Arroyo Seco Watershed
Ecosystem Restoration
Study

Stakeholder Workshop
Summary Presentation
August 29, 2013
Arroyo Seco Watershed Supporting Agencies

City of Pasadena

City of Los Angeles

City of La Cañada

Flintridge Raymond Basin Management Board

City of South Pasadena
Study Location
THE SIX STEP PLANNING PROCESS

1. Specify Problems & Opportunities
2. Formulate Alternative Plans
3. Evaluate Effects of Alternative Plans
4. Compare Alternative Plans
5. Select Recommended Plan
6. Future Steps

In Progress
Arroyo Seco Watershed Ecosystem Restoration Study

Summary of Progress to Date:

• Present existing and future-without project conditions
• Identify planning objectives and constraints
• Summarize preliminary plan formulation for ecosystem restoration in the watershed
Study Area

Los Angeles County
Department of Public Works

LEGEND
- Rivers
- Foothills
- Reservoirs
- Watershed Boundary
- Angeles National Forest

1 inch = 8,400 Feet
Background

2002 Reconnaissance Study
Determined that multiple water resources issues are present with a federal interest to proceed into a cost shared feasibility study

Potential Outputs Identified in Reconnaissance

- Environmental Restoration
- Water Quality
- Flood Risk Management
- Water Conservation
- Recreation
Ecosystem Restoration projects should be formulated in a systems context to improve the potential for long-term survival of aquatic, wetland, and terrestrial complexes as self-regulating, functioning systems.

Restored ecosystems should mimic, as closely as possible, conditions which occur in the area in the absence of human changes to the landscape and hydrology.
Restoration (-cont)

Those restoration opportunities that are associated with wetlands, riparian and other floodplain and aquatic systems are most appropriate for Corps involvement.

(ER 1165-2-501)
Public Concerns

- Urbanization of the watershed and engineered channels have reduced or eliminated aquatic habitat and restricted access for wildlife
- Urban runoff has affected water quality and altered the hydrology of Arroyo Seco
- Recreational opportunities and public access to Arroyo Seco are limited
Problems and Opportunities

Problems

• Fragmented riparian habitat
• Disturbed hydrologic regime by impervious surfaces and engineered drainage
• Reduced ground-water recharge decreases base flow
• Hard stream bottom has eliminated habitat and disconnected the floodplain
• Lack of open space and public access

Opportunities

• Link habitat fragments
• Provide for fish passage
• Invasive species eradication
• Create alternative stream channels (non-flood conveyance)
• Alter channel banks to accommodate habitat
• Improve water quality through wetland restoration
• Improve access and recreation features
Planning Objectives

- To reduce further ecosystem degradation by restoring water-related habitats
- Restore connectivity of habitats and provide wildlife corridors
- To restore water quality to support aquatic habitat and wildlife
- To design restoration features that mitigate or avoid increased risk of flood damages and channel erosion
- To provide recreational opportunities and aesthetics within the watershed
Planning Constraints/Considerations

- Maintenance of flood damage risk reduction
- Real estate considerations/existing land uses
- Availability of water to support habitat
- Maintain flood storage capacity behind Devil’s Gate Dam
- Existing recreational access and uses
- Avoidance of HTRW
- Avoidance of impacts to endangered species
- Public support and acceptability
- Avoidance of cultural resource impacts
Existing Conditions

- Geologic Hazards and Land Use
- Hydrology and Hydraulics
- Water Quality
- Groundwater
- Vegetation
- Habitats
- Special Status Species
Hydrology

