

Session V: Monitoring & Performance Standards

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In-Lieu Fee Program Training
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US Army Corps of Engineers
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Session Objectives

- Types of performance standards
- Enforceable performance standards
 - EPA Level 1, 2, 3 Framework
 - Reference sites
- Monitoring
- Monitoring Reports
- Los Angeles District tools
- Discussion and Questions



Types of Performance Standards

- Administrative measures
- Adaptive management measures
- Ecological performance standards



Administrative Measures

- Responsibility
- Financial assurances
- Site protection
- Construction, Monitoring & Maintenance
- Long-term management & maintenance

PERFORMANCE BOND		DATE BOND EXECUTED (Must be same or later than date of permit)		
PRINCIPAL (Legal name and business address)		Surety(s) (Legal name(s) and business address(es))		
TYPE OF ORGANIZATION (Check one) <input type="checkbox"/> Individual <input type="checkbox"/> Joint Venture <input type="checkbox"/> Partnership <input type="checkbox"/> Corporation		PENAL SUM OF BOND Millions Thousands Hundreds Cents		
STATE OF INCORPORATION		PERMIT DATE	PERMIT NO.	

OBIGATION:
We, the Principal and Surety(ies) hereto, are jointly bound as Obligors to the U.S. Army Corps of Engineers (hereinafter called the Oblige) in the above penal sum. For the payment of the penal sum, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally. However, when the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves to such sum "jointly and severally" as well as "severally" only for the purpose of allowing a part action or actions against any or all of us. For all other purposes, each Surety shall be bound jointly and severally with the Principal, for the payment of the sum shown opposite the name of the Surety. The limit of liability shall be the full amount of the penal sum.

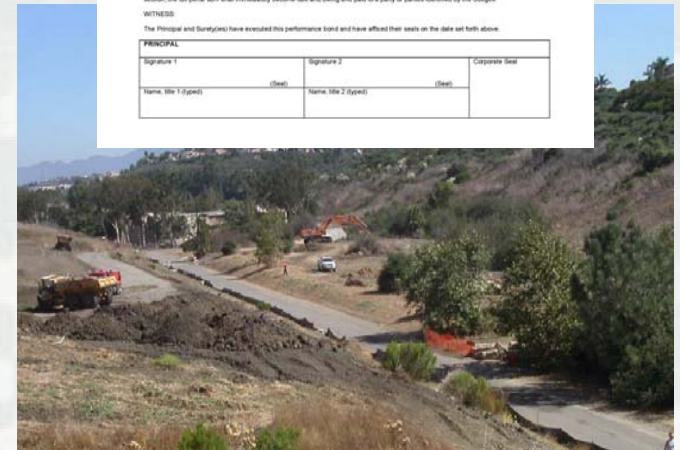
CONDITIONS:
The Principal received the permit identified above.

HEREBY:
The above obligation is void if the Principal --
(a) Performs and fulfills all of the undertakings, covenants, terms, conditions and agreements of the permit during the original term of the permit and any extensions thereof that may be granted by the Oblige, with or without notice to the Surety(ies); and during the life of any guaranty required under the permit, and;
(b) Also performs and fulfills all of the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of the permit that may hereafter be made. Notice of those modifications to the Surety(ies) are waived.

IT IS FURTHER EXPRESSLY PROVIDED THAT:
The Oblige shall have the final authority to determine whether the Principal and Surety(ies) have performed and fulfilled some or all of the undertakings, covenants, terms, conditions and agreements of the permit.
Within thirty (30) days of receiving notice from the Oblige that the Principal has defaulted on some or all of the undertakings, covenants, terms, conditions and agreements of the permit, the Surety(ies) shall either --
(a) Remedy the default of the Principal to the full satisfaction of the Oblige by a certain date determined by the Oblige; or --
(b) Immediately tender to a party or parties identified by the Oblige the portion of the penal sum that the Oblige determines is necessary to remedy the default.
In the event that the Surety(ies) fails to respond to the Oblige's notice of default as to (a) or (b) above of this section, the full penal sum shall immediately become due and owing and paid to a party or parties identified by the Oblige.

WITNESS:
The Principal and Surety(ies) have executed this performance bond and have affixed their seals on the date set forth above.

PRINCIPAL		
Signature 1	Signature 2	Corporate Seal
Name, title 1 (typed)	Name, title 2 (typed)	



Adaptive Management

Why?

- Learn from success/failure
- Increased sustainability & reduces uncertainty

How?

Plan, including contingencies

Monitor (at every stage)

Analyze outcomes

Adapt (at every stage)

Incorporate results into future actions!



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Ecological Performance Standards

LA Draft Definition:

Observable or measurable physical (including hydrological), chemical and/or biological attributes that are used to determine if a compensatory mitigation project meets its objectives.

Must be based on:

- Attributes that are objective and verifiable
- The best available science that can be measured in a **practicable** manner



Ecological Performance Standards

- Measure structure, function or community development trajectory
- May be based on:
 - Variables or measures of “functional capacity” or condition
 - Measurements of hydrology or soil development
 - Comparisons to reference wetlands



Measures of Structure

- **Description:** size, landscape position, wetland classification (HGM, Cowardin, Rosgen)
- **Hydrology:** depth, duration, physical patch types as indicators of surface flows
- **Soils:** texture, color/hydric, structure
- **Vegetation:** dominants, species composition, structure
- **Stream:** morphology (sinuosity, cross section, bankfull width), particle size



Measures of Function or Condition

Indicators of functions or community condition:

Rapid Assessments

- HGM
- CRAM

Intensive Assessments:

Index of Biotic Integrity (IBI)

- Vegetation
- Birds
- Macroinvertebrates or Algae



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Enforceable Performance Standards

A performance standard is enforceable if:

- The responsible party can be made to comply
- Likely to be upheld in court
- Simple, clear, unambiguous, and precise



Enforceable performance standards

Steps for Developing an enforceable performance standard:

- Goal for the Project: Statement of intended outcome

- Objective: Specific elements, functions, or services to be provided by the project and features that are critical to establishment of the desired outcome

- Each Performance standard should identify:
 - Attribute to be achieved
 - Condition or level that defines success
 - Period of time for success



Enforceable performance standards

- Must focus on a measurable outcome
not completion of an action

- Must include clear
measures:
Qualitative or
Quantitative

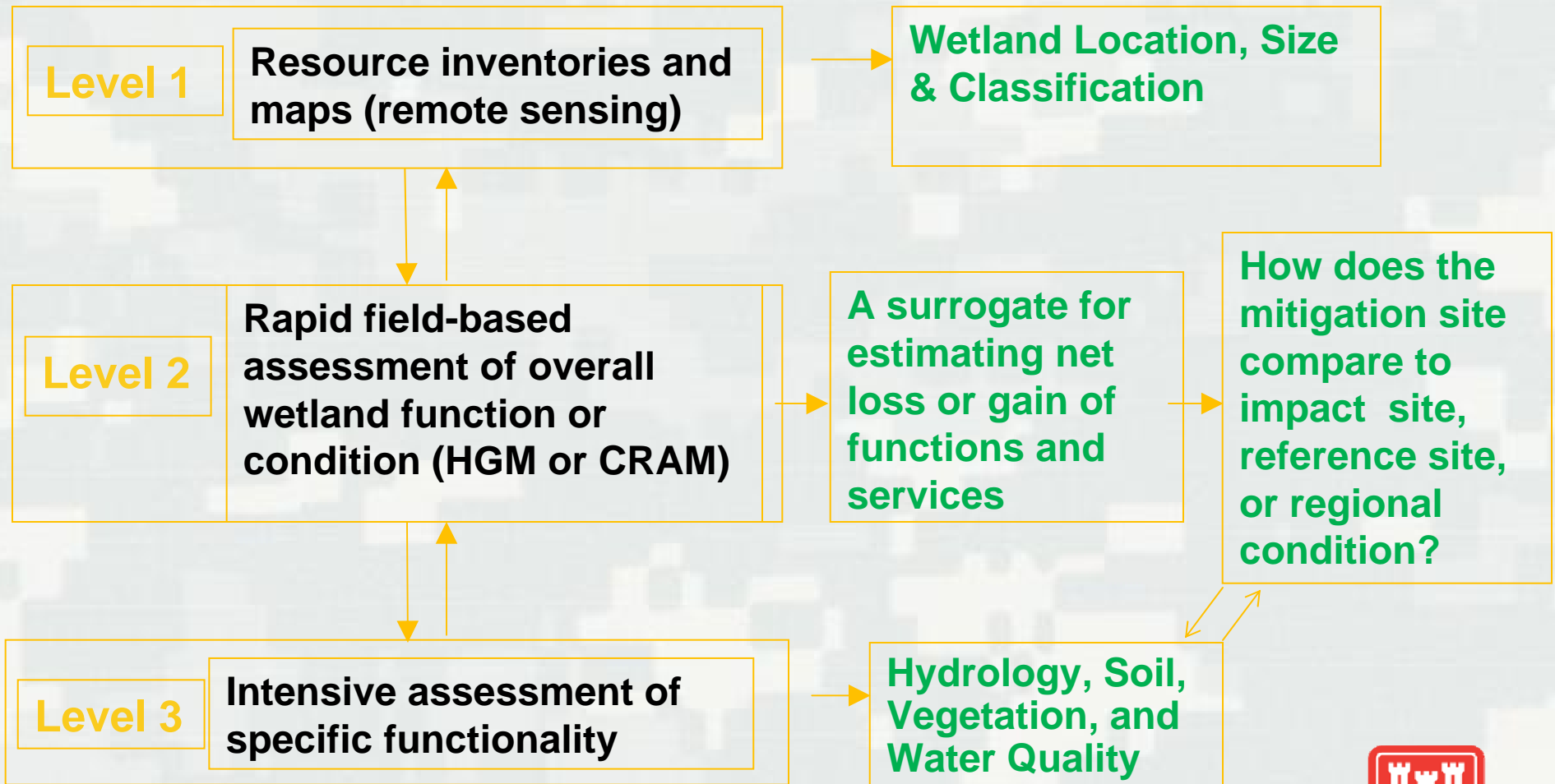


Enforceable?

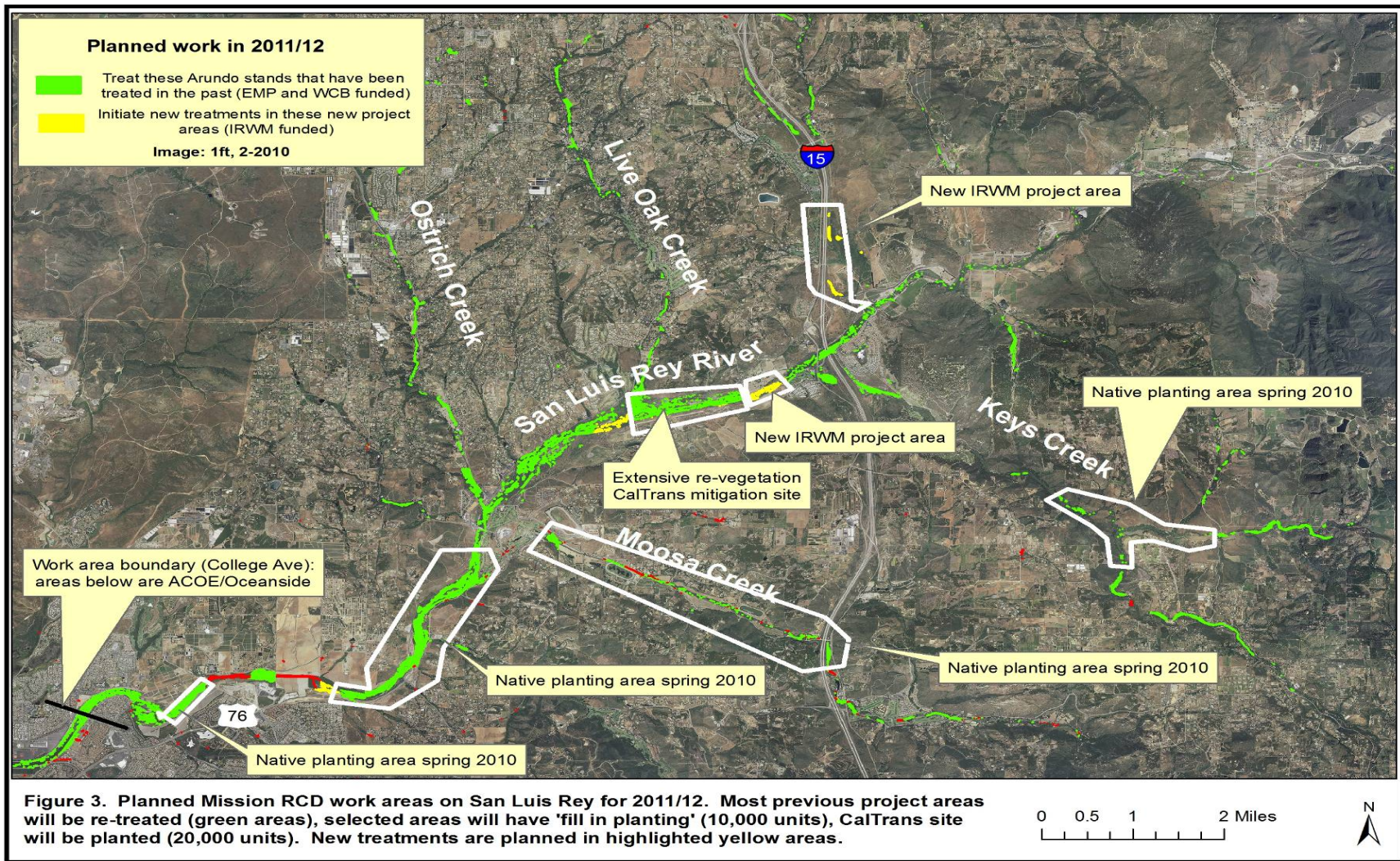
- Control invasive plant species
- Water at or within 12" of surface for 30 days
- Stream banks shall be stable



Ecological Performance Standards & EPA 3-Level Approach to Monitoring



Level 1 Monitoring

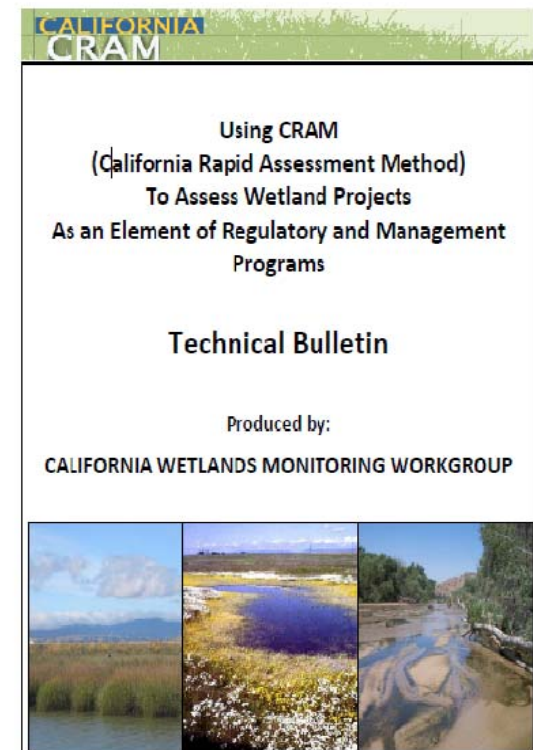


Level 1 Monitoring



Level 2: Appropriate Uses of CRAM (Technical Bulletin – CRAMWetlands.org)

- CRAM is designed to evaluate the ecological condition of a wetland in terms of its ability to support characteristic plants and animals. Human use values cannot be appropriately assessed using CRAM.
- Evaluation of pre project conditions at mitigation sites
- Assessment of mitigation compliance as function/condition-based performance criteria (along with Level 1 and 3 measures)
- Comparison of alternatives



Level 2 Monitoring (Performance Standards – CRAM Metrics)

The wetland restoration site must meet or exceed the CRAM target scores for individual metrics by Year 3 and Year 5 as provided in Table 3.

**Table 3
CRAM DATA SUMMARY**

CRAM Attributes	METRICS	BASELINE SCORES			TARGET SCORES	
		Impact Site/ Pre-Rest ¹	Post-Rest ² (Baseline)	Reference Site	Year 3	Year 5
Buffer and Landscape Context	Landscape Connectivity	12		3	12	12
	Buffer Sub-metrics:					
	- Percent of Assessment Area with	3		12	12	12
	- Average Buffer Width	3		3	3	3
	- Buffer Condition	3		9	9	12
	Attribute Score (Raw/Final)	15/63		10/42	19/79	20/83
Hydrology	Water Source	6		6	6	6
	Hydroperiod or Channel Stability	12		9	9	12
	Hydrologic Connectivity	9		12	9	12
	Attribute Score (Raw/Final)	27/75		27/75	27/75	30/83
Physical	Structural Patch Richness	9		9	9	9
	Topographic Complexity	3		6	6	6
	Attribute Score (Raw/Final)	12/50		15/63	15/63	15/63
Structure	Plant Community Sub-metrics:					
	- Number of Plant Layers	9		9	6	9
	- Number of Co-dominant Species	3		6	3	6
	- Percent Invasion	3		3	12	12
	Horizontal Interspersion and Zonation	6		6	6	6
	Vertical Biotic Structure	3		9	3	9
	Attribute Score (Raw/Final)	14/39		21/58	16/44	24/67
Overall AA Score		57		60	65	74



Level 2 Monitoring (Performance Standards – HGM Scores)

Table 9: Post-Restoration HGM Variable Index Scores for the Sulphur Creek Ecosystem Restoration Project

Variable	Baseline Consensus 2002	Post-Construction 2008	Maximum Variable Scores (Year 10)
contig	0.5	0.5	0.5
subin	0.235	0.25	0.25
fpa	0.67	0.75	0.75
topo	0.5	0.5	1
surfcon	0.53	0.5	0.75
surwat	0.25	0.5	1
pore	0.36	0.1	0.5
organ	0.345	0.5	1
sed	0.22	0.25	0.25
trees	0.37	0.5	1.0
sap	0.1	0.1	0.75
shrub	0.24	0.25	1
ratio	0.7	0.5	1
cwd	0.23	0.25	0.75
fwd	0.455	0.5	0.75
decay	0.195	0.25	1
litter	0.545	0.5	1
agedist	0.75	0.75	1
invert	0.75	0.75	1
vert	0.75	0.75	1

Table 10. Functional Capacity Indices Scores for Restoration Site and Projected Scores

Variable	Pre-Construction Baseline 2002	Post-Construction Baseline 2008	Projected Scores with Restoration		
			Year 1	Year 5	Year 10
HYDROLOGIC FUNCTIONS					
Maintenance of Characteristic Channel Dynamics	0.38	0.43	0.46	0.58	0.64
Dynamic Surface Water Storage and Energy Dissipation	0.35	0.39	0.60	0.71	0.88
Long-term Surface Water Storage	0.47	0.56	0.79	0.81	0.75
Dynamic Subsurface Water Storage	0.42	0.37	0.58	0.63	0.50
BIOGEOCHEMICAL FUNCTIONS					
Nutrient Cycling	0.24	0.28	0.27	0.53	0.92
<i>(NOTE: Use lowest index score as the limiting factor)</i>	0.39	0.44	0.27	0.53	0.91
Detention of Imported Elements and Compounds	0.32	0.40	0.59	0.74	0.81
Detention of Particulates	0.33	0.37	0.53	0.64	0.79
Organic Carbon Export	0.38	0.39	0.52	0.67	0.72
HABITAT FUNCTIONS					
Maintain Characteristic Plant Community	0.43	0.42	0.67	0.80	0.95
Maintain Characteristic Detrital Biomass	0.40	0.42	0.25	0.54	0.88
Maintain Spatial Structure of Habitat	0.38	0.42	0.51	0.70	0.92
Maintain Habitat Interspersion and Connectivity	0.49	0.55	0.85	0.90	0.80
Maintain Characteristic Invertebrate Diversity	0.75	0.75	0.75	1.00	1.00
Maintain Characteristic Vertebrate Diversity	0.75	0.75	0.75	1.00	1.00



Level 3 Monitoring Examples

Vegetation

- Percent absolute cover of native species must be 80 percent or higher across wetland restoration site by Year 5.
- Five (5) percent or less annual non-native species cover for two (2) years prior to Corps Regulatory Division release of the mitigation site.
- No individuals (i.e., zero percent cover) of perennial weeds are permitted for two (2) years prior to Corps Regulatory Division release the mitigation site, including, at a minimum, giant cane (*Arundo donax*), salt cedar (*Tamarix* spp.), castor bean (*Ricinus communis*), pampas grass (*Cortaderia* spp.), tree tobacco (*Nicotiana glauca*), cocklebur (*Xanthium strumarium*), and gum tree (*Eucalyptus* spp.).



Level 3 Monitoring Examples

Hydrology

- Water on the surface of the wetland for 30 or more consecutive days between December and April under typical precipitation conditions (2 out of 5 years).
- The “active floodplain” will exhibit evidence of overbanking, sediment deposition, and other indicators of Ordinary High Water Mark (OHWM) as defined in the Corps’ *A Field Guide to the Identification of OHWM in the Arid West Region of the Western U.S.* (August 2008).

Soils

- The mitigation site must meet the hydric soil criteria required by the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* through hydric soil development as indicated by USDA NRCS hydric soil characteristics appropriate for the region.



Monitoring

- Necessary detail to evaluate performance standards

- Overall Monitoring Structure

Qualitative Visits (Quarterly)

Photo Monitoring (Annually)

Vegetation Transects (Annually)

Vegetation Community Mapping (0, 3, 5 years)

Jurisdictional Delineation (0, 3, 5 years)

HGM (0, 3, 5)

CRAM (0, 3, 5)



- Monitoring methods should include quantitative sampling methods following established, scientific protocols (e.g.,

California Native Plant Society protocols:

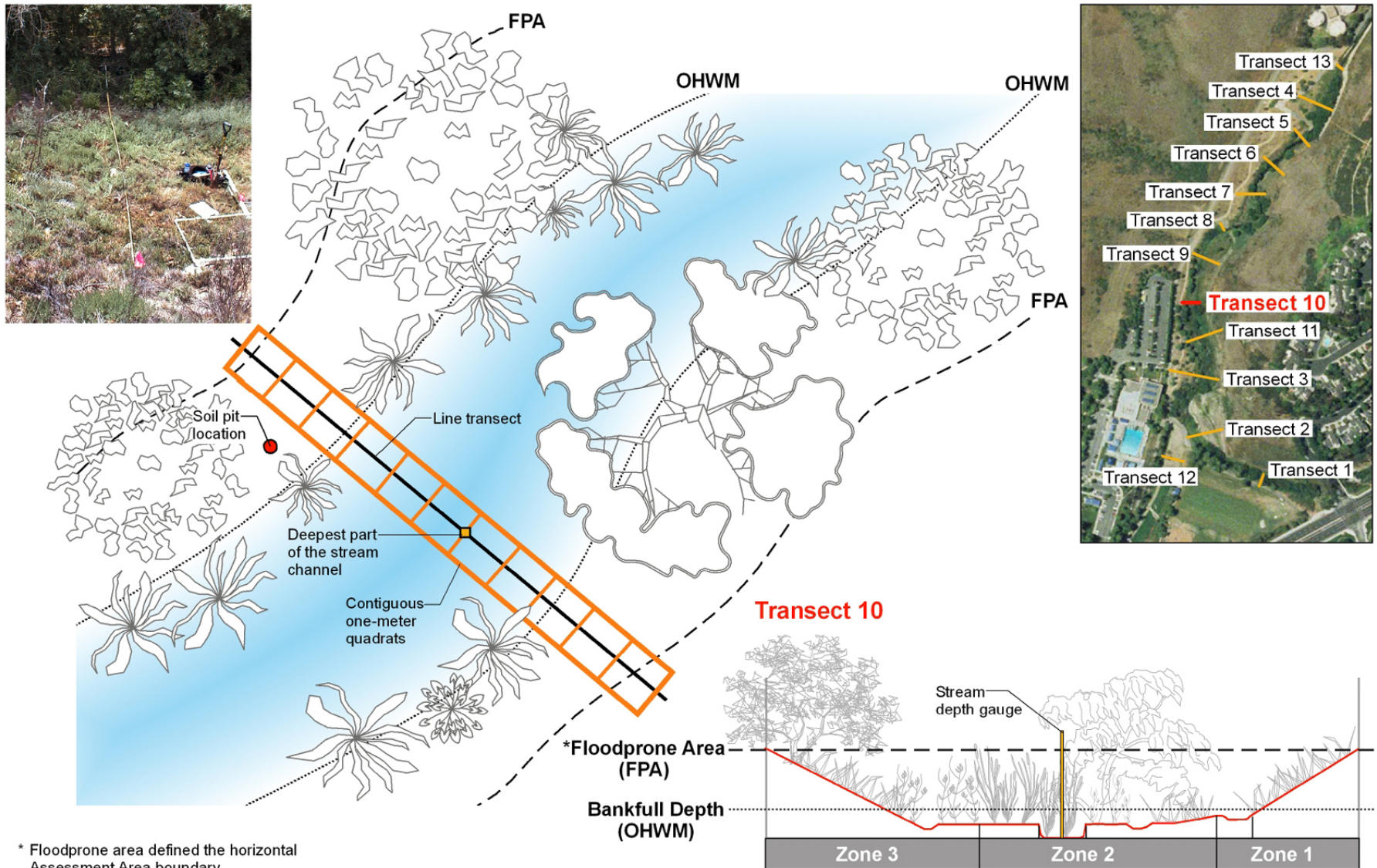
http://www.cnps.org/cnps/vegetation/pdf/cnps_releve_protocol_20070823.pdf; also see the 1987 Wetland Delineation Manual).



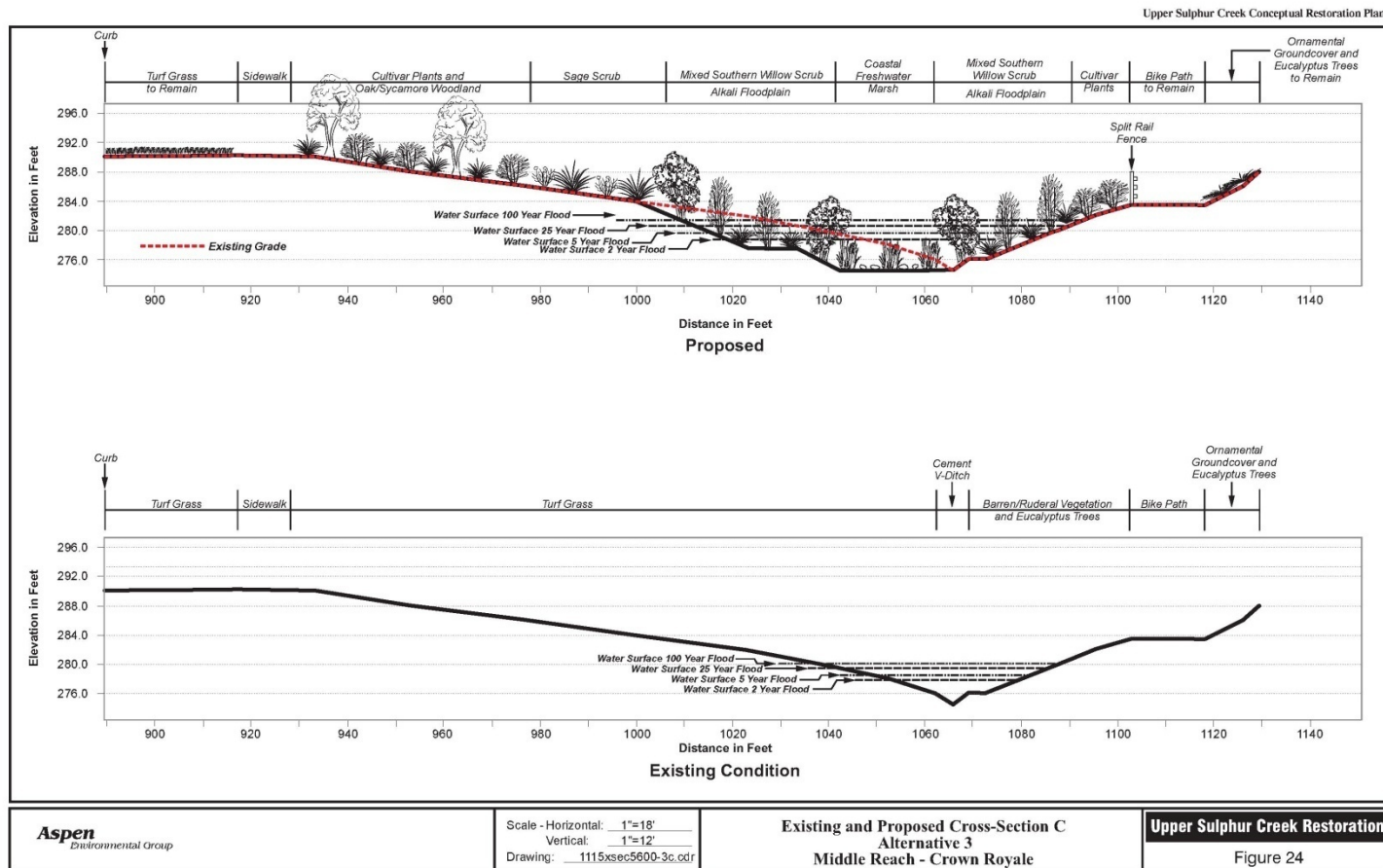
Photo Monitoring



Field Data Collection



Field Data Collection



Monitoring Reports

- Content and detail commensurate with the scale and scope of the mitigation project
- Post-Construction Baseline Memorandum:
 - Following 60-120-day “plant establishment period”
 - Construction summary, including adaptive management; locations of permanent photo monitoring stations and photos of pre- and post-construction conditions, transects, soil pits and hydrologic monitoring tools (peizometers, etc.), post-construction level-2 “baseline” (establishment sites), schedule for future monitoring.
- 2004 Guidelines & RGL O8-03: Short and Sweet!
 - Annual Reports: Concise and Narrative <10 pagesInformation on site conditions, monitoring methods and timing, performance standards, recommendations, and schedule for adaptive management. Data sheets and photo monitoring logs as attachments.



LA District Tools

Existing Guidance Documents:

- LA District 2004 Mitigation Guidelines & Monitoring Requirements
- RGL 08-03 (Minimum Monitoring Requirements)
((many great references in the program that aren't LA Dist))

Anticipated SPD 2011 Guidance Documents:

- Mitigation and Monitoring Guidelines
- Mitigation Ratio Checklist
- Performance Standards
- Monitoring Form



Questions?



7/17/06