

**POST AUTHORIZATION CHANGE REPORT AND INTERIM GENERAL
REEVALUATION REPORT
AMERICAN RIVER WATERSHED, COMMON FEATURES PROJECT
NATOMAS BASIN
SACRAMENTO AND SUTTER COUNTIES, CALIFORNIA**

REPORT SUMMARY FOR CIVIL WORKS REVIEW BOARD

Schedule

Feasibility Scoping Meeting:	11 MAR 2009
Alternative Formulation Briefing:	24 MAY 2010
AFB Guidance Memorandum:	30 JUN 2010
Draft Report Guidance Memorandum:	27 AUG 2010
Division Engineer Transmittal:	31 AUG 2010
Received at CECW-PC:	31 AUG 2010
CWRB Briefing:	27 SEP 2010
FEIS filed with EPA:	xx OCT 2010
30-Day S&A Review start:	xx OCT 2010
30-Day S&A Review end:	xx NOV 2010

STUDY INFORMATION

Study Authority. The Common Features Project was authorized in WRDA 1996, Pub. L. 104-303 (S 640), Sec. 101(a) (1), 110 STAT. 3658, 3662-3663 (1996), as amended by the Energy and Water Development and Related Agencies Appropriations Act of 2008, Pub. L. 110-161 (HR 2674), Sec. 130, 121 STAT. 1844, 1947 (2007). Additional authority was provided in WRDA 1999, Pub. L. 106-53 (S 507), Sec. 366, 113 STAT. 269, 319-320 (1999). Significant changes to the project were approved via the Supplemental Information Report of March 2002. Additionally, the Energy and Water Development Appropriations Act of 2004, Pub. L. 108-137 (HR 2754), Sec. 129, 117 STAT. 1827, 1839 (2003) increased the authorized total cost of the project to \$205,000,000. Pertinent sections of these Congressional authorizations are provided below:

a. Water Resources Development Act of 1996 (Pub. L. 104-303)

Sec. 101. Project Authorizations

(a) PROJECTS WITH CHIEF'S REPORTS. Except as provided in this subsection, the following projects for water resources development and conservation and other purposes are authorized to be carried out by the Secretary substantially in accordance with the plans, and subject to the conditions, described in the respective reports designated in this subsection:

(1) American River Watershed, California.

(A) IN GENERAL. The project for flood damage reduction, American and Sacramento Rivers, California: Report of the Chief of Engineers, dated June 27, 1996, at a total cost of \$56,900,000, with an estimated Federal cost of \$42,675,000 and an estimated non-Federal cost of \$14,225,000, consisting of

(i) approximately 24 miles of slurry wall in the levees along the lower American River;

(ii) approximately 12 miles of levee modifications along the east bank of the Sacramento River downstream from the Natomas Cross Canal;

(iii) 3 telemeter stream flow gauges upstream from the Folsom Reservoir; and

(iv) modifications to the flood warning system along the Lower American River.

(B) CREDIT TOWARD NON-FEDERAL SHARE. The non-Federal interest shall receive credit toward the non-Federal share of project costs for expenses that the non-Federal interest incurs for design or construction of any authorized project feature, including credit for work commenced before the date of execution of a cooperation agreement for the affected feature. The amount of the credit shall be determined by the Secretary.

(D) OTHER COSTS. The non-Federal interest shall be responsible for

(i) all operation, maintenance, repair, replacement, and rehabilitation costs associated with the improvements carried out under this paragraph; and

b. Water Resources Development Act of 1999 (Pub. L. 106-53). Section 366 of WRDA 1999 includes further direction for the Common Features Project:

(a) IN GENERAL. The project for flood damage reduction, American and Sacramento Rivers, California, authorized by section 101(a)(1) of the Water Resources Development Act of 1996 (110 Stat. 3662-3663), is modified to direct the Secretary to include the following improvements as part of the overall project:

(1) Raising the left bank of the non-Federal levee upstream of the Mayhew Drain for a distance of 4,500 feet by an average of 2.5 feet.

(2) Raising the right bank of the American River levee from 1,500 feet upstream to 4,000 feet downstream of the Howe Avenue Bridge by an average of 1 foot.

(3) Modifying the south levee of the Natomas Cross Canal for a distance of 5 miles to ensure that the south levee is consistent with the level of protection provided by the authorized levee along the east bank of the Sacramento River.

(4) Modifying the north levee of the Natomas Cross Canal for a distance of 5 miles to ensure that the height of the levee is equivalent to the height of the south levee as authorized by paragraph (3).

(5) Installing gates to the existing Mayhew Drain culvert and pumps to prevent backup of floodwater on the Folsom Boulevard side of the gates.

(6) *Installing a slurry wall in the north levee of the American River from the east levee of the Natomas east Main Drain upstream for a distance of approximately 1.2 miles.*

(7) *Installing a slurry wall in the north levee of the American River from 300 feet west of Jacob Lane north for a distance of approximately 1 mile to the end of the existing levee.*

(b) COST LIMITATIONS. Section 101(a)(1)(A) of the Water Resources Development Act of 1996 (110 Stat. 3662) is amended by striking “at a total cost of” and all that follows through “\$14,225,000,” and inserting the following: “at a total cost of \$91,900,000, with an estimated Federal cost of \$68,925,000 and an estimated non-Federal cost of \$22,975,000,”

(c) COST SHARING. For the purposes of Section 103 of the Water Resources Development Act of 1986 (33 U.S.C. 2213), the modifications authorized by this section shall be subject to the same cost sharing in affect for the project for flood damage reduction, American and Sacramento Rivers, California, authorized by Section 101(a)(1) of the Water Resources Development Act of 1996 (110 Stat. 3662).

c. Energy and Water Development Appropriations Act of 2004 (Pub. L. 108-137). Section 129 of the Energy and Water Development Appropriations Act of 2004 provided the following authorization:

The project for flood damage reduction, American and Sacramento Rivers, California, authorized by section 101(a)(1) of the Water Resources Development Act of 1996 (110 Stat.3662–3663) and modified by section 366 of the Water Resources Development Act of 1999 (113 Stat. 319–320), is further modified to direct the Secretary to carry out the project, at a total cost of \$205,000,000.

Study Sponsor. The non-Federal sponsor for the project and general reevaluation study is the State of California Central Valley Flood Protection Board (CVFPB). The Sacramento Area Flood Control Agency (SAFCA) has a Local Cooperation Agreement with the CVFPB.

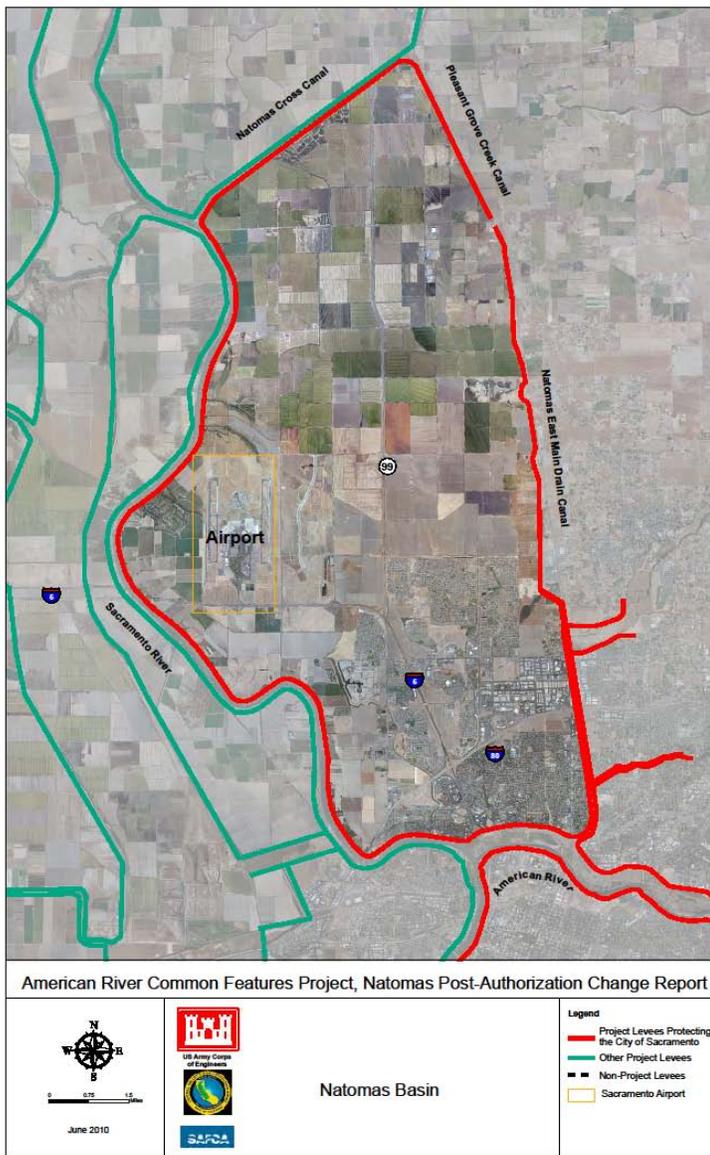
Study Purpose and Scope.

The purpose of this report is to present the findings of an interim general reevaluation study of the authorized American River Common Features Project. The study was conducted specifically to determine if there is a Federal interest in modifying the authorized project features for flood risk management in the Natomas Basin portion of the project area. While other significant changes are expected in the future to reduce risks in areas subject to flooding from the Lower American and Sacramento Rivers, only improvements to the Natomas Basin levees are the subject of proposed changes at this time.

Project Location/Congressional District.

The study area is part of the Sacramento and American River Watersheds. The Sacramento River watershed covers approximately 26,000 square miles in central and northern California. The American River Watershed covers about 2,100 square miles northeast of the City of Sacramento. In the Sacramento area, these two rivers form a flood plain covering roughly 110,000 acres, approximately half of which comprises the Natomas Basin. This report focuses on the Natomas Basin that is hydraulically separable and is a separable element of the authorized Common Features Project. The study area map is presented below:

Figure 1: Study Area Map



The project area includes the following Congressional Districts and Representatives:

Congressional District 02 – Representative Walter Herger
Congressional District 03 – Representative Daniel Lundgren
Congressional District 04 – Representative Tom McClintock
Congressional District 05 – Representative Doris Matsui

California Senators are Sen. Barbara Boxer and Sen. Dianne Feinstein.

Prior Reports and Existing Water Projects.

a. **Reports.** The following reports were reviewed as a part of this study:

- 1) American River Watershed Investigation, California, Feasibility Report, December 1991.
- 2) American River Watershed Investigation, California, Chief of Engineers' report, dated 29 June 1992.
- 3) American River Watershed Project, California, Supplemental Information Report, March 1996.
- 4) American River Watershed, California, Chief of Engineers' Report dated 27 June 1996.
- 5) Supplemental Information Report (SIR), American River Watershed Project, California, Main Report and SEIS/EIR Addendum, 18 August 1997.
- 6) Project Cooperation Agreement between the Department of the Army and the State of California for Construction of the American River Watershed (Common Features), California Project, 13 July 1998.
- 7) American River Watershed Project, California (Common Features), Information Paper, 16 August 2000.
- 8) American River Watershed Project (Common Features), California, Second Addendum to the Supplemental Information Report (SIR), March 2002.
- 9) American River (Common Features) Project, California, Project Cooperation Agreement (Contract 460000065 I), Amendment No. 1, 13 June 2003.
- 10) Memorandum, CESPCK-PM-C, Subject: American River Watershed (Common Features), California Project, Pocket and Pioneer Reservoir Levee Improvement Areas- Information Paper, 07 April 2007.
- 11) Memorandum for Record, CESPCK-OC, Inclusion of Levee Repair within the Sacramento Pocket and Pioneer Sites under the American River Common Features Project, 17 April 2006.
- 12) American River Watershed Project, Folsom Modification and Folsom Dam Raise Post Authorization Report and Engineering Documentation Report, March 2007
- 13) American River Watershed Project, Folsom Modification and Folsom Dam Raise Economic Reevaluation Report, Draft June 2007.

b. Existing Water Projects. Federal levees, part of the Common Features project and the Sacramento River Flood Control System, are located both upstream of the Natomas Basin on the American and Sacramento rivers and downstream of the Natomas Basin on the Sacramento River. Multiple projects, including the Sacramento River Bank Protection Project and the West Sacramento General Reevaluation Report, are underway in the project vicinity.

There are several Federal and State Reservoirs located upstream of the project area. Shasta Dam and Reservoir is located approximately 120 miles upstream on the Sacramento River and is operated by the Bureau of Reclamation. Oroville Dam and Lake is located approximately 50 miles upstream of the project on the Feather River and is operated by the State of California. New Bullards Bar Dam and Reservoir is located on the Yuba River approximately 50 miles northeast of the project and is operated by the Yuba County Water Agency. Englebright Dam and Lake is located on the Yuba River approximately 50 miles northeast of the project area and is operated by the Corps of Engineers. Folsom Dam and Reservoir is located on the American River approximately 25 miles east of the project and is operated by the Bureau of Reclamation.

c. Natomas Levee Improvement Program

SAFCA and the State of California have constructed levee improvements as part of the Natomas Levee Improvement Program and either have received approval for credit or will request credit under Section 104 of WRDA 1986. SAFCA has constructed or will construct the following features with associated mitigation, relocations, and real estate acquisition:

- Strengthen approximately 5.3 miles of the Natomas Cross Canal south levee by flattening the landside levee slope and installing seepage cut-off walls.
- Strengthen approximately 4.9 miles of the Sacramento River east levee from Verona to Elverta Road by constructing a landside adjacent levee and installing seepage cut-off walls and landside seepage berms.
- Strengthen approximately 7.7 miles of the Sacramento River east levee from Elverta Road past Powerline Road by constructing a landside adjacent levee and installing seepage cut-off walls and landside seepage berms.

Federal Interest.

The Federal Interest in flood risk management in Sacramento, California was first established by the Flood Control Act of 1962 and was expanded by the Water Resource Development Acts of 1996 and 1999. This federal interest now extends to the current interim General Reevaluation Report and the Recommended Plan presented therein. The Recommended Plan improves the reliability of the existing levee system consistent with prior congressional intent and does not expand the flood risk management benefits beyond the boundaries or the scope of the existing system. The Recommended Plan minimizes environmental effects and produces a positive benefit to cost ratio.

STUDY OBJECTIVES

Problems and Opportunities.

The existing levee system does not provide the intended level of flood risk management benefit. The following problems and opportunities have been identified during ongoing analysis of the existing levee system.

- 1) Flood Damages - Documented reports of flooding in the Sacramento/Central Valley Region have been described by Native Americans and pioneer settlers dating prior to 1850. Significant events have occurred on the Sacramento, the Feather, and the American River system in 1862, 1867, 1875, 1881, 1890, 1907, 1909, 1914, 1937, 1955, 1964, 1986, and 1997. Major flood risks include direct impacts to 550,000 people, 170,000 structures and potentially \$10 - \$46 billion in damage in a single flood event.
- 2) Underseepage and through seepage – High stage in the Sacramento and American Rivers or NCC can cause higher pressure through the sand layer beneath the levee and in turn cause boils and erosion.
- 3) Utilities through levees – Utilities that pass through levees can provide a route for through seepage. Resultant removal of levee material could result in levee failure.
- 4) Vegetation and encroachments on Levees – Due to the unique history of the flood risk management system in the California Central Valley, levee slopes often contain brush and trees that are the last remnants of a vast riparian forest which once extended across the valley floor adjacent to the Sacramento and San Joaquin rivers. Much of this vegetation provides important environmental, recreational, and cultural benefits that would be impacted by the stricter enforcement of Corps regulations. In addition, a significant number of encroachments, including residences, commercial buildings, and roadways are present on the levees within the study area.
- 5) Levee Stability – Erosion and underseepage can impact levee instability. Sloughing of the levees or the formation of caves is caused by the erosion at the levee toe under water and eventually causes sloughing of the upper levee side slope. Underseepage can result in the removal of levee material leading to boils, erosion of the underlying material and potential levee failure.
- 6) Levee Erosion - The waterside levee slopes in the project area have been impacted by erosional forces. Waterside erosion is impacted by water draw down, sloughing of the levees, and overtopping.
- 7) Ecosystem Restoration Opportunities - The primary interest of the sponsor is to develop an economically viable and implementable plan to reduce flood damages in the study area. If adding ecosystem restoration as a purpose would contribute to its viability as a plan, the sponsor would support ecosystem restoration on that basis.

Planning Objectives.

The water and related land resource problems and opportunities identified in this study are refined and stated as specific planning objectives to provide focus for the formulation of alternatives. These planning objectives reflect the problems and opportunities and represent desired positive changes in the without project conditions. The planning objectives, specific to the Natomas Basin are specified as follows:

1. Reduce flood risk to public health, safety, and property in the Natomas Basin associated with levee under- and through-seepage, levee erosion, levee instability, levee overtopping, and vegetation/encroachments on the levees.
2. Educate the public about ongoing residual risk.
3. Provide opportunities to connect the community to the river.

Planning Constraints.

1. No large-scale upstream regional detention alternatives on the American River (Auburn Dam) will be considered in this investigation.
2. Plans must avoid adverse effects to endangered and threatened species in the Greater Sacramento area. Primarily, these are the valley elderberry longhorn beetle, giant garter snake, delta smelt, Swainson's hawk, Sacramento River winter run Chinook salmon, and Central Valley spring run Chinook salmon.
3. Plans should minimize adverse effects on cultural resources to the degree practicable.
4. Adverse impacts to riparian vegetation should be avoided to the extent practicable.
5. Plans should avoid adverse hydraulic effects that increase flood risks to other parts of the system to the extent practicable. This will be measured in terms of increased flood damages to other areas.
6. Plans should avoid effects to existing infrastructure (bridges, highways, railroads, utilities, airports) to the extent practicable. This will be evaluated in terms of costs for any modifications to existing infrastructure needed to implement the plan.
7. Plans must not provide additional bird habitat that would conflict with the Sacramento Airport restrictions. This constraint will be evaluated in terms of a qualitative description of the potential for plans to attract bird populations to the airport vicinity.
8. Plans should minimize the relocation and/or removal of structures to the extent practicable. Relocation and removal of structures will add significant costs to plans, as well as being viewed as undesirable by the residents of the Sacramento area. This constraint will be evaluated in terms of the number of structures that must be removed.

ALTERNATIVES

Plan Formulation Rationale.

The purpose of the plan formulation in this interim general reevaluation study is to develop an array of alternatives to address the planning objectives and constraints, to establish the plan that can be supported Federally. To accomplish this, the interim general reevaluation study supporting the post authorization change evaluated an array of alternatives to establish the limit on Federal cost sharing. The post authorization change is not a full reformulation of the authorized project, but it does include a new economic analysis.

A wide variety of management measures were developed to address the planning objectives for the Natomas portion of the authorized Common Features Project. These measures were evaluated and then screened. Formulation strategies were then developed to address various combinations of the planning objectives and planning constraints. Based upon these strategies, various combinations of the measures were assembled to form an array of preliminary plans. The preliminary plans were then evaluated, screened, and reformulated, resulting in a final array of alternatives. From the final array of alternatives, a tentatively selected plan was identified.

Management Measures and Alternative Plans.

a. Management Measures

a. No Action. The Corps is required to consider “No Action” as one of the alternatives for selection. With the No Action Plan, it is assumed that no additional features would be implemented by the Federal Government or by local interests to achieve the planning objectives, over and above those elements of the Common Features project that will have been implemented prior to reauthorization of the project.

b. Measures to Address Planning Objectives. A wide variety of measures were considered, some of which were determined to be infeasible due to technical, economic, or environmental constraints. Each measure was assessed and a determination made regarding whether it should be included in the formulation of alternative plans. The measures are identified below with the objectives that they address.

Measures Considered to address objectives:

Underseepage and through-seepage measures

- Seepage berms
- Relief wells
- Seepage cutoff walls

Erosion

- Rock riprap

- Cobble slope/existing vegetation
- Instream woody material

Stability

- Adjacent levee
- Flatten slopes in place

Vegetation and encroachments

- Removal
- Adjacent levee (with variance to vegetation ETL)

Overtopping

- Levee raises for height deficiency
(Evaluated on a preliminary basis not considered for recommendation as part of this PAC Report due to constraints such as insufficient data regarding optimal levee heights and hydraulic impacts)

Non-Structural measures

- Zoning and building codes
- Outreach
- Evacuation plan
- Insurance

The following measures were eliminated from consideration based on either being beyond the scope of the study, an initial assessment of cost, and /or the failure of the measure to address the seepage and stability issue for Natomas:

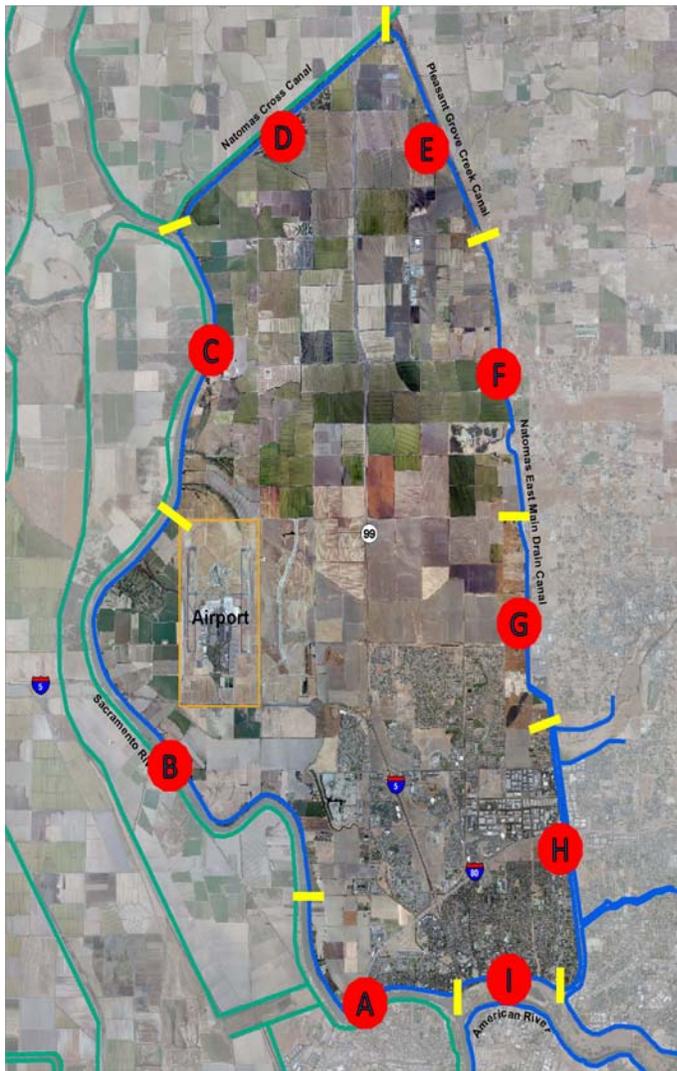
- Upstream storage
- Yolo Bypass improvements
- Widening the Sacramento Bypass
- Transitory storage
- Cross-Natomas levee
- New setback levee

b. Final Alternatives.

Basis for Alternatives. Based on the evaluations of measures described above, an initial array of alternatives was formulated based on tradeoffs between different planning constraints. In order to evaluate various combinations of measures, screening level estimates were developed for the measures carried forward for consideration. Nine different index points (A through I in Figure 2) were analyzed, each associated with one of nine reaches identified for the Natomas Basin. Because the levees around the Natomas Basin have different problems, or different combinations of problems, each reach has its own probability of failure performance in a flood based on its

condition which may differ from other reaches. Furthermore, with each levee reach there are different consequences when the levee fails. The most appropriate seepage, stability, vegetation, height deficiency, and erosion mitigation measures were selected for each reach. Two different methods for fixing levees were evaluated. These two methods were: to fix the levees in-place or to fix them through the use of an adjacent levee.

Figure 2: Index Point Map



Comparison of Alternatives.

During plan formulation, the alternatives were narrowed down to strengthening the perimeter levees of the Natomas Basin through the construction of an adjacent levee, where practical, and fixing in place where that was most practical. Additional alternatives were evaluated and eliminated. Major reasons for eliminating alternatives include other alternatives achieve the

same objectives at a much lower cost, and they would present significant barriers to achieving the goals for the Natomas Basin Habitat Conservation Plan (NBHCP).

Key Assumptions.

The following general assumptions have been made in regard to the without-project condition for this study:

- In 2014-2015, the Joint Federal Project auxiliary spillway with six submerged tainter gates at Folsom Dam will be completed and a new water control manual will be adopted.
- In 2016-2017, the 3.5-foot mini-raise of the Folsom Dam will be completed. At that point, the American River levees will be able to pass an objective release from Folsom Dam of 145,000 cfs.
- SAFCA will put their Life Cycle Management (LCM) plan for vegetation management on levees into place.

Recommended Plan.

Plan Components. The Natomas basin in the Sacramento area is a hydrologic unit and the levee surrounding the Natomas basin constitutes a system of flood risk management, i.e., a ring levee around the Natomas area. Therefore, the most appropriate manner of plan formulation and planning analysis for the Natomas levee is at the systems level approach versus the historical USACE incremental approach. Therefore, improvements to all nine reaches (A through I) are included in the recommended plan. This plan addresses and satisfies the four formulation criteria suggested by the U.S. Water Resources Council: completeness, effectiveness, efficiency and acceptability. In addition, this approach is consistent with lessons learned from previous flood events within the USA and with implementation of USACE Flood Risk Management program policy.

The selected plan includes all the authorized features from the 1996 and 1999 authorizations, plus the additional features to complete the plan for flood risk management to the Natomas Basin. The principal additional features of this plan are: (1) seepage remediation and embankment stabilization along the Natomas Cross Canal south levee, the Sacramento River east levee, The American River north levee, the Pleasant Grove Creek Canal, and the NEMDC west levees; (2) agricultural irrigation and drainage improvements, including construction of a new GGS/Drainage Canal; (3) habitat creation and management in connection with project borrow activities; (4) aviation safety components, including relocation of irrigation and drainage infrastructure in the Airport Operation Area and grading of the Airport's northern bufferlands to improve surface drainage and reduce the risk of bird strikes; and (5) right-of-way acquisition to facilitate long-term operation and maintenance activities.

The modifications to existing interior drainage facilities have been limited to bringing the facilities in compliance with Corps criteria for penetrations through levees (upgrading discharge lines, pumps, etc. to raise the drainage over the top of levee). No assessment of the capacity of

existing facilities to address the residual flooding from interior runoff was accomplished. The interior drainage plan of the Natomas Basin was developed by the City of Sacramento and is documented in the "Natomas Comprehensive Drainage Plan Conditional Letter of Map Revision", May 1997.

Systems / Watershed Context.

The Natomas levees constitute a system of flood management for the Natomas Basin, given that the levees are a ring levee forming a single hydrologic unit. Therefore, the appropriate manner of analysis for this levee is in a systems context. This approach is consistent with lessons learned from previous flood events within the USA and with implementation of USACE Flood Risk Management program policy.

Federal, State, and local public works projects within the Sacramento and American River basins provide flood risk management, municipal and agricultural water supply, hydropower, and recreation for the residents of the basin.

Environmental Operating Principles.

The Recommended Plan supports each of the seven USACE Environmental Operating Principles (EOPs) as indicated below:

Planning with the environment (EOP 1,2 4, and 5)

- Worked with local resource agencies during planning phase to minimize impacts to the environment and construct on-site mitigation
- Designed project to keep activities within the Natomas Basin when feasible
- Avoid cumulative impacts to the river systems within the project vicinity

Environmental balance and sustainability (EOP 1,2,3 &4)

- Project avoids or minimizes environmental impacts while maximizing future safety and economic benefits to the community
- Borrow returned to agricultural use or designed to mitigate for project impacts
- Designed to comply with the Corps ETL and maintain important Endangered Species Habitat

Seeks Public input and Comment (Win-win solutions) (EOP 7)

- Held public meetings throughout the process
- Worked with local groups to achieve a balance of project goals and public concerns
- Worked with FAA to locate mitigation so that the project will comply with regulation to reduce aircraft strikes

Integrate scientific, economic and social knowledge base (EOP 6)

- Project was granted the first Vegetation Variance to save Endangered Species Habitat based on best available science.

Peer Review.

Agency Technical Review (ATR). ATR was conducted by a qualified interdisciplinary team of Corps of Engineers personnel from the Louisville (LRL), Los Angeles (SPL), Kansas City (NWK), and Walla Walla (NWW) Districts with ATR lead being assigned to the Louisville District. Comments included clarification of the following issues:

- Without project condition H&H and economics
- Geotechnical stability of the existing levee system and underseepage issues
- O&M, existing vegetation on levees, and associated environmental concerns
- Local flood response efforts and public safety
- Adequacy of the project cost estimates
- Cost sharing, real estate, and other crediting issues
- Formulation of the NED plan and the recommended locally preferred plan.

There was one unresolved ATR comment that addressed flood damages occurring in the study area for the without project condition. The economic models forecast massive and frequent flood damages while the actual history of the area shows there have been virtually no historic damages. The situation reflects the inability of Corps models and policies to accurately account for flood fighting efforts during actual flood events. The report recommendations are based on the model results as the more conservative approach to addressing flood risk management. The decision to override the concerns of the ATR on this point is permitted under current guidance.