Channel Morphology Prior to LACDA (1938)
Hydraulics

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Habitats

- Riversidian Alluvial Fan Sage Scrub
- Coastal Scrub
- Southern Sycamore Alder Riverine Woodland
- Mulefat Scrub
- Southern Willow Scrub
- Coast Live Oak Forest And Woodland
- Streambed
<table>
<thead>
<tr>
<th>COMMON NAME (Scientific Name)</th>
<th>FEDERAL STATUS</th>
<th>CA STATE STATUS</th>
<th>CNPS STATUS</th>
<th>POTENTIAL FOR OCCURRENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nevin's barberry (<em>Berberis nevinii</em>)</td>
<td>Endangered</td>
<td>Endangered</td>
<td>1B.1</td>
<td>Present</td>
</tr>
<tr>
<td>Slender-horned spineflower (<em>Dodecahema leptoceras</em>)</td>
<td>Endangered</td>
<td>Endangered</td>
<td>1B.1</td>
<td>Unlikely</td>
</tr>
<tr>
<td><strong>Amphibians</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arroyo toad (<em>Bufo californicus</em>)</td>
<td>Endangered</td>
<td>None</td>
<td>NA</td>
<td>Possible</td>
</tr>
<tr>
<td>California red-legged frog (<em>Rana aurora draytonii</em>)</td>
<td>Threatened</td>
<td>None</td>
<td>NA</td>
<td>Unlikely</td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coastal California gnatcatcher (<em>Polioptila californica californica</em>)</td>
<td>Threatened</td>
<td>None</td>
<td>NA</td>
<td>Unlikely</td>
</tr>
<tr>
<td>Least Bell’s vireo (<em>Vireo bellii pusillus</em>)</td>
<td>Endangered</td>
<td>Endangered</td>
<td>NA</td>
<td>Possible</td>
</tr>
<tr>
<td>Southwestern willow flycatcher (<em>Empidonax traillii extimus</em>)</td>
<td>Endangered</td>
<td>Endangered</td>
<td>NA</td>
<td>Possible</td>
</tr>
</tbody>
</table>
Plan Formulation
Management Measures

- Habitat Restoration
  - In-channel vegetation
  - Riparian-fringe vegetation
  - In-stream habitat improvement
  - Invasive species eradication
  - Low-flow channel modification
  - Flow pattern modification (including dam operation)
  - Fish ladder or passage structures
  - Wetland restoration, including open water
  - Terracing
  - Island creation
  - Concrete removal
  - Stream daylighting of existing culverts
  - Sediment redistribution
Management Measures

- Flood Risk Management and Erosion Control (ancillary to ecosystem restoration)
  - Stream meanders
  - Bank stabilization
  - Modification of existing channel banks
  - Drop structures/weirs
  - Grade control structures
  - Storm water retention upstream of channels
Management Measures

- Recreation
  - Recreational Corridor/Trails
  - Access Points
- Water Quality and Water Conservation (ancillary to ecosystem restoration)
  - Stormwater best management practices
  - Treatment wetlands
  - Retention/infiltration basins
  - Riparian buffers
Management Measures

Non-structural Measures

- Coordination of policies and strategies with CASA stakeholders
- Stormwater-sensitive site planning and design
- Watershed education plan
- Street sweeping
- Citizen monitoring program
- Local government ordinances and policies
- Reduce areas of impervious surfaces
- Storm drain disconnections
- Open land acquisition
Alternatives For Consideration

- No Action
  - Continued operation and maintenance of flood damage risk reduction project for Arroyo Seco
  - Basis for future without conditions for period of analysis
Alternatives For Consideration

❖ Floodplain Reconnection
- Diversion of water from Arroyo Seco into side channels.
- Allow sediment to pass beyond the dam.
- Excavation of off-stream channels or backwaters.
- Creating terraces above the existing channel and revegetating with native plants.
- Restoring wetlands in the floodplains.
- Stream daylighting of tributaries.
- Modifying bank slopes for riparian buffers.
Alternatives For Consideration

❖ Invasive Plant Eradication/Revegetation
  • In-channel vegetation plantings.
  • Flow modification to favor native species over non-native species.
  • Sediment redistribution to enhance substrate conditions for revegetation.
  • Invasive non-native species removal.
  • Establishment of riparian-fringe vegetation and riparian buffers.
Alternatives For Consideration

- Wetland Restoration/Enhancement
  - Modify flow to support off-channel habitat
  - Provide low-flow channels to divert water
  - Construct stormwater treatment wetlands
  - Install retention basins to reduce bed and bank erosion
  - Include recreational and educational features at wetland areas.
Alternatives For Consideration

- Fish Passage, Rearing and Forage
  - Fish ladder/passage systems
  - Reconnection of the main channel to small tributaries
  - Reestablishing riparian forest at the stream’s edge to provide organic input and shade
  - In-channel restoration to provide habitat and complexity.
Identification of Candidate Restoration Sites

- Start with a consideration of the entire watershed
- Focus on major restoration opportunities and potential benefits
- Consider potential for connectivity and sustainability
- Avoid conflicts with planning constraints
- Consider input of the public and local agencies (incorporate outside expertise)
Candidate Restoration Sites

Legend:
- Arroyo Seco
- Hahamongna Area (Site#1)
- Flint Wash (Site#2)
- 210 Fwy near Oak Grove Dr (Site#3)
- Brookside Area (Site#4)
- Lower Arroyo Seco Park (Site#5)
- South Pasadena Island (Site#6)
- Arroyo Seco - Los Angeles (Site#7)
- Sycamore Grove Park (Site#8)
- Rainbow Canyon (Site#9)

1 inch = 6,000 Feet

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## Hydrology
(HEC-HMS Return Flows)

<table>
<thead>
<tr>
<th>Location</th>
<th>Drainage Area (sq mi)</th>
<th>2-year flow (CFS)</th>
<th>100-year flow (CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Devil’s Gate Dam</td>
<td>31.6</td>
<td>399</td>
<td>10,100</td>
</tr>
<tr>
<td>2. Brookside Park</td>
<td>36.8</td>
<td>678</td>
<td>11,200</td>
</tr>
<tr>
<td>3. Lower Arroyo Seco Park</td>
<td>37.5</td>
<td>791</td>
<td>11,800</td>
</tr>
<tr>
<td>4. South Pasadena Island</td>
<td>39.4</td>
<td>1,060</td>
<td>13,200</td>
</tr>
<tr>
<td>5. Sycamore Creek Park</td>
<td>44.5</td>
<td>2,110</td>
<td>17,800</td>
</tr>
<tr>
<td>6. Upstream of LA River Confluence</td>
<td>46.2</td>
<td>2,430</td>
<td>19,200</td>
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</table>
Hydraulics

**ARROYO SECO CHANNEL CROSS-SECTION**

**TYPICAL SECTION (TRAPEZOID)**

<table>
<thead>
<tr>
<th>River STA.</th>
<th>1850.736 (Marmion Way)</th>
<th>River STA.</th>
<th>3108.139 (530' from 4.8 of Dam &amp; Crest)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (L.A.R.)</td>
<td></td>
<td>2982.98 (Seco St.)</td>
<td></td>
</tr>
</tbody>
</table>

**TYPICAL SECTION (RECTANGLE)**

<table>
<thead>
<tr>
<th>River STA.</th>
<th>1850.738 (Marmion Way)</th>
<th>River STA.</th>
<th>2768.759 (Colorado Bl. Landmark Bridge)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2850.714 (450' below Holly St.)</td>
<td></td>
<td>2989.628 (Seco St.)</td>
<td></td>
</tr>
</tbody>
</table>

**SCALE: NONE**

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Department of Public Works

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Water Quality
303(d) Impaired Waters
Groundwater
Vegetation

Los Angeles County
Department of Public Works
Habitats

Riversidian Alluvial Fan Sage Scrub (in Hahamongna)

Coastal Scrub (upstream of JPL)
Habitats

Southern Sycamore Alder Riverine Woodland
(downstream of Devil’s Gate Dam)

Mulefat Scrub
(edge of Hahamongna reach)
Habitats

Southern Willow Scrub
(confluence of Arroyo Seco and Flint Wash)

Landscaped Vegetation
(at Sycamore Grove Park)
Habitats

Coast Live Oak Forest
And Woodland
(Oak Grove area of Hahamongna)

Streambed
(between Devil’s Gate and Highway 134)
Restoration Site 1
Hahamongna (Devil’s Gate Basin)
Restoration Site 2 Flint Wash
Restoration Site 3
210 Freeway Near Oak Grove
Restoration Site 4 Brookside Area

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Restoration Site 7
Arroyo Seco - Los Angeles
Restoration Sites 8 and 9
Sycamore Grove and Rainbow Canyon