ALDER CREEK
WATERSHED

Management Recommendations

Chapter 5

5 Management Recommendations

This chapter presents recommendations for the protection, restoration, and long-term stewardship of the Alder Creek watershed. It describes the process used to develop the recommendations, followed by summary descriptions of each recommended policy and project.

5.1 Process Used to Develop Recommendations

Recommendations for the protection of the Alder Creek watershed were identified through a dynamic process that relied on the results from the watershed assessment and input from stakeholders regarding their "preferred future" for the watershed. The process included a review of the historic and existing natural resource conditions and planning influences in the Alder Creek watershed to identify the important beneficial natural resource functions and values (see Chapter 2). Key community values and concerns regarding watershed protection were considered to identify where priorities should be placed (see Chapter 3). A synthesis of the assessment results highlighting the interrelated and complex relationship between cause-and-effect linkages for the different resource areas was prepared, and opportunities and constraints were identified and analyzed to provide a logical method to identify potential policies and projects (see Chapter 4).

The final list of recommendations satisfy a wide range of watershed protection criteria and in general, are consistent with local, state, and federal plans, policies and regulations. It should also be noted that all recommendations are intended to be directed to sites where the landowner, land manager and/or community is accepting of the recommendation and willing to support and participate in its implementation.

> *"We envision a future in which Alder Creek, associated waterways, and surrounding buffers are protected and restored to support diverse ecosystem functions and recreation. Multi-functional stream corridors shall provide open space for the community as well as flood water attenuation, water quality treatment, and habitat for plants, fish, and wildlife. Residents, businesses, organizations, landowners, and government agencies will work collaboratively to implement policies and practices to achieve this vision and protect our local waterways."*
>
> In April 2008, the Alder Creek watershed stakeholder group articulated this vision statement that summarizes its "preferred future" for the Alder Creek watershed

Each of the recommended policies and projects in this Plan were selected to achieve one or more of the following eight watershed protection criteria that were developed based on the stakeholders vision for a preferred future for the watershed:

1. **Habitat** – Protection, restoration, and enhancement of vegetation communities and aquatic resources, which provide habitats for numerous plant, wildlife, and fish species.

2. **Water Quality** – Protection and maintenance of water quality, which provides many beneficial uses in and downstream of the watershed.

3. **Ecosystem Processes** – Protection, restoration, and enhancement of essential ecosystem processes throughout the watershed, including interrelated physical, chemical, and biological processes that are vital for the maintenance of habitats and water quality. For example, floodplain processes involves the overbanking of water from the creek channel onto the adjacent floodplain, which results in the exchange of nutrient and materials (e.g., sediments, organic matter) and supports riparian vegetation recruitment and succession.

4. **Connectivity** – Protection, restoration, and enhancement of hydrologic, biologic, and human connectivity throughout the watershed and the larger region.

5. **Recreation** – Protection, restoration, enhancement, creation of important recreational amenities and opportunities throughout the watershed and the region for the enjoyment of the public.

6. **Stewardship and Education** – Development, implementation, and promotion of important education, interpretation, and stewardship opportunities throughout the watershed for the enjoyment and enrichment of the public.

7. **Flood Protection** – Protection, restoration, and enhancement of the watershed's ability to effectively convey floodwaters and provide flood control services for the surrounding community.

8. **Collaboration** – Residents, businesses, organizations, landowners, and government agencies working collaboratively to implement policies and practices to achieve this vision and protect local waterways.

> *"The overarching goal of the Alder Creek Watershed Project and Plan is to gather stakeholders together to prepare a watershed management action plan that will describe existing conditions and recommend projects or actions to protect the health of the watershed and the creek in light of planned future development."*
>
> Stated goal for the Alder Creek Watershed Project and Plan (CALFED Watershed Grant application)

5.2 Categories of Recommendations

Two primary categories of recommendations are included in this Plan to achieve watershed management goals and to broadly recognize the different requirements for addressing policy-based watershed protection, as well as on-the-ground projects to protect and restore natural resources. Together, these different categories express the direction that will guide future management and stewardship of the watershed:

1. **Policies** –Two types of policies for watershed protection and management are recommended to apply to future development projects in the Alder Creek watershed:

   - policies for development planning, and
   - policies for development design and implementation.

2. **Projects** – Two types of projects are recommended for which on-the-ground activities could be implemented to achieve watershed management goals and protection criteria:

    - watershed-wide projects
    - site-specific projects

Tables 5-1a and 5-1b present summary lists of the recommended policies and projects for the Alder Creek watershed. Table 5-1b gives a relative indication of magnitude of project cost and readiness as well as most likely stakeholder partners. Project readiness is presented as immediate (ready for action now without the need for extensive planning and permitting and likely can be conducted using volunteers and in-kind resources), versus those projects that are near-term (less than a year likely required for minor planning, approