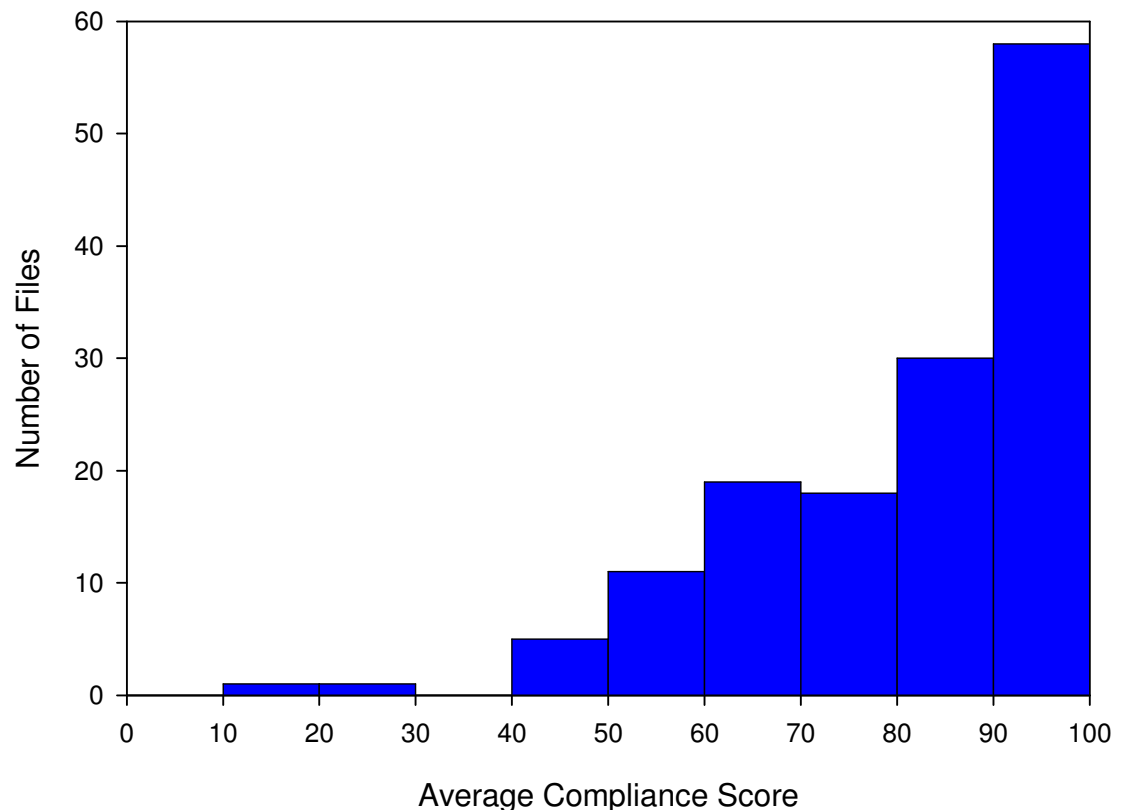
# Study Sites

- Files selected randomly from State Water Board database
  - Regions sampled in proportion to number of §401 permits issued
- 143 files reviewed for compliance
- 129 files assessed for wetland condition (as well as compliance)
  - 204 different mitigation sites (some projects included >1 site)
  - 321 separate CRAM evaluations



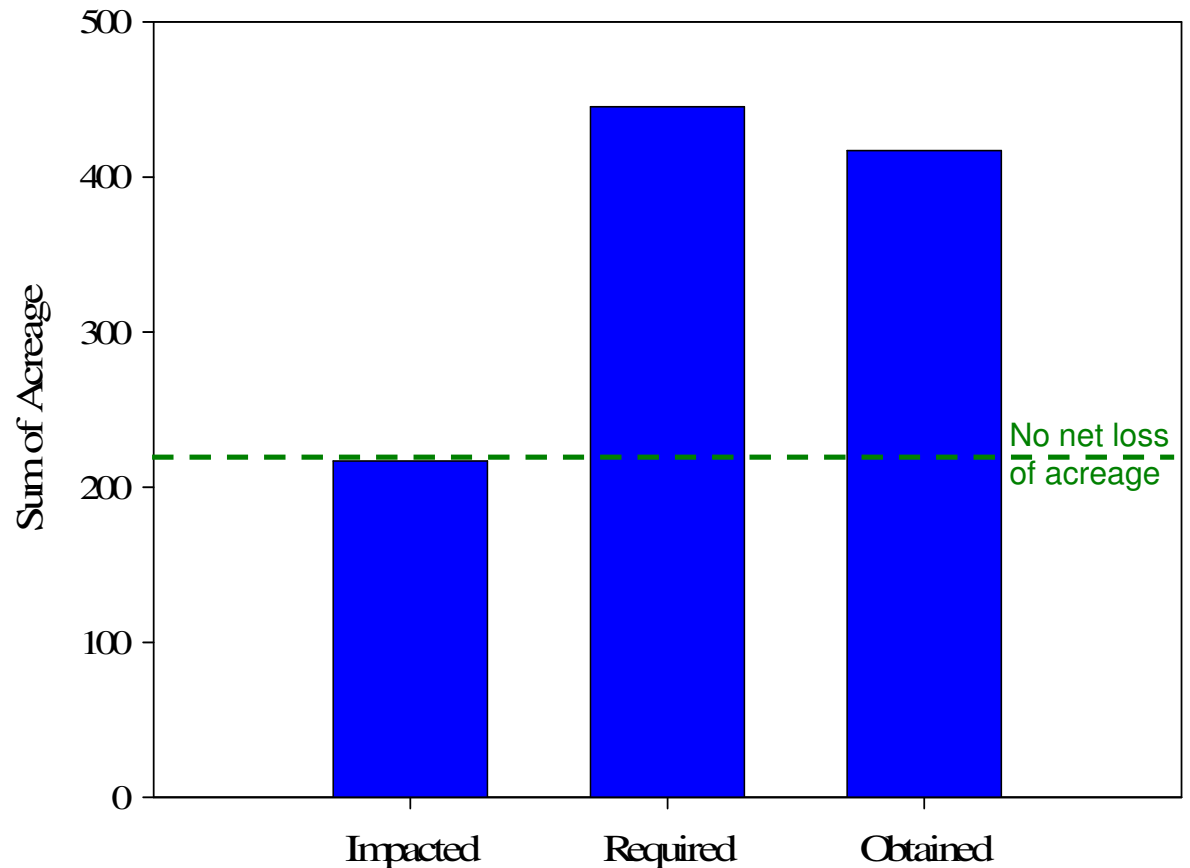
# Compliance with Permit Conditions

- Compliance with all permit conditions was relatively high
  - 27% of files complied with *all* conditions
  - Average compliance score was 82%



# Compliance with Acreage Requirements

- Approx 2:1 mitigation ratio was required
- Actual acreage obtained was slightly less than requirement
- Obtained acreage exceeded impacted acreage



► Indicates no net loss of acreage

# Assessing wetland condition

## *California Rapid Assessment Method (CRAM)*

- 15 individual metrics scored
- Scores combined into one total score plus 4 attributes (landscape context, hydrology, physical structure, biological structure)
  - Total scores can range from 15 to 100
- Optimal, sub-optimal, marginal and poor categorization based on data from 47 reference sites
  - Optimal defined as ~90% of reference sites





CRAM = 78



CRAM = 51



CRAM = 41



CRAM = 38



CRAM = 32

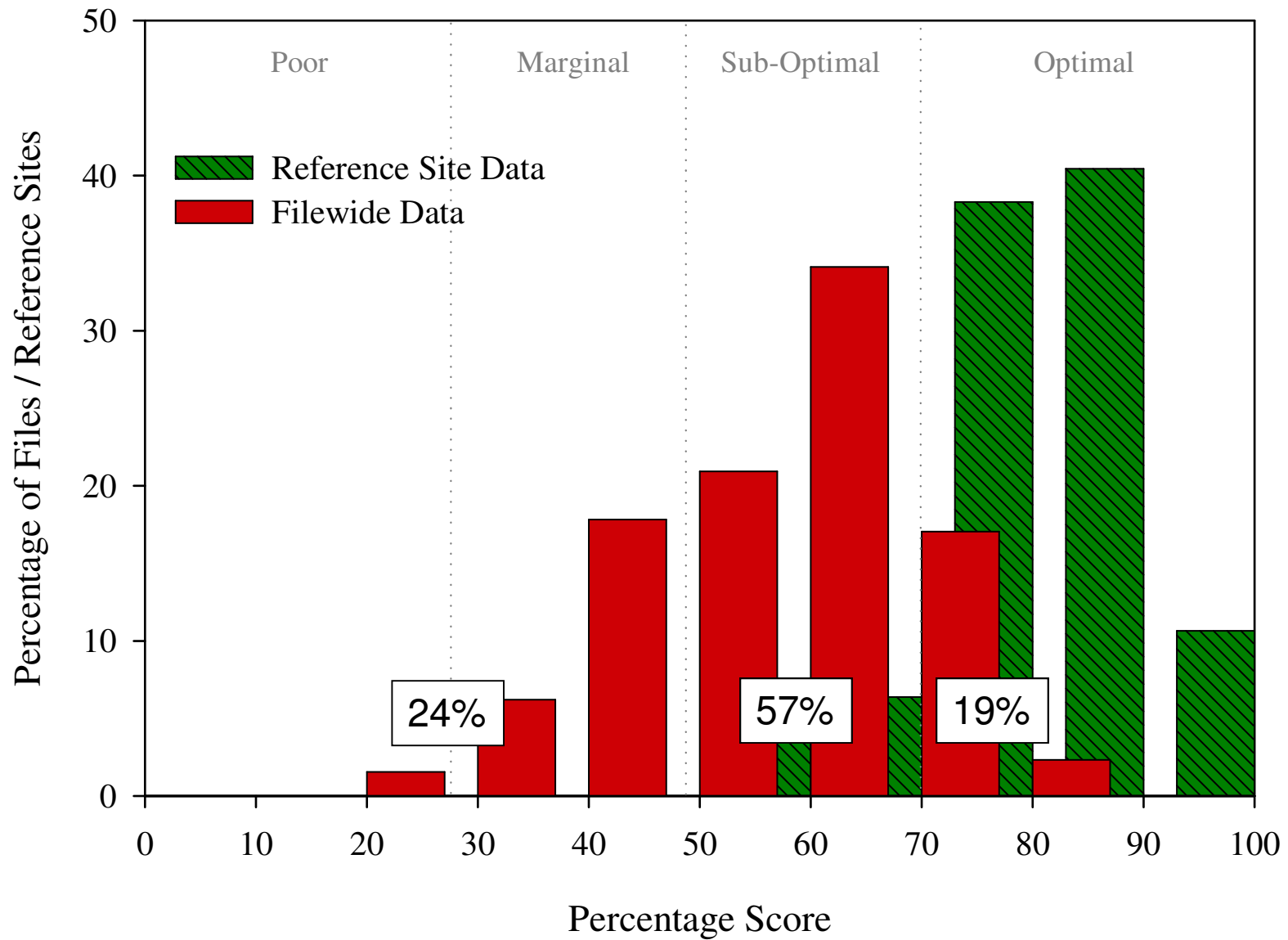


CRAM = 32



CRAM = 28

