

Attachment A

CALFED Bay-Delta Program

Agency Performance Measures Committee

Data Collection Profile Sheets

Water Quality Subgroup
Water Supply Reliability Subgroup
Levee System Integrity Subgroup
Ecosystem Restoration Subgroup

May 14, 2008

Water Quality Subgroup

The following pages provide draft data collection profile forms for each of the following water quality performance measures:

- **Performance Measure 1:** Organic carbon levels at Delta intakes
 - ✓ **Metric 1:** Annual averages
 - ✓ **Target 1:** 3.0mg/L total organic carbon

- **Performance Measure 2:** Bromide levels at Delta intakes
 - ✓ **Metric 1:** Annual averages
 - ✓ **Target 1:** 50µg/L bromide

- **Performance Measure 3:** Mercury concentrations in the tissue of representative Bay-Delta fish and wildlife species⁽¹⁾
 - ✓ **Metric 1:** TMDL levels in the muscle tissue of trophic level 3 and 4 fish
 - ✓ **Target 1:** 0.07 mg methylmercury/kg in trophic level 3 fish (150-500 mm total length)
 - ✓ **Target 2:** 0.24 mg methylmercury/kg in trophic level 4 fish
 - ✓ **Target 3:** 0.03 mg methylmercury/kg wet weight in less than 50 mm in length

¹ For more specific information on these performance measures, please refer to the CALFED Bay-Delta Program Phase 1 Performance Measures Final Report, dated October 23, 2007.

Performance Measures Phase 2 Data Collection Profile

CALFED Objective:

Water Quality

Performance Measure:

Organic carbon concentrations at drinking water intakes

1. Metric

Organic carbon concentration

2. Conceptual Model

Source:

**Central Valley Drinking Water Policy
Delta Regional Ecosystem Restoration Implementation
Plan (DRERIP)**

Status:

The CM for drinking water is complete as of April 2006. Analytical modeling is scheduled in 2008. The DRERIP organic carbon model describing the ecosystem needs is in draft form. The schedule for finalizing the document is unknown.

3. Available Data

<i>Time Period:</i>	1990 to present
<i>Geospatial Extent:</i>	Delta drinking water intakes and Delta boundary conditions are well-characterized. Data on upstream sources is needed.
<i>Data issues/dependencies:</i>	Analytical method used must be evaluated. TOC measured most often, however, analytical modeling is more robust using DOC concentrations.
<i>Contact Names:</i>	Sam Harader, CBDA; Karen Larsen, RWQCB; Cindy Messer, DWR

4. Analysis

<i>Type of Analysis Done or Required:</i>	Box plots, time series plots, and fingerprint analyses completed for CALFED Drinking Water Program's Stage 1 final assessment.
<i>Steps Needed to Complete Analysis:</i>	None
<i>Years of Analysis Complete?</i>	Through June 2006
<i>By Whom?</i>	CALFED

5. Reporting

<i>Status and Trends Complete?</i>	Status complete.
<i>Format for Reporting:</i>	
<i>Confounding Factors:</i>	Trends not easily evaluated due to dependence on hydrology and water project operations.

6. Issues/Dependencies

Describe:

This PM focuses on drinking water quality issues related to organic carbon. In addition, available data will restrict initial reporting to Delta intakes and boundary conditions. Additional analyses of upstream sources is needed. There is also need to analyze ecosystem issues related to organic carbon.

7. Recommended Approach

Describe:

Utilize analyses in final assessment report to develop pilot performance measures for organic carbon at Delta drinking water intakes and the Delta boundary conditions (i.e., Sacramento River at Hood and San Joaquin River at Vernalis). Review DRERIP CM to identify which ecosystem measures may be appropriate for initial reporting.

8. Action Items

Action:

Who:

Review final assessment report to develop pilot organic carbon PMs	Water Quality Subgroup
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Performance Measures Phase 2 Data Collection Profile

CALFED Objective:

Water Quality

Performance Measure:

Reduce production of disinfection byproducts in treatment plants using Delta water as a source.

1. Metric

Bromide concentration at Drinking Water Intakes

2. Target

Average bromide concentration of <50ug/L at Delta drinking water intakes.

3. Conceptual Model

Source:

Salinity Conceptual Model for the Central Valley Drinking Water Policy

Status:

Complete

4. Available Data	
<i>Time Period:</i>	1990 - present
<i>Geospatial Extent:</i>	SWP intakes are well characterized, others less so, River inputs to Delta also fairly well characterized
<i>Data issues/dependencies:</i>	For a given location, EC-Br correlation is good, Cl-Br relationship is even better, detection limits are a bit high
<i>Contact Names:</i>	Sam Harader, CALFED; Karen Larsen, RWQCB

5. Analysis	
<i>Type of Analysis Done or Required:</i>	See CALFED Drinking Water Quality Program Final Assessment Report (FAR) - box plots, time series, trend analyses, and relationships to EC, DOC, and Cl, seasonal and hydrologic year type effects also analyzed
<i>Steps Needed to Complete Analysis:</i>	Extract and compile bromide information from the Final Assessment Report, write introductory text and a summary of findings.
<i>Years of Analysis Complete?</i>	1990-2007 for major intakes and rivers
<i>By Whom?</i>	CALFED WQ Program, Patricia Fernandez

6. Reporting	
<i>Status and Trends Complete?</i>	Yes, status and trends analysis in the FAR
<i>Format for Reporting:</i>	FAR analysis methods and charts

<i>Confounding Factors:</i>	Trends not easily evaluated due to dependence on hydrology and water project operations.
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7. Issues/Dependencies

Describe: The conceptual model hypothesizes that nearly all bromide is directly or indirectly from seawater. This is borne out by the geographic distribution, modeling, and strong correlation to chloride concentration. More hydrologic dependence than many pollutants because of seawater source.

8. Recommended Approach

Describe: Measure bromide at intakes using recently installed analyzers at Banks and Vernalis. Utilize data from ongoing DWR monitoring.

9. Action Items

<i>Action:</i>	<i>Who:</i>
Determine if there is adequate data to hand off to the Science Program.	CALFED staff (Program Performance and W/Q Program)

10. Notes

Historical data was from grab samples taken approximately monthly. Recently installation of continuous anion analyzers at Banks and Vernalis provide near real time data at 45 minute intervals. DWR can also model bromide concentrations including fingerprinting.

Performance Measures Phase 2 Data Collection Profile

CALFED Objective: Water Quality

Performance Measure: Methylmercury in fish tissue

1. Metric

0.24 mg/kg methyl mercury in TL4 fish, 0.08 mg/kg methyl mercury in TL3 fish (150-500 mm total length),

2. Conceptual Model

<i>Source:</i>	DRERIP Mercury Conceptual Model
<i>Status:</i>	in progress

3. Available Data

<i>Time Period:</i>	Fish tissue has been monitored since the '70s in the Delta
<i>Geospatial Extent:</i>	Delta and major tributaries
<i>Data issues/dependencies:</i>	
<i>Contact Names:</i>	Patrick Morris, CVRWQCB

4. Analysis

<i>Type of Analysis Done or Required:</i>	Draft Delta methylmercury TMDL
<i>Steps Needed to Complete Analysis:</i>	Currently addressing peer review
<i>Years of Analysis Complete?</i>	1969-2002
<i>By Whom?</i>	Regional Water Board staff

5. Reporting

<i>Status and Trends Complete?</i>	yes
<i>Format for Reporting:</i>	Draft Delta methylmercury TMDL
<i>Confounding Factors:</i>	

6. Issues/Dependencies

Describe: TMDL is still under review and has not been adopted

7. Recommended Approach

Describe: Review draft TMDL staff report to determine locations for and most appropriate method of reporting.

8. Action Items

Action:

Who:

Review TMDL analysis	Water Quality Subgroup - Mercury experts
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9. Notes

Water Supply Reliability Subgroup

The following pages provide draft data collection profile forms, for each of the following Water Supply Reliability performance measures:

- **Performance Measure 1:** The annual number of incidences when water quality standards, flow requirements, or other agreements related to SWP operations throughout the Delta are not met.
 - ✓ **Target 1:** Zero incidences of not meeting water quality and flow requirements, or other agreements throughout the Delta related to SWP operations.

- **Performance Measure 2:** Acre-feet of unexpected reductions in SWP water supplies due to Delta export reductions to meet Endangered Species Act requirements or actions taken to protect at-risk Delta fish species during the current year.
 - ✓ **Target 2:** Zero unexpected reductions in SWP water supplies.

- **Performance Measure 3:** Acre-feet of water delivered in a water year with a description of the conditions during the water year for each delivery (e.g. above average snowpack, salinity problems in Delta during July, etc.) This would be compared to a long-term delivery capability estimate for the same type of water year.
 - ✓ **Target 3:** Actual annual deliveries within one standard deviation of the long term statistical mean for a given water year type

¹ For more specific information on these performance measures, please refer to the CALFED Bay-Delta Program Phase 1 Performance Measures Final Report, dated October 23, 2007.

Water Supply Reliability – Performance Measures, Phase 2 Data Collection Profile

CALFED Objective:	Water Supply Reliability
Performance Measure:	1
Reporting Complexity:	Moderate

1. Metric

Annual number of incidences when water quality standards, flow requirements, or other agreements related to SWP operations throughout the Delta are not met

2. Conceptual Model

<i>Source:</i>	See attached
<i>Status:</i>	Attached model in rough draft, based on preliminary discussions with Paul Marshall. Per action item below, Paul is tasked with review/finalization of the model

3. Available Data

	<p><u>Water Quality:</u> Phase 2 reporting will be based on SWP operations data reporting processes and data that is already in place. This helps to fully leverage existing efforts for effectiveness and efficiency. For Phase 2 reporting specifically, this will comprise the following:</p> <ul style="list-style-type: none"> • Will use 10-years historical data to develop baseline analysis, although many decades of data is available. 10-year data will provide a comparison of conditions pre and post-EWA. • Will report on established D-1641 standards – utilizing same data extracts, analysis and graphing. (Number of individual standards is to be determined). • Perhaps more simplified report format, however, including a single graph and supporting text for each standard. <p><u>Flow Requirements:</u> Again, this will be based on existing data/processes however additional modeling/analysis may be needed.</p> <ul style="list-style-type: none"> • Will use 10-years historical data to develop baseline analysis, although CDEC data goes back approx 40 years. • Will report on established export/inflow ratios, based on DWR’s calculated value (modeling) for flow requirements.
<i>Time Period:</i>	
<i>Geospatial Extent:</i>	Legal Delta

<i>Data issues/dependencies:</i>	No major data issues. Data and methods will match those already in place for current operations reporting. Some unique modeling may be needed for flow requirements, and this is currently under review (Paul Marshall). Source of data will be CDEC with extracts to MS-excel for analysis and graphing. DSM-II will be used for modeling.
<i>Contact Names:</i>	SWP Ops Planning; DWR District Offices; DWR WQ Office. DWR staff (Paul Marshall, Tracy Hinajosa, Joel Dudas (data contact from DFM), Andy Chu (data contact for CDEC data analysis))

4. Analysis	
<i>Type of Analysis Done or Required:</i>	<p>The following steps mirror processes already in place.</p> <ol style="list-style-type: none"> 1. Extract operations data from CDEC, representing water quality and E/I flow monitoring 2. Extract to WQ data to MS-Excel for comparative analysis to D-1641 standards and baseline. Generate graphs. 3. Load E/I flow data to DSM-II modeling tool for analysis, apply parameters and develop E/I model. 4. Extract E/I flow data to MS-Excel for charting and comparative analysis. 5. Consolidate charts to MS-Word document, and add narrative paragraph for each chart to elaborate on results.
<i>Years of Analysis Complete?</i>	Ten years for both W/Q and flow requirements.
<i>By Whom?</i>	DWR staff (Paul Marshall, Tracy Hinajosa, Joel Dudas (data contact from DFM), Andy Chu (data contact for CDEC data analysis))

5. Reporting	
<i>Status and Trends Complete?</i>	Flow requirements: the agencies look at performance in terms of "balanced conditions", where they are managing a system. Looking for trends doesn't really fit into this.
<i>Format for Reporting:</i>	One graph per standard and a supporting narrative paragraph explanation. Number of graphs is to be determined.
<i>Confounding Factors:</i>	Not centralized - Data collected by various offices throughout DWR. The SWP cannot be modified to change these variables.

6. Issues/Dependencies

Describe: **Issue:** This performance measure includes two different parameters that each require their own process for data collection and reporting. Should we break these down into two incidence-related performance measures for W/Q standards and flow requirements? This would make organizing the PM implementations efforts easier. Will discuss further with Paul Marshall and determine preferred approach.

7. Recommended Approach

Describe: Mirror current processes for analyzing and reporting on operational monitoring of WQ and E/I flow data. WQ reporting will likely be reported as a distinct, separate performance measure from E/I flow, however this requires further discussion with Paul Marshall.

8. Action Items

Action:

Who:

1. Provide PPT copies of existing WQ and flow performance reports (D-1641 and E/I standards).	Paul Marshall
2. Determine the exact number of D-1641 standards against which we should report in Phase 2.	Paul Marshall
3. Confer with agency peers to confirm analysis/reporting complexity and issues.	Paul Marshall
4. Confer with agency peers to confirm personnel resource needs/availability.	Paul Marshall
5. Determine impact, if any, of separately reporting WQ from E/I flow measures.	Paul Marshall with Bill Foster
6. Review and refine profile description and draft conceptual model.	Paul Marshall

9. Notes

- ✓ Water quality data issues: DWR has an agency report on the number of times when W/Q is substandard in the South Delta. It is a semi-technical document that documents when and to what degree there were W/Q violations. Some parameters are chlorides, and ambient W/Q standards (DO incl.?). For reporting PM's, it should be a matter of changing the report format. DWR also reports on D-1641 standards. The 2008 data for this will have a higher standard following a court decision.
- ✓ If necessary to cover X2, they report this as a monthly parameter.
- ✓ To add as a footnote in the Report: PM's for flow requirements are based on the Coordinated Operations Agreement between the CVP and SWP. As stated, flow requirements are implemented through both systems, not either. As such, we cannot analyze flow requirements as met by the SWP alone.
- ✓ D-1641 reports available on the web at www.waterboards.ca.gov.
- ✓ DWR does not need to report on D.O.C standards. These are EPA's standards.
- ✓ There is currently no TMDL for Hg+ standards.

Water Supply Reliability – Performance Measures, Phase 2 Data Collection Profile

CALFED Objective: Water Supply Reliability

Performance Measure: 2

1. Metric Acre-feet of unexpected reductions in SWP water supplies for a given year

2. Conceptual Model

Source: **See attached**

Status: Attached model in rough draft, based on preliminary discussions with Paul Marshall. Per action item below, Paul is tasked with review/finalization of the model

3. Available Data	
<i>Time Period:</i>	Historical delivery data from 1960's to present
<i>Geospatial Extent:</i>	SWP delivery area
<i>Data issues/dependencies:</i>	Delivery forecasting and retrospective water accounting/balance. The data source is modeling runs vs. actual reductions. This requires a fair amount of analysis (CALSIM, processing, QA/QC). It will take a week to come up with the numbers to do this.
<i>Contact Names:</i>	SWP Analysis Office - Water Accounting and Balances; SWP Ops Planning - Delivery forecasting and approvals

4. Analysis	
<i>Type of Analysis Done or Required:</i>	Sample application presented in Phase I report for 2006
<i>Steps Needed to Complete Analysis:</i>	TBD
<i>Years of Analysis Complete?</i>	Analysis will occur on an annual basis
<i>By Whom?</i>	TBD

5. Reporting	
<i>Status and Trends Complete?</i>	Applicable? The reporting is done on an action-by-action basis.
<i>Format for Reporting:</i>	Possible to plot graphs going back approx. 2 years. Staff will need to look into it. Annual reporting would work, based on "reduction" vs. "no reduction" scenarios.
<i>Confounding Factors:</i>	Need to determine how far to go back with reporting.

6. Issues/Dependencies

Describe: This PM deals with the reductions needed to meet the ESA. Two factors: 1) EWA actions, and 2) Court decisions (ex Delta Smelt)

7. Recommended Approach

Describe: Consolidate and compare two data sources; provide narrative describing drivers that lead to any anomalies

8. Action Items

Action:

Who:

Review and refine profile description and draft conceptual model.

Paul Marshall

Water Supply Reliability – Performance Measures, Phase 2 Data Collection Profile

CALFED Objective: Water Supply Reliability

Performance Measure: 3

1. Metric

Acre-feet of water delivered in a water year with a description of the conditions during the water year for each delivery.

2. Conceptual Model

Source: **See attached**

Status: Attached model in rough draft, based on preliminary discussions with Paul Marshall. Per action item below, Paul is tasked with review/finalization of the model

3. Available Data	
<i>Time Period:</i>	N/A
<i>Geospatial Extent:</i>	Deliveries - project area; Hydrology - statewide
<i>Data issues/dependencies:</i>	Data and assumptions used in model will change "target"
<i>Contact Names:</i>	DWR Modeling Support;

4. Analysis	
<i>Type of Analysis Done or Required:</i>	System operations study using historical hydrology and current facilities, regulations and land use
<i>Steps Needed to Complete Analysis:</i>	Multiple modeling runs with varying assumptions
<i>Years of Analysis Complete?</i>	
<i>By Whom?</i>	

5. Reporting	
<i>Status and Trends Complete?</i>	One application completed for Phase I report using 2005 conditions for modeling run versus actual 2007 deliveries
<i>Format for Reporting:</i>	Consolidate and compare two data sources.
<i>Confounding Factors:</i>	

6. Issues/Dependencies

Describe: The assumptions behind the modeling runs will characterize the performance of the projects; depending on how "optimistic" or "pessimistic" the assumptions are.
The index in the Phase I Report covers only Sac Valley, which is okay since that has the most influence on the system.

7. Recommended Approach

Describe: Determine delivery levels from SWPO. Continue to use bar graph currently in Phase I Report, with narrative added for the given Water Year. We will discuss the water supply cuts associated with Delta Smelt this year. No changes are needed to the conceptual model already in the Phase I Report.

8. Action Items

Action:

Who:

Review and refine profile description and draft conceptual model.

Paul Marshall

Levee System Integrity Subgroup

The following pages provide draft data collection profile forms, for each of the following Levee System Integrity performance measures:

- **Performance Measure 1:** Kilo-Inch-Mile (KIM) – This represents an overall measure of net work to achieve the USACE PL 84-99 standard.
 - ✓ **Target 1:** KIM = 0 (A zero KIM target represents that there is no additional work to be done to meet the standard).

- **Performance Measure 2:** Risk-Adjusted Kilo-Inch-Mile (RKIM) – This is a measure of risk associated with inadequate and sub-standard levee maintenance.
 - ✓ **Target 2:** RKIM = 0 (A zero KIM target represents no risk).

- **Performance Measure 3:** Electro-magnetic Conductance – This is a number of levee miles with electro-magnetic conductance anomalies quantified.
 - ✓ **Target 3:** Target: 700 miles by December 2007.

¹ For more specific information on these performance measures, please refer to the CALFED Bay-Delta Program Phase 1 Performance Measures Final Report, dated October 23, 2007.

Performance Measures Phase 2 Data Collection Profile

CALFED Objective: Levee System Integrity

Performance Measure: KIM (Kilo-Inch-Mile)

1. Metric

An overall measure of net work to achieve the USACE PL 84-99 standard.

2. Target

KIM = 0 (A zero KIM target represents that there is no additional work to be done to meet the standard)

3. Conceptual Model

Source: **A conceptual model has not been developed.**

Status: **Draft conceptual model proposed (please see attached).**

4. Available Data	
<i>Time Period:</i>	The first baseline year for this measurement type is 2007.
<i>Geospatial Extent:</i>	LiDAR surveys cover geospatial extent beyond the legal Delta.
<i>Data issues/dependencies:</i>	LiDAR data collection flights are 60% complete. Ten percent of the Delta will be re-flown, so we have 50% of useable data. In February 2008 we will have a complete KIM snapshot of the Delta. QUESTION: (Is it safe to just say we have 50% of useable data?)
<i>Contact Names:</i>	Bill Burkhard, Mike Mirmazaheri

5. Analysis	
<i>Type of Analysis Done or Required:</i>	Spreadsheet calculations of levee build-up volume needed (in units of work needed to overcome levee subsidence) to attain the ACOE PL84-99 standard. Note: DWR will use the LiDAR dataset to work with existing data to come up with long-term trends in levee subsidence. QUESTION: Can we break this down into a few steps to get a somewhat accurate time estimate?
<i>Steps Needed to Complete Analysis:</i>	Data collection, data input, calculation.
<i>Years of Analysis Complete?</i>	This is the first year of a baseline Delta-wide analysis through LiDAR survey.
<i>By Whom?</i>	The data collection is subcontracted by DWR. Data analysis

	will come through Bill B., Mike M., or other DWR staff.
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6. Reporting	
<i>Status and Trends Complete?</i>	Just beginning with the first-year baseline.
<i>Format for Reporting:</i>	Island-by-island reporting of KIM value.
<i>Confounding Factors:</i>	The analysis and reporting of comparative Delta-wide KIM values against a historical dataset is not reasonably achievable. Therefore, the analysis is instead to select a geospatial subset (Sherman, Twitchell, plus two or three others) for April 2008 reporting.

7. Issues/Dependencies

Describe:

The process requires more flight data.
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8. Recommended Approach

Describe:

Proceed with existing approach.

9. Action Items

<i>Action:</i>	<i>Who:</i>
Establish a tie-in between data collection, analysis, and what we can report for the PM.	

Performance Measures Phase 2 Data Collection Profile

CALFED Objective:

Levee System Integrity

Performance Measure:

2 - Risk-Adjusted Kilo-Inch-Mile (RKIM)

1. Metric

RKIM (Risk-adjusted-Kilo-Inch-Mile) is a measure of risk associated with inadequate and sub-standard levee maintenance

2. Target

RKIM = 0 (A zero KIM target represents no risk)

3. Conceptual Model

Source:

No existing conceptual model.

Status:

4. Available Data	
<i>Time Period:</i>	Ongoing
<i>Geospatial Extent:</i>	The legal Delta
<i>Data issues/dependencies:</i>	Dependent on KIM dataset and DRMS resource valuations.
<i>Contact Names:</i>	Bill Burkhard, Mike Mirmazaheri

5. Analysis	
<i>Type of Analysis Done or Required:</i>	Probability
<i>Steps Needed to Complete Analysis:</i>	Finalize KIM dataset, develop probability model.
<i>Years of Analysis Complete?</i>	This analysis is KIM dataset-dependent, so one year.
<i>By Whom?</i>	DWR staff

6. Reporting	
<i>Status and Trends Complete?</i>	Will be complete, by estimate, the end of this year.
<i>Format for Reporting:</i>	Possibility of reporting risk potential per each asset identified.
<i>Confounding Factors:</i>	Somebody will need to identify which risks to look at before a valuation of assets lost and a subsequent risk factor can be calculated. This work is difficult and involves a lot of guesswork.

7. Issues/Dependencies

Describe: It is very difficult to come up with a probability model. Nobody wants to make risk forecasts that they need to put their signature on.

8. Recommended Approach

Describe: Time is needed to develop risk valuations.

9. Action Items

Action:

Who:

Develop KIM data and begin probability work.

Performance Measures Phase 2 Data Collection Profile

CALFED Objective: Levee System Integrity

Performance Measure: 4 - Electro-magnetic Conductance

1. Metric

Number of levee miles with electro-magnetic conductance anomalies quantified

2. Target

Target: 700 miles by December 2007

3. Conceptual Model

Source:

No dependency on a conceptual model.

Status:

4. Available Data	
<i>Time Period:</i>	This effort began in 2006, and runs out in 2008.
<i>Geospatial Extent:</i>	Delta-wide.
<i>Data issues/dependencies:</i>	Completion of ongoing Magnetic Anomaly Surveys. Other processes (reimbursement issues to contractor) are precluding data collection.
<i>Contact Names:</i>	Bill Burkhard, Mike Mirmazaheri

5. Analysis	
<i>Type of Analysis Done or Required:</i>	Listing of anomalies throughout Delta levee system.
<i>Steps Needed to Complete Analysis:</i>	Data collection to 2008.
<i>Years of Analysis Complete?</i>	About 2 years.
<i>By Whom?</i>	DWR subcontracts this work to the reclamation districts.

6. Reporting	
<i>Status and Trends Complete?</i>	Not yet.
<i>Format for Reporting:</i>	A geospatial list of anomalies, status report on the progress

	of Phase 2 (inspection and repair of potential anomaly sites).
<i>Confounding Factors:</i>	There are roadblocks with completing this work (see next section).

7. Issues/Dependencies

Describe: The completion of collecting magnetic anomaly data requires buy-in from the reclamation districts, and we are not there yet.

8. Recommended Approach

Describe: Continue the education process needed to get buy-in from the remaining reclamation districts.

9. Action Items

<i>Action:</i>	<i>Who:</i>
Continue present work.	

Ecosystem Restoration Subgroup

The following pages provide draft data collection profile forms for each of the following Ecosystem Restoration performance measures:

- **Performance Measure 1:** Resilience of Delta Smelt
 - ✓ **Target 1:** Delta Smelt viability and habitat suitability

- **Performance Measure 2:** Population status of Chinook Salmon
 - ✓ **Target 2:** Chinook Salmon viability and habitat suitability

- **Performance Measure 3:** Population Status of Lange's Metalmark butterfly
 - ✓ **Target 3:** Maintain a five year moving average count of Lange's Metalmark adults, based on flight season peak population counts of 2,000 individuals.

¹ For more specific information on these performance measures, please refer to the CALFED Bay-Delta Program Phase 1 Performance Measures Final Report, dated October 23, 2007.

Performance Measures Phase 2 Data Collection Profile

CALFED Objective: Ecosystem Restoration

Performance Measure: Delta Smelt Resilience

1. Metric

Delta smelt viability and habitat suitability performance measures

2. Conceptual Model

Source: **DRERIP and Bennett (2005: San Francisco Estuary and Watershed Science)**
 Status: **in progress**

3. Available Data	
<i>Time Period:</i>	1967-2006
<i>Geospatial Extent:</i>	San Pablo Bay - Delta
<i>Data issues/dependencies:</i>	
<i>Contact Names:</i>	Randy Baxter - rbaxter@dfg.ca.gov; Fred Feyrer - ffeyrer@water.ca.gov

4. Analysis	
<i>Type of Analysis Done or Required:</i>	population viability analysis (PVA), and Environmental Quality Index (EQI)
<i>Steps Needed to Complete Analysis:</i>	see Bennett (2005) and Feyrer et al. (2007: Canadian Journal of Fisheries and Aquatic Sciences)
<i>Years of Analysis Complete?</i>	PVA: 1967-2001? EQI: 1967-2006
<i>By Whom?</i>	Bill Bennett - wabennett@ucdavis.edu and Fred Feyrer - ffeyrer@water.ca.gov

5. Reporting	
<i>Status and Trends Complete?</i>	Yes
<i>Format for Reporting:</i>	
<i>Confounding Factors:</i>	PVA is not possible on actual population size estimates because these are not currently scientifically achievable. Therefore, the PVA needs to be done on relative abundance indices with a subjective cutoff for what defines acceptably high relative abundance.

6. Issues/Dependencies

Describe:

7. Recommended Approach

Describe:

8. Action Items

Action:

Who:

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Performance Measures Phase 2 Data Collection Profile

CALFED Objective:

Ecosystem Restoration

Performance Measure:

Central Valley Spring-Run Chinook
Salmon population viability/recovery
(Viable Salmonid Population--VSP)

1. Metric

Population Growth Rate (e.g., recruits/spawner, eggs/spawner, etc.)

Diversity (genetic and behavioral traits within and among populations)

Population Spatial Structure (geographic distribution of the fish in a population and to the processes that lead to that geographic distribution; i.e., habitat quality, spatial configuration, and dynamics as well as the dispersal characteristics of individuals in the population.)

Abundance (population size)

2. Conceptual Model

Source:

NMFS Recovery Plan and DRERIP APMT models

Status:

**NMFS Recovery Plan to be released Autumn 2008.
DRERIP model is in peer review.**

3. Available Data

<i>Time Period:</i>	Spawning Adult numbers: Sacramento River 1967-2006; Mill Creek 1970-2006; Deer Creek 1970-2006; Butte Creek 1967-2006; Clear Creek 1967-2006; Battle Creek 1998 to present. Juvenile numbers: Various data available--need some time to compile.
<i>Geospatial Extent:</i>	California Central Valley (streams listed above)
<i>Data issues/dependencies:</i>	Sampling methods vary in frequency and intensity in different locations over time. Hatchery fish confound estimates of naturally produced fish.
<i>Contact Names:</i>	Howard Brown, NMFS

4. Analysis	
<i>Type of Analysis Done or Required:</i>	Viable Salmon Population (VSP), consisting of all metrics, will be an integral part of the analysis.
<i>Steps Needed to Complete Analysis:</i>	
<i>Years of Analysis Complete?</i>	
<i>By Whom?</i>	

5. Reporting	
<i>Status and Trends Complete?</i>	Status and trends data for adult spawners is in the Comprehensive Assessment and Monitoring Plan (CAMP).
<i>Format for Reporting:</i>	
<i>Confounding Factors:</i>	

6. Issues/Dependencies

Describe: NMFS has not yet disclosed the approach to their Recovery Plan, and all other monitoring efforts are planned to be incorporated into this approach. Where does BDCP fit in with this?

7. Recommended Approach

Describe:

8. Action Items

<i>Action:</i>	<i>Who:</i>
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9. Notes

These distinct, geospecific monitoring efforts will fall under the NMFS Recovery Plan, in terms of the VSP. However, the specifics of this approach have not yet been disclosed by NMFS.

These efforts include:

1) Battle Creek Anadromous Fish Recovery Plan (AFRP):

<http://www.delta.dfg.ca.gov/AFRP/project.asp?code=1998-33>

2) USFWS report on Adult Spring Chinook Salmon Monitoring in Clear Creek (July 2004, prepared by Jess M. Newton and Matthew R. Brown)

Performance Measures Phase 2 Data Collection Profile

CALFED Objective: Ecosystem Restoration

Performance Measure: Achieve recovery of Lange's Metalmark
(Version 04-14-08)

1. Metric

Minimum viable population or similar recovery criteria

2. Conceptual Model

Source: **Delta Regional Ecosystem Restoration Implementation Plan (DRERIP)**

Status: **Draft available (included in Performance Measures Report: Phase 1)**

3. Available Data	
<i>Time Period:</i>	Anecdotal population estimate for 1850s (25,000) Collector record based estimate for 1972 (5,000) Capture-recapture 1977-1985 (declined from 2,100 to 1286) Peak flight counts 1986-present (declined from 2,342 to 232)
<i>Geospatial Extent:</i>	Antioc Dunes (endemic species range)
<i>Data issues/dependencies:</i>	Metalmark population correlated with buckwheat host plant population
<i>Contact Names:</i>	Antioc Dunes National Wildlife Refuge; Sacramento Fish & Wildlife Office

4. Analysis	
<i>Type of Analysis Done or Required:</i>	Need to determine appropriate analysis for performance measure target (e.g., Population Viability Analysis)
<i>Steps Needed to Complete Analysis:</i>	Depends on analysis type(s) chosen
<i>Years of Analysis Complete?</i>	None
<i>By Whom?</i>	To be determined

5. Reporting	
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<i>Status and Trends Complete?</i>	No
<i>Format for Reporting:</i>	To be determined
<i>Confounding Factors:</i>	To be determined

6. Issues/Dependencies

Describe: Need to coordinate performance measure development with FWS species recovery staff and wildlife refuge staff

7. Recommended Approach

Describe: To be determined

8. Action Items

<i>Action:</i>	<i>Who:</i>