ATR of the draft feasibility report was certified in 27 August 2010. The HQUSACE Policy Review comments via the Policy Guidance Memorandum were addressed and responses incorporated into the report. The ATR of the final report with PGM responses incorporated was certified on 26 August 2010.

Independent External Peer Review of the final report was coordinated by a representative of the Corps Flood Risk Management Center of Expertise via a contract with Battelle, Inc, and conducted by appropriate outside resources familiar with the study area and its resources. Comments made by the IEPR team and responses to those comments, are documented in the IEPR package which will be completed on 17 September 2010. The HQUSACE Policy Review comments via the Policy Guidance Memorandum (PGM) were addressed, and responses were incorporated into the report.

EXPECTED PROJECT PERFORMANCE

Project Performance. The Without-Project probability of failure for the Natomas levee is 0.21 (a five-year event). The probability of failure is due to the conditions of the levee related to seepage, stability, and erosion. Implementation of the recommended plan would result in an annual exceedance probability of 0.015 (a 67-year event). Because the recommended plan addresses the seepage, stability and erosion problems associated with the Natomas levee, the residual risk to the Natomas Basin is related to potential overtopping of the levee.

Project Costs. Project costs are presented in the table below:

Table 6
Cost Summary
Post Authorization Change Report and Interim General Reevaluation Report
American River Watershed, Common Features Project
Natomas Basin
(October 2010 Price Levels, 1,000s)

Construction Item	Cost
Lands & Damages	\$223,830
Relocations	\$110,766
Fish and Wildlife Facilities	\$18,869
Levees and Floodwalls	\$388,083
Cultural Resources	\$6,578
Engineering and Design	\$148,711
S&A	\$158,588
Total First Cost	\$1,111,560

Equivalent Annual Costs and Benefits.

Table 7
Equivalent Annual Costs and Benefits
Post Authorization Change Report and Interim General Reevaluation Report
American River Watershed, Common Features Project
Natomas Basin
(October 2010 Price Level, 50-Year Period of Analysis, 4.375 % Discount Rate, \$1,000s)

Investment Costs	
Total Project Construction Costs	\$1,111,560
Interest During Construction	\$158,981
Total Investment Cost	\$1,263,573
Average Annual Costs	
Interest and Ammortization of Initial Investment	\$62,644
OMRR&R	\$5,180
Total Average Annual Costs	\$67,824
Average Annual Benefits	\$443,000
Net Annual Benefits	\$375,176
Benefit-Cost Ratio	6.5
Benefit Cost Ratio (at 7%)	4.2

Cost Sharing.

Table 8 Natomas Post Authorization Change Report – Cost Sharing Recommended Plan (October 2010 Price Level)			
Item	Federal Cost	Non-Federal Cost	Total Cost
<u>Flood Damage Reduction (FDR)</u>			
PED	\$129,097,000	\$19,614,000	\$148,711,000
LERR&D	\$18,492,000	\$316,104,000	\$334,596,000
Flood Damage Reduction	\$620,698,000	\$7,555,000	\$628,253,000
Subtotal	\$639,190,000	\$323,659,000	\$962,849,000
FDR Subtotal	\$768,287,000	\$343,273,000	\$1,111,560,000
Total Project	\$768,287,000	\$343,273,000	\$1,111,560,000
Cash Requirements	- \$55,758,000	\$55,758,000	
Total with Associated Costs	\$712,709,000	\$398,851,000	\$1,111,560,000

Table 9 Total American River Common Features Project – Cost Sharing Recommended Plan (October 2010 Price Level)			
Item	Federal Cost	Non-Federal Cost	Total Cost
<u>Flood Damage Reduction (FDR)</u>			
PED	\$200,506,000	\$19,809,000	\$220,315,000
LERR&D	\$20,719,000	\$331,431,000	\$352,150,000
Flood Damage Reduction	\$809,509,000	\$7,566,000	\$817,075,000
Subtotal	\$830,228,000	\$338,997,000	\$1,169,225,000
FDR Subtotal	\$1,030,734,000	\$358,806,000	\$1,389,540,000
Total Project	\$1,030,734,000	\$358,806,000	\$1,389,540,000
Cash Requirement	-\$109,540,000	\$109,540,000	
Total with Associated Costs	\$921,194,000	\$468,346,000	\$1,389,540,000

Project Implementation.

The State of California Department of Water Resources and the Sacramento Area Flood Control Agency, the non-federal sponsors, will provide at least 35% of the cost associated with construction of the Recommended Plan, including provisions of all lands, easements, rights-of-way, and necessary relocations (LERRD); and will pay 100% of the OMRR&R costs associated with the project. The non-Federal sponsor's responsibilities will be defined in a Project Cooperation Agreement.

Monitoring and Adaptive Management - Overall, after implementation of mitigation components, the mitigation sites would be monitored throughout the year for 3–8 years depending on the type of habitat and as developed in negotiation with the appropriate resource agencies. SAFCA would be responsible for providing success monitoring, which, as required by the appropriate resource agencies, would be conducted by a qualified ecologist, botanist, or biologist. The monitor would be objective and independent from the installation contractor responsible for maintenance of the site.

Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R).

OMRR&R - The Standard Operation and Maintenance Manual, Sacramento River Flood Control Project, approved April 1948, will be supplemented for the work completed along the Sacramento River east levee and the American River north levee. New operation and maintenance manuals will be required for work completed along the Natomas Cross Canal, Natomas East Main Drainage Canal and the Pleasant Grove Creek Canal.

The agencies and organizations that would have management responsibility for proposed project features are SAFCA, RD 1000, Natomas Central Mutual Water Company, Sacramento County Airport System, and TNBC.

Future OMRR&R practices would remain the same as current operations for inspection and monitoring, levee mowing, vegetation control, outfall cleaning, etc.

Key Social and Environmental Factors.

Because of the volume of borrow material that must be procured and delivered, the project would result in significant temporary increases in traffic on local roadways and substantial temporary air quality impacts. In addition, due to the need to maintain continuous cutoff wall construction 24 hours per day seven days per week during the seasonally limited period available for construction, temporary short-term noise and vibration impacts affecting residents along the Garden Highway would be substantial at times.

The expansive footprint of the adjacent levee would result in the conversion of a large amount of important farmland to non-agricultural use. Moreover, because of the existence of known prehistoric resources along the Sacramento River, it is possible that project construction activities will encounter these resources as well as other undiscovered cultural resources and human remains. These impacts will be minimized to the extent possible through avoidance

where feasible, recovery and preservation of resources where disturbance is unavoidable and close coordination with representatives of the tribal communities that historically occupied the area.

Because of the habitat components, including the design of the needed borrow operations, the plan would avoid any significant impacts on fish and wildlife habitat in the Natomas Basin. Rather, it would consolidate, expand and connect the habitat preserves under the TNBC's management and thus contribute significantly to the habitat enhancement goals of the Natomas Basin Habitat Conservation Plan.

Mitigation needs for the project have been coordinated with U.S. Fish and Wildlife Service (FWS), NMFS, and the California Department of Fish and Game. This coordination has been occurring over the past 4 years as the project has been going through the 408/404 permit process. During all previous phases of the project, mitigation of project associated impacts has been compensated for sufficiently through the Section 7 Consultation at the Federal level and the 2081 Permit at the State level. No additional compensation has been recommended during coordination under the Fish and Wildlife Coordination Act.

In compliance with ER 1105-2-100, a Biological Assessment has been prepared and coordinated with the resource agencies. Section 7 Consultation under the Endangered Species Act has been on-going as part of the Natomas Levee Improvement Program and this Phase will be appended to the Programmatic Biological Opinion. A Biological Opinion will be received prior to the signing of the Record of Decision (ROD).

Stakeholder Perspectives and Differences.

The Central Valley Flood Protection Board and the Sacramento Area Flood Control Agency fully support the recommended plan. The draft EIS was circulated for public and agency review in July 2010. All comments received and USACE responses are summarized in the Public Involvement Section of the EIS/EIR.

During the general reevaluation study, coordination with the USFWS is being conducted in accordance with the Fish and Wildlife Coordination Act. USFWS will provide the Corps with a draft Coordination Act Report that includes their views on the tentatively selected plan. USFWS had no mitigation recommendations beyond those described through the Section 7 consultation. All USFWS recommendations will be given full consideration.

Environmental Compliance.

The NEPA Document is an Environmental Impact Statement/ Environmental Impact Report (EIS/EIR). The Draft EIS/EIR was released for public review on 2 July 2010, the public review comment period ends on 16 August 2010. Coordination is occurring under the Fish and Wildlife Coordination Act Report will be provided prior to the release of the Final EIS/EIR. A Biologic Assessment has been prepared and sent to the National Marine Fisheries Service to initiate Section 7 consultation or appropriate coordination. Coordination with the California Department of Fish and Game has been ongoing; a 2081 permit application will be submitted by the local sponsor for approval prior to construction.

The project has responded to all resource agency and interested party comments, and compensatory mitigation for environmental losses are included in the plan. The Final EIS/EIR will be made available for 30 days prior to a final decision and a Record of Decision (ROD) being completed.

State and Agency Review.

(To be inserted by HQUSACE after the S&A Review ends.)

Certification of Peer and Legal Review.

Final Agency Technical Review (ATR) was certified on 26 August 2010 with all review comments, with the exception of one previously discussed, satisfactorily addressed. Final legal certification as completed on xx August 2010 by Sacramento District Council with the GRR and EIS/EIR considered legally sufficient. The Cost Engineering Center of Expertise (CX) Review was completed by the Walla Walla District CX and certified on 26 August 2010. The Walla Walla CX review comments resulted in improvement in some of the computations, characterization, descriptive elements and format of the total project cost estimate, but did not significantly affect the relative magnitude of the numbers nor plan recommendation

Policy Compliance Review.

The Policy Compliance Review conducted to date is documented in the Policy Guidance Memorandum dated 27 August 2010, which contains the District responses to all comments. All comments have been incorporated into the final report, EIS/EIR and appendices as appropriate. The final policy review findings will be documented herein when completed by HQUSACE.