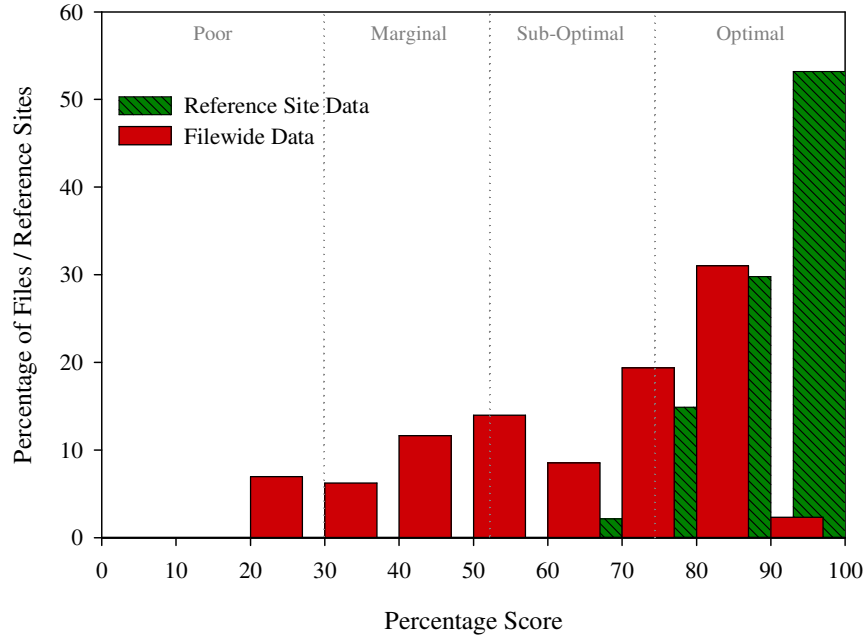
# Total CRAM Scores



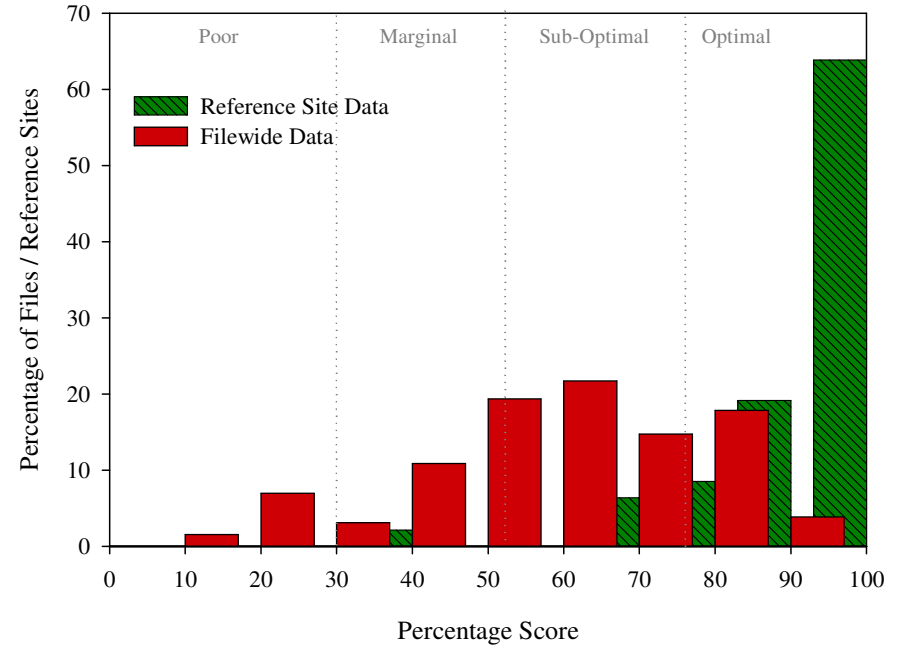
N=129 mitigation files and 47 reference sites



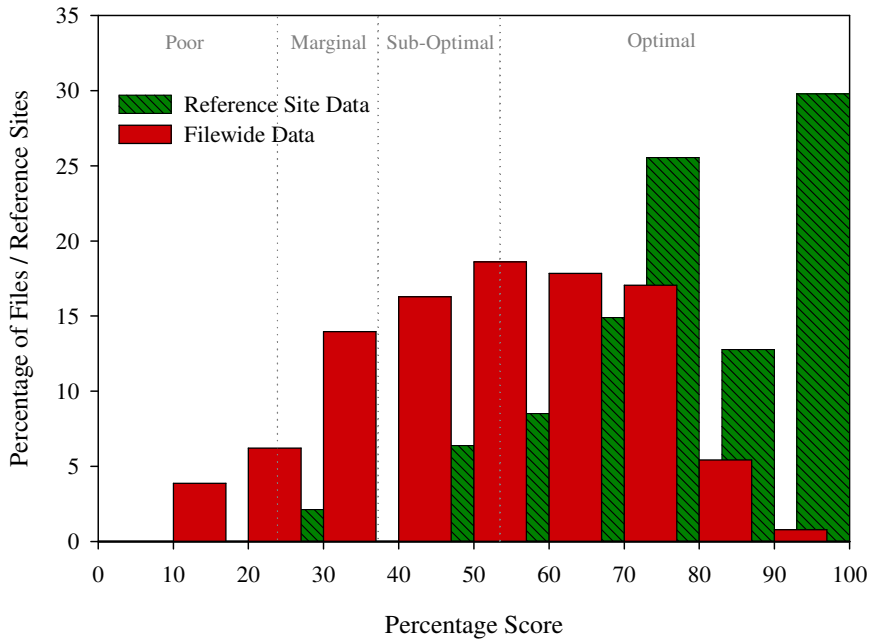
## Landscape Context



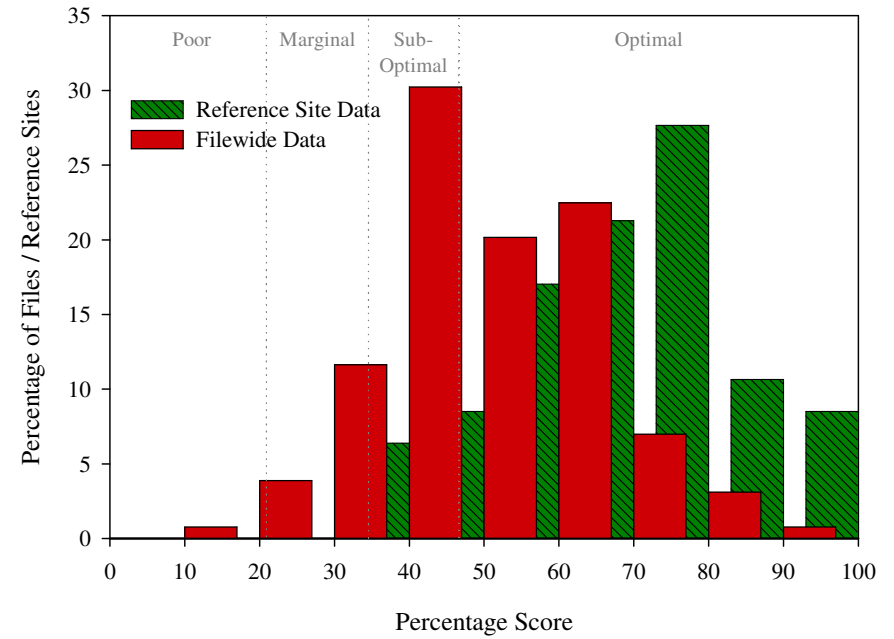
## Hydrology



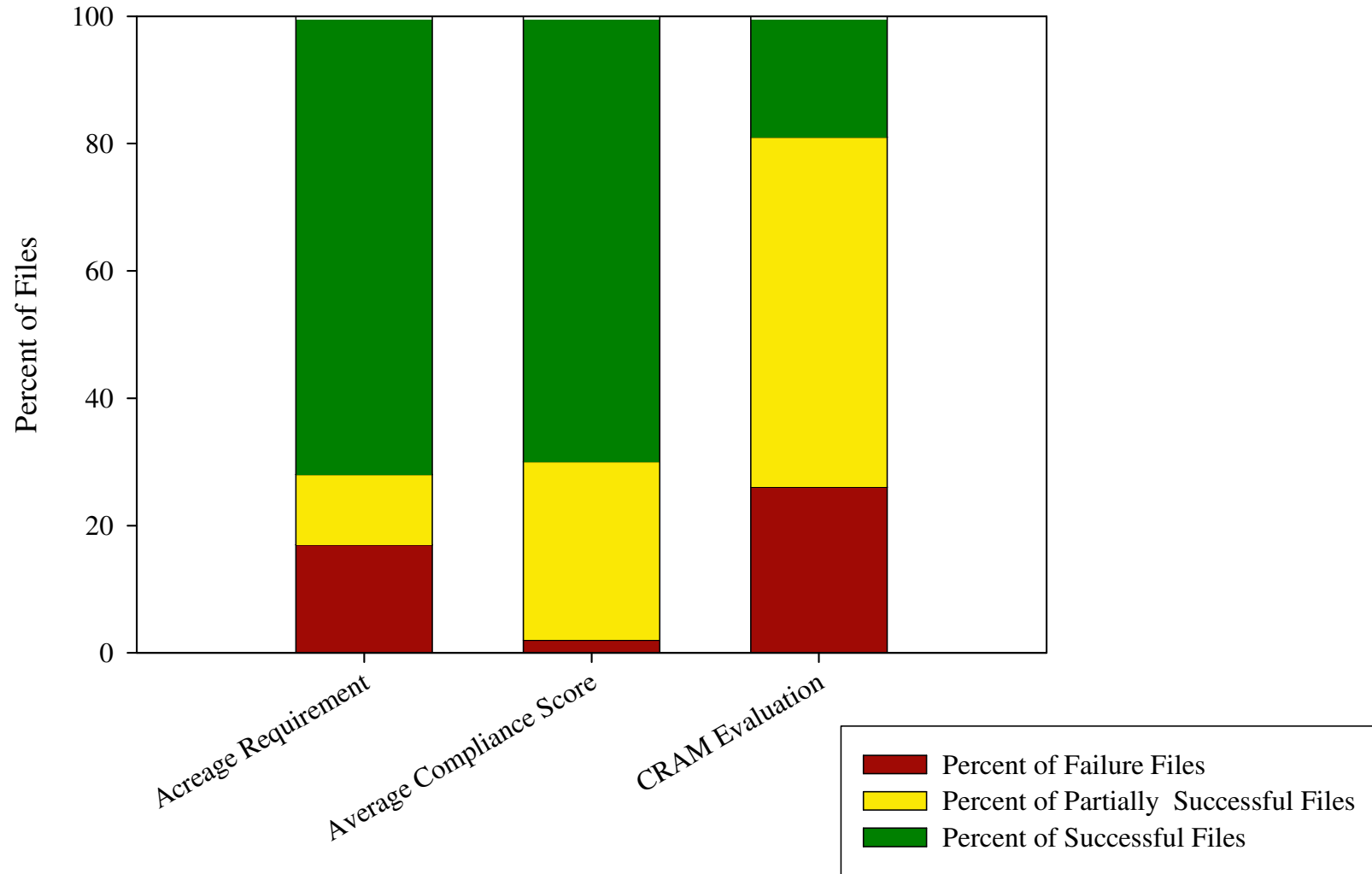
## Physical Structure



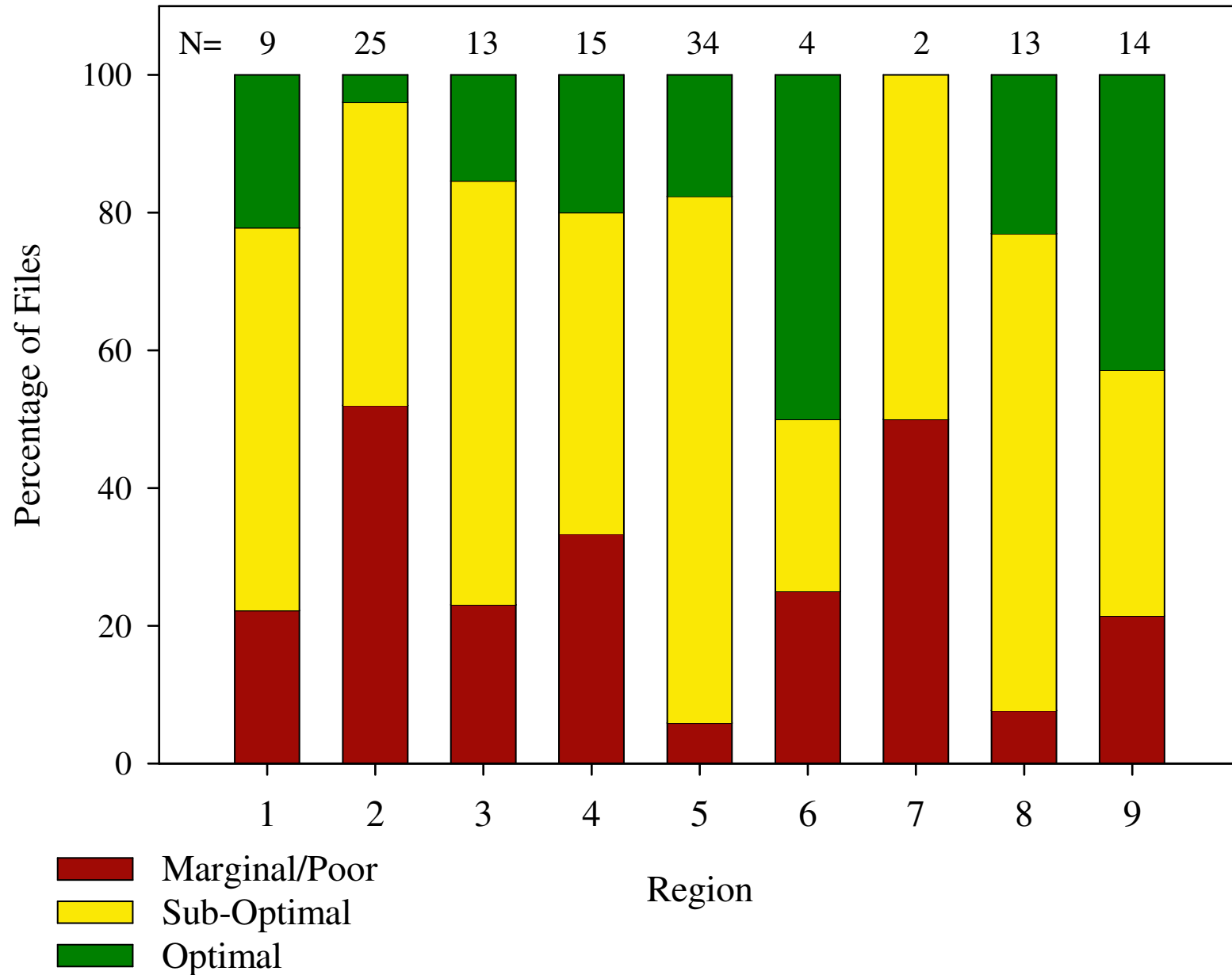
## Biotic Structure



# Mitigation Success Summary



# Regional differences in Mitigation Site conditions



# Summary

- Compliance was relatively good
  - Average compliance score was 82%
  - However, only 27% of files fully complied with *all* conditions
  - Mitigation requirements have been sufficient to compensate for acreage of wetlands lost
- Ecological condition was generally poor
  - Only 19% of mitigation sites had optimal condition
  - Vegetation (the focus of most permits) scores were relatively high
  - Landscape context and hydrology were most different from reference sites

What would improve wetland mitigation success?

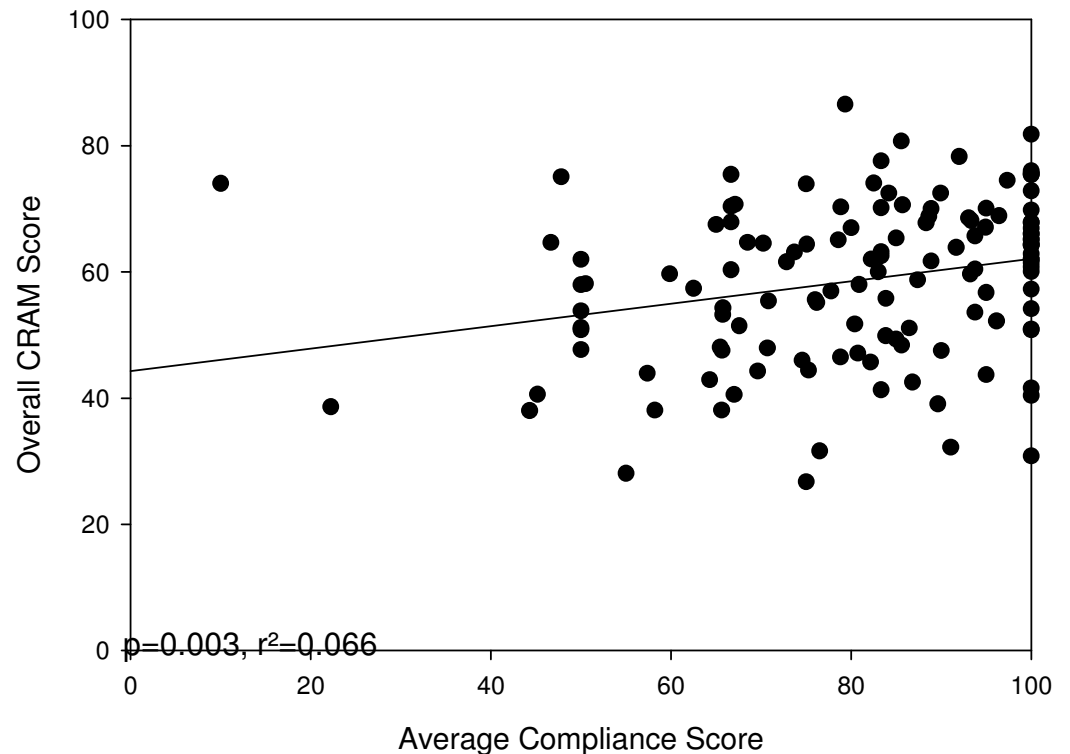
## Better Enforcement

- Compliance is rarely assessed – most sites never visited by regulatory agencies
- 5% of the files we reviewed had significant compliance problems (such as the impact occurring but no mitigation being undertaken)
- Overall, there appeared to be compliance issues with **42%** of the files we evaluated

# What would improve wetland mitigation success?

## Better Performance Standards

- Permittees are, for the most part, meeting their mitigation obligations
- Compliance with permit conditions only loosely related to wetland performance



► Performance standards are not leading to success

What would improve wetland mitigation success?

## Better Performance Standards

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  - Past focus has been on vegetation and invasive plants

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  - More attention to hydrological and biogeochemical processes
  - More attention to landscape context, since wetlands make important linkages to other habitats



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## Better Performance Standards

- Better performance standards require more focus on all wetland functions and services
  - Past focus has been on vegetation and invasive plants
  - More attention to hydrological and biogeochemical processes
  - More attention to landscape context, since wetlands make important linkages to other habitats
- More explicit links between lost habitats, functions and services, and the mitigation requirements

# Recommendations

- Improving mitigation requirements: 5
- Information management: 3
- Improve permit clarity: 6
- Assessment of “no net loss”: 1
- Coordination with other agencies: 2

	Improving mitigation requirements	Information management	Improve permit clarity	Assessment of “no net loss”	Coordination with other agencies
Permit conditions should ensure complete compensation for the full suite of wetland functions and services lost	X				
Ensure that mitigation projects compensate for losses in water quality (pollution) improvement services	X				
There should be a better accounting of the habitat types lost and gained	X				
Mitigation projects should have appropriate landscape context	X				
Offsite mitigation should be within the same catchment, or at least the same watershed	X				
Improvements to Database		X			
Improve permit archiving		X			
Improve tracking the progress of mitigation projects		X			
Important permit information should be clearly delineated in tables			X		
Permit conditions should be written so that the extent of efforts must match the intent of the condition to be in compliance			X		
Every mitigation plan and permit should include a table of requirements upon which compliance will be judged			X		
Permits should be clear about the meaning of enhancement, restoration and creation			X		
Performance standards should be clear about the goal of invasive species control			X		
Proof of inundation or saturation appropriate for wetland development should be required for mitigation wetlands			X		
Pre- and post-construction functional assessments of impact and mitigation sites should be required				X	
Improve incorporation of final permit information into Water Board files					X
Consider developing an integrated permit					X

# Recommendations

	Improving mitigation requirements	Information management	Improve permit clarity	Assessment of "no net loss"	Coordination with other agencies
Requiring CRAM and BMI on relevant projects (although these do not capture all important ecosystem elements)	Permit conditions should ensure complete compensation for the full suite of wetland functions and services lost	X			
	Ensure that mitigation projects compensate for losses in water quality (pollution) improvement services	X			
	There should be a better accounting of the habitat types lost and gained	X			
	Mitigation projects should have appropriate landscape context	X			
	Offsite mitigation should be within the same catchment, or at least the same watershed	X			
Using State Electronic Content Management (ECM) system and EcoAtlas (but still not complete)	Improvements to Database		X		
	Improve permit archiving		X		
	Improve tracking the progress of mitigation projects		X		
Improved mitigation plans with clear description of success criteria (incl CRAM targets), enhancement vs. creation, clear goals of invasive species control	Important permit information should be clearly delineated in tables		X		
	Permit conditions should be written so that the extent of efforts must match the intent of the condition to be in compliance		X		
	Every mitigation plan and permit should include a table of requirements upon which compliance will be judged		X		
	Permits should be clear about the meaning of enhancement, restoration and creation		X		
	Performance standards should be clear about the goal of invasive species control		X		
Pre- and post- construction CRAM assessment being required for mitigation site	Proof of inundation or saturation appropriate for wetland development should be required for mitigation wetlands		X		
	Pre- and post-construction functional assessments of impact and mitigation sites should be required			X	
Regional Board staff is working closely with Corps and CDFW	Improve incorporation of final permit information into Water Board files				X
	Consider developing an integrated permit				X

# Wetlands Compensatory Mitigation Rule

- Emphasizes that the process of selecting a **location** for compensation sites should be driven by assessments of watershed needs and how specific wetland restoration and protection projects can best address those needs;
- Requires **measurable and enforceable ecological performance standards** for all types of compensation so that project success can be evaluated;
- Requires **regular monitoring** to document that compensation sites achieve ecological performance standards;
- Clearly specifies the components of a complete **compensation plan based on the principles of aquatic ecosystem science**; and
- Emphasizes the use of **science-based assessment procedures** to evaluate the extent of potential water resource impacts and the success of compensation measures.

# The value of independent science-based monitoring

- Agency resources are too limited to assess compliance for most projects
  - Limited ability for field assessments
- Consulting companies can conduct required mitigation monitoring but need to be responsive to their clients (the permittees)
- Monitoring by an independent group could provide an objective assessment of compliance and ecological condition
  - Could simultaneously assess conditions for multiple agencies

# Conclusions

- It *is* possible to replace wetland acreage, BUT...
- It is difficult (although not impossible) to create a wetland that functions like a natural wetland, and
- The regulatory procedures must be improved before wetland mitigation can achieve the goal of no net loss of wetland acreage and function
  - Permit conditions should focus on the replacement of lost wetland functions and services
  - There should be an explicit link between the functions and services lost and those to be gained through mitigation



Report to the State Water Board is available at:

[http://www.waterboards.ca.gov/water\\_issues/programs/cwa401/docs/mitigation\\_finalreport\\_wo\\_app081307.pdf](http://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/mitigation_finalreport_wo_app081307.pdf)