ARROYO SECO WATERSHED ECOSYSTEM RESTORATION STUDY, CA

18 OCT 2021

US Army Corps of Engineers

U.S.ARMY

Status of study

- Technical Models and Analyses Completed (for Focused Array of Restoration Plans) - OCT 2016
- Preliminary Best Buy Plans developed (Habitat Output Model and Economics Evaluation) – NOV 2016
- Pre-Tentatively Selected Plan Milestone/In Progress Review with HQ and Division – DEC 2016
- Placed on “Inactive Status” – 10 FEB 2017
- Study activated – MAR 2019
- Congressional Notification – Completed; 6OCT2021

Next steps for completion of study

1. Resumption of Study
   a) Committee Notification (6OCT21)
   b) Amend Feasibility Cost Share Agreement for Contributed Funds

2. Feasibility Study
   a) Update analyses (2015) and assumptions after feedback
   b) Tentatively Selected Plan
   c) Release of Public Draft
   d) Agency Decision Milestone
   e) Final Report
   f) Chief's Report

SCHEDULE

Resumption

Feasibility Study

1. Re-initiation Letter (complete)

2. Committee Notification (complete) ***(OCT2019-OCT2021)***

6-12 months going forward (when coordination restarts)

3. Execution of FCSA Amendment
- rescoping required for updating costs and schedule (inflation; update of analyses required; study assumptions)

Sponsor/ Stakeholders outreach

Update Technical Models/Analyses

1. Tentatively Selected Plan Milestone

2. Release of the Public Draft/ Environmental Impact Statement

3. Concurrent Reviews – Public, Agency, Technical, Policy & Legal

Estimated 24+ months (rescope necessary)

4. Agency Decision Milestone

5. District Engineer Submittal of Final Report

6. Division Transmittal of Final Report

7. Chief of Engineers Report

Note: These projected timelines are for existing Alternatives and project Area. If changes in scope/project area/assumptions anticipated – impact on cost and schedule

Not to Scale

Phases: Study to Construction

Feasibility Phase (Tentatively Selected Milestone to the Chief's Report)

- Total Study Cost and Months needed to complete (Potential rescoping based on change in assumptions)

Planning, Engineering and Design (PED) Phase

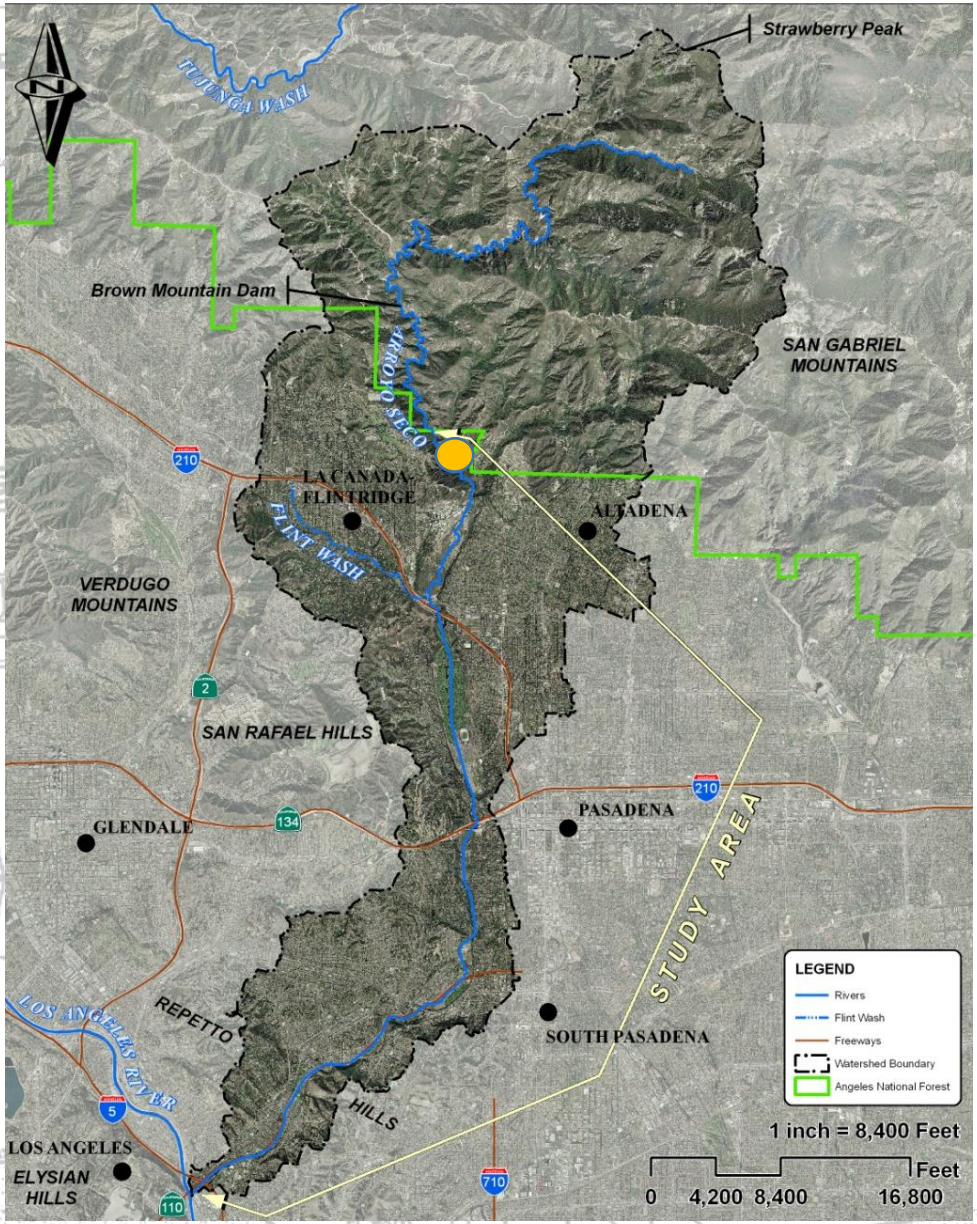
Cost share Fed (65%) to NonFed (35%)

Construction Phase

Cost share Fed (65%) to NonFed (35%)

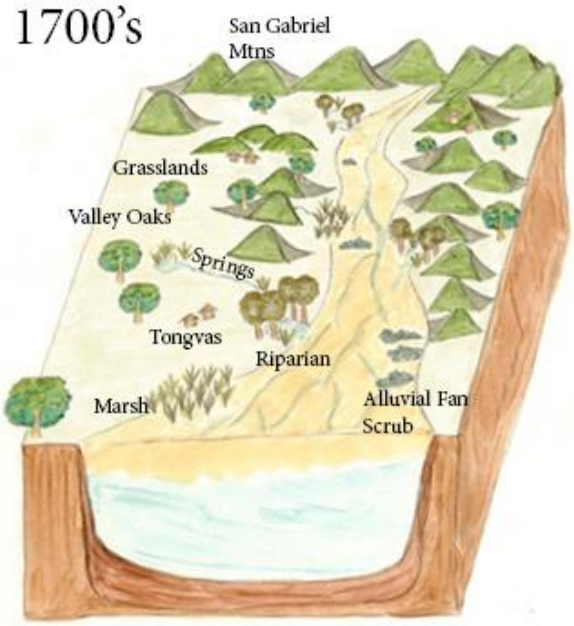
Note: Public Private Partnership (P3 program) being undertaken by USACE HQ (Fargo project completion; LA River in progress). Alternate financing; cost-efficiencies and bundling approach

Project Area



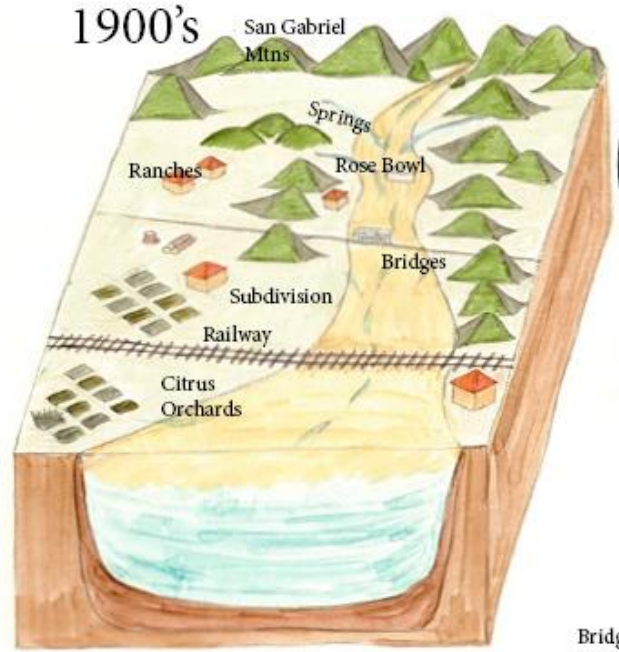
- 10 Miles from border of Angeles National Forest (ANF) - under jurisdiction of National Forest Service, to 0.5 miles u/s from confluence with Los Angeles River (LAR) – part of another Corps study – Los Angeles Ecosystem Restoration Study
- Public ownership
- Channel configurations:
  - Concrete invert with vertical side walls
  - Trapezoidal concrete channel configuration
  - Natural channel

Historical Conditions




Tongvas


Devil's Gate



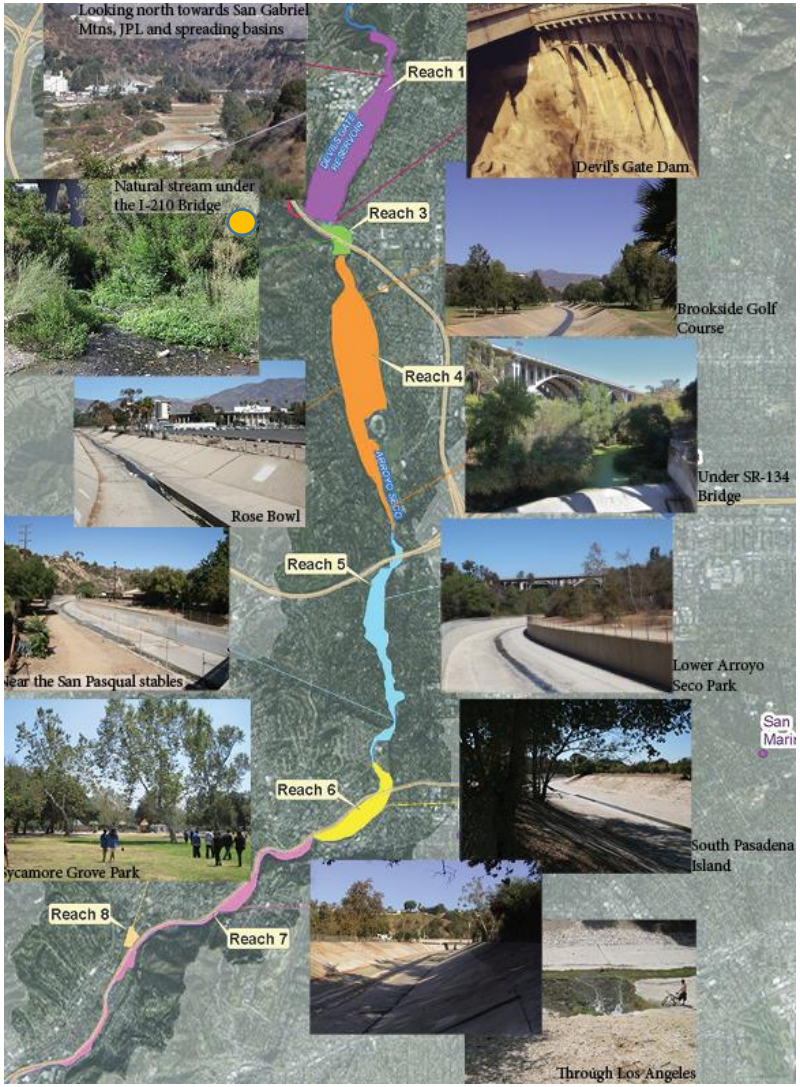

Bridge over Arroyo Seco 1885

Photos from 1880-1897
Pasadena Museum of History

- Theodore Roosevelt in 1903 proclaimed that Arroyo Seco was a splendid natural park and should be kept as it was.
- Before construction of the Devil's gate Dam in 1920, there was good fishing in the arroyo.
- Arroyo Seco varied from the wooded glades to wide stretches of open valley floor.
- Arroyo Seco – "Dry River"

Study Reaches

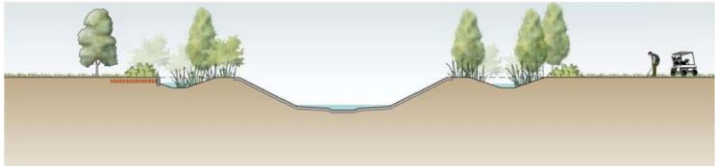
Color	Reach No.	Name	Jurisdictions
	1	Hahamongna Basin *	City of Pasadena
	2	Flint Canyon Wash	City of La Cañada Flintridge
	3	I-210 Near Oak Grove	City of Pasadena
	4a	Brookside - North	City of Pasadena
	4b	Brookside - South	City of Pasadena
	5a	Lower Arroyo Park - N	City of Pasadena
	5b	Lower Arroyo Park - S	City of Pasadena
	6	South Pasadena	City of South Pasadena
	7a	Arroyo Seco - North	City of Los Angeles
	7b	Arroyo Seco - South	City of Los Angeles
	8	Sycamore Grove Park	City of Los Angeles



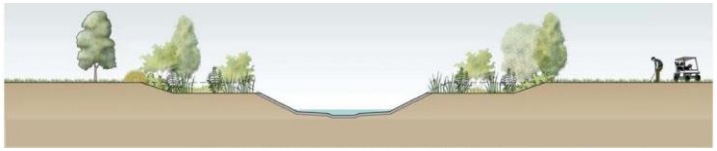
Planning Constraints and Considerations

- Maintain flood risk management function/capability of the Arroyo Seco system
- Availability of water
- Avoid identified existing HTRW sites
- Minimize impacts to existing facilities (e.g. Brookside Golf Course, Arroyo Seco Golf Course, Rose Bowl) and transportation infrastructure
- Minimize adverse impacts to nearby residences (especially historic/culturally significant districts and properties)

Final Array of Measures



Low-Flow Channel
Maximize creating low-flow channel and day-lighting storm drains in study area; Grade control/bank control, habitat-creating measures. Armored back wall.



Notched Side Walls
Maximize creating low-flow channel in study area while modifying side channel walls; Grade control/bank control, habitat-creating measures. Structurally reinforced walls and armored landside slopes.

RCB Culverts with Low-Flow Channel
Maximize creating low-flow channel in study area; main channel in RCB culvert; Grade control/bank control, habitat-creating measures.

Floodplain Benching
Maximize removal of concrete to naturalize the streambed in study area; Grade control/bank control, habitat-creating measures.

Sheetpile Bank Protection with Floodplain Benching
Maximize removal of concrete to naturalize the streambed in study area while reinforcing banks with sheetpiles; Grade control/bank control, habitat-creating measures.

Potential Measures by Reach

MEASURES	REACH									
	2	3	4a	4b	5a	5b	6	7a	7b	8
Low-Flow Channel			■	■	■	■	■	■	■	■
Notched Channel Sidewalls				■		■		■		
Reinforced Concrete Box (RCB) Culverts with Low-Flow Channel				■		■		■		
RCB Culverts with Low-Flow Channel and Pools				■		■		■		
Floodplain Benching			■		■		■			
Floodplain Benching with Pools			■		■		■			
Floodplain Benching with Sheetpiles			■		■		■			
Floodplain Benching with Sheetpiles and Pools			■		■		■			
Invasive Vegetation Removal	■	■								

La Cañada Flintridge
Pasadena
South Pasadena
Los Angeles

Best Buy Plans

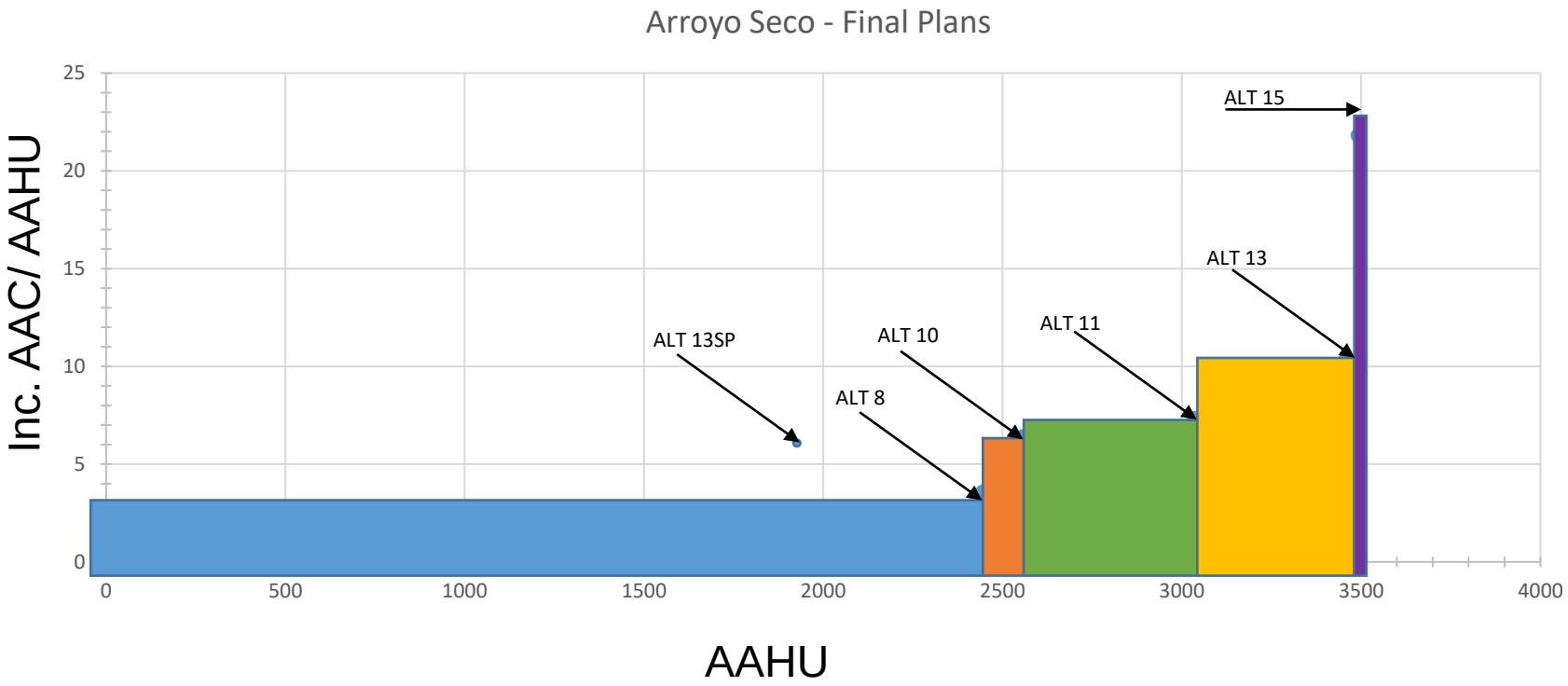
#	Features	Additions	Total First Cost ($1,000)	Output (AAHU)	Cost (AAC) ($1,000)	Cost per Unit
1	No Action	-	0	0	0	0
2	**A1**	Invasive Plant Removal – Reach 2	11	29	0.4	0.0138
3	A1, **B1**	Invasive Plant Removal – Reach 3	22	63	0.9	0.0143
4	A1, B1, **C1**	Low-Flow – Reach 4a	22,021	444	882	1.9863
5	A1, B1, C1, **G1**	Low-Flow – Reach 6	35,135	628	1,406	2.2387
6	A1, B1, C1, **D1**, G1	Low-Flow – Reach 4b	41,483	711	1,659	2.3332
7	A1, B1, C1, D1, G1, **H1**	Low-Flow – Reach 7a	49,708	793	1,987	2.5055
8	A1, B1, **C2**, D1, G1, H1	Floodplain Benching – Reach 4a	207,973	2,444	8,750	3.5802
9	A1, B1, C2, D1, G1, H1, **J1**	Low-Flow – Reach 8	214,361	2,490	9,005	3.6164
10	A1, B1, C2, D1, **E1**, G1, H1, J1	Low-Flow Reach 5a	226,162	2,557	9,476	3.7059
11	A1, B1, C2, D1, **E2**, G1, H1, J1	Floodplain Benching – Reach 5a	311,131	3,035	12,987	4.2790
12	A1, B1, **C3**, D1, E2, G1, H1, J1	Floodplain Benching with Pools – Reach 4a	311,559	3,235	14,515	4.4868
13	A1, B1, C3, D1, E2, **G4**, H1, J1	Sheetpile Benching – Reach 6	381,040	3,458	17,372	5.0237
14	A1, B1, C3, D1, E2, **F1**, G4, H1, J1	Low-Flow – Reach 5b	385,395	3,471	17,562	5.0596
15	A1, B1, C3, D1, E2, F1, G4, H1, **I1**, J1	Low-Flow – Reach 7b	399,084	3,491	18,092	5.1824
16	A1, B1, C3, D1, E2, F1, G4, **H3**, I1, J1	Reinforced Concrete Box Culverts (RCB) – Reach 7a	683,846	3,636	30,723	8.4496
17	A1, B1, C3, D1, **E3**, F1, G4, H3, I1, J1	Floodplain Benching with Pools – Reach 5a	684,261	3,651	32,240	8.8304
18	A1, B1, C3, **D3**, E3, F1, G4, H3, I1, J1	RCB – Reach 4b	876,535	3,716	40,476	10.8923
19	A1, B1, C3, D3, E3, **F3**, G4, H3, I1, J1	RCB – Reach 5b	1,104,904	3,764	50,369	13.3817
20	A1, B1, C3, D3, E3, F3, G4, **H4**, I1, J1	RCB with Pools – Reach 7a	1,104,483	3,770	51,850	13.7533

Note: Costs are FY2015; need updating.
Habitat model needs updating.

Final Array

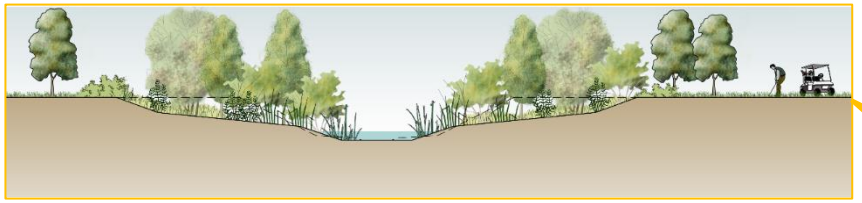
ALT	Reach										First Cost ($1,000)	Restored Area (acres)	AAC ($1,000)	AAHU	AAC/ AAHU	Inc AAC	Inc AAHU	Inc AAC/ AAHU
	2	3	4a	4b	5a	5b	6	7a	7b	8								
1	No Action Plan										0	0	0	0	0	0	0	0
8	IVR	IVR	FB	LF	-	-	LF	LF	-	-	207,973	85.8	8,749	2,444	3.58	8,749	2,444	3.58
10	IVR	IVR	FB	LF	LF	-	LF	LF	-	LF	226,162	92.9	9,474	2,557	3.71	725	113	6.42
11	IVR	IVR	FB	LF	FB	-	LF	LF	-	LF	311,131	125.7	12,986	3,035	4.28	3,511	478	7.35
13	IVR	IVR	FBP	LF	FB	-	SP	LF	-	LF	381,040	138.2	17,371	3,458	5.02	4,386	423	10.37
15	IVR	IVR	FBP	LF	FB	LF	SP	LF	LF	LF	399,084	144.1	18,091	3,491	5.18	720	33	21.82
13SP	IVR	IVR	SP	LF	SP	-	SP	LF	-	LF	289,280	98.6	11,873	1,926	6.16			

Final Array of Plans

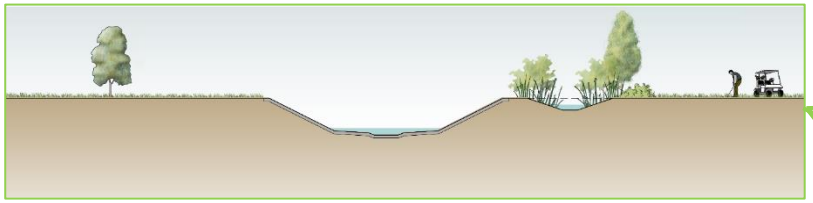


AAHU = Avg Annual Habitat Unit

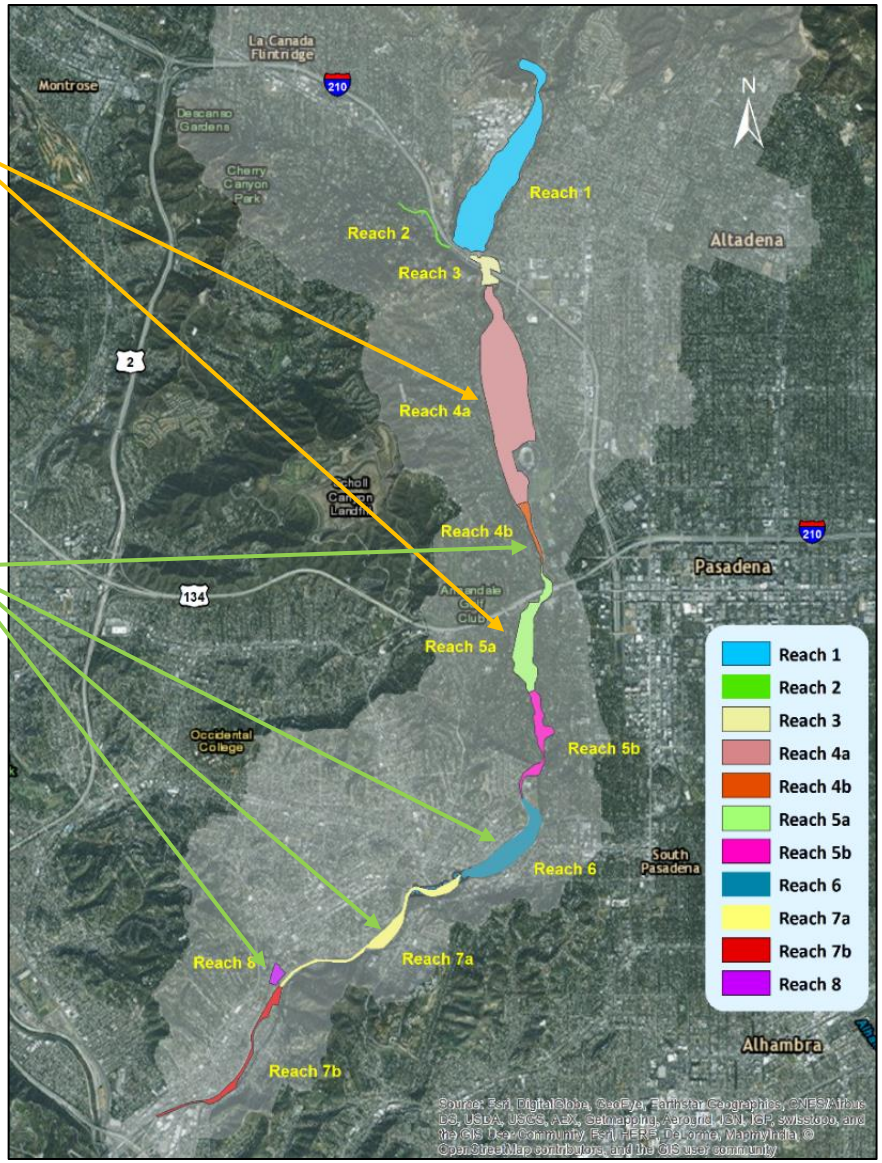
Inc. AAC/AAHU = Incremental Avg Annual Cost/Avg Annual Habitat Unit



Floodplain Benching – Reaches 4a and 5a



Low-Flow Channel – Reaches 4b, 6, 7a, and 8



ALTERNATIVE 11

- First Cost: $311M
- Restored Area: 122.4 acres

Evaluation and Comparison of Array of Alternative Plans : *May need updating*

Analyses

- Hydraulic modeling:
  - utilize updated 2-D version of HEC-RAS model
  - sediment transport analysis
  - Floodplain mapping
  - grade control stabilizers: number and siting determination
  - determination of infrastructure and other bank protection
- Civil Engineering design
- Economic Update
- Cost Engineering ; CE/ICA
- Habitat Model (CHAP)
- Cultural resources analysis
- Real estate needs
- OMRRR

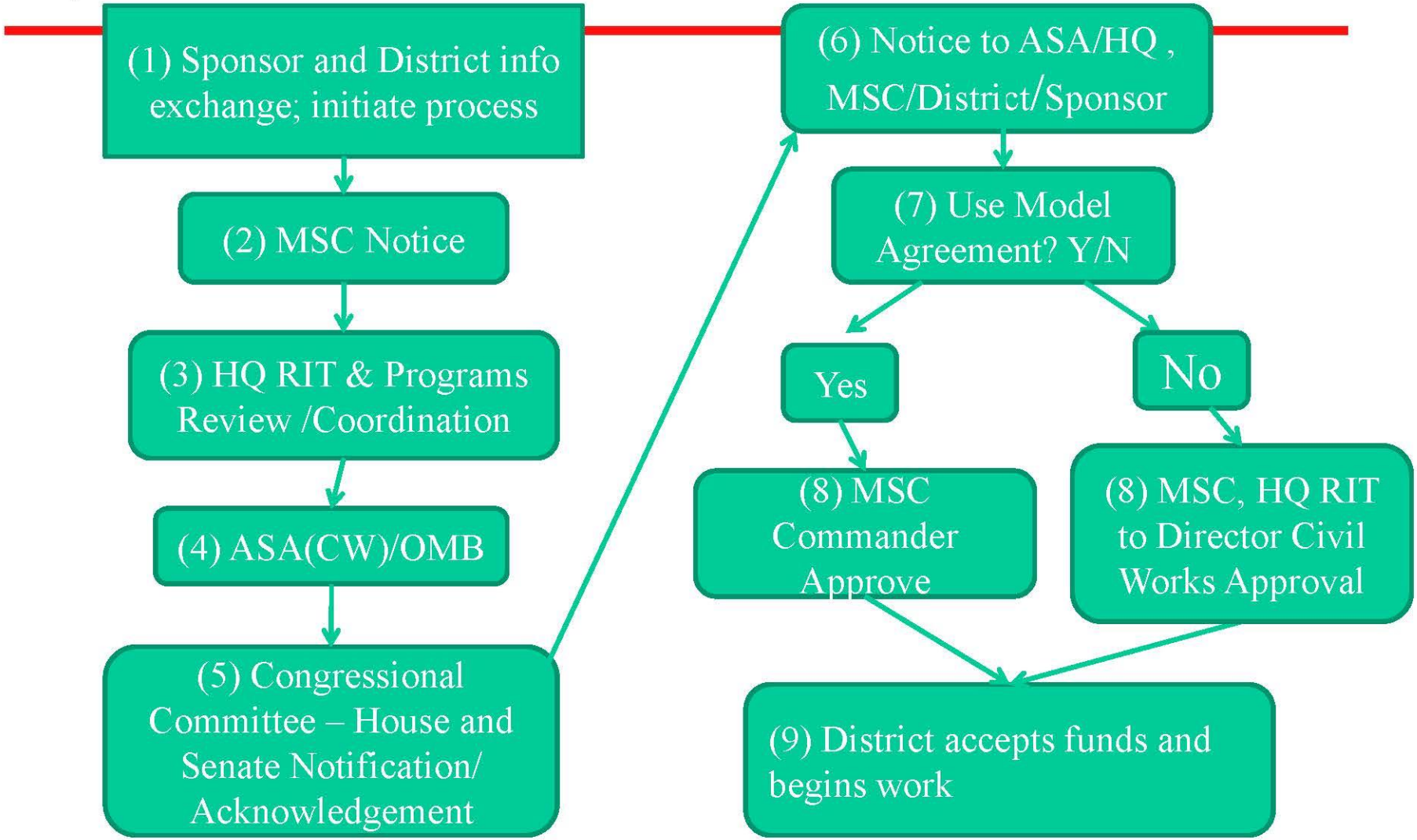
Evaluation Criteria

- Primary
  - CHAP baseline with Best Professional Judgment (BPJ)
  - CE/ICA
- Supporting Evaluation Criteria
  - Flooding impacts and related mitigation costs
  - Impacts to cultural resources
  - Sustainability (adaptive management, O&M)
  - Construction impacts (AQ, noise, etc)
  - Water quality improvements - incidental (qualitative)
  - Recreation benefits (passive) - incidental

Back-up Slides

US Army Corps of Engineers

Contributed Funds Flowchart



Committee notification & Execution of the agreement

Must notify Congress prior to negotiations and acceptance of such funds.

• To initiate Committee notification process, field offices must submit the following information to HQs:

- Draft Committee notification letters
- Written letter from the sponsor committing to funds to complete the study
- Information on the study/project and information on the work to be accomplished with the contributed funds and why accomplishment of such work is in the public interest

Committee notification (continued)

- HQ-RIT drafts memos to Chairmen of House and Senate Appropriations, Subcommittees on Energy and Water Development
- HQ RIT coordinates draft memos within HQ, including Counsel and Policy, and then forwards memos and supporting information to OASA(CW)
- OASA(CW) coordinates draft memos and supporting information with OMB for clearance
- Upon OMB clearance, ASA(CW) signs memos and they are sent to the Committees

Definition of contributed funds

Section 111 of the FY 2012 Energy and Water Appropriation Acts amended 33 USC 701(h).

- Guidance issued in April 12, 2012 memo.
- Contributed Funds are those funds above any statutorily required non-Federal share voluntarily provided by a State (including territories and commonwealths) or political subdivision thereof and Federally recognized Indian tribes for all phases of a water resources development project “in connection with funds appropriated by the United States”.

Definition of contributed funds (-continued)

- No repayment or credit afforded for any contributed funds obligated by the Government. Will refund contributed funds that have not been obligated.
- Contributed Funds can be accepted for planning, design, construction and O&M for a water resources development project, including Continuing Authorities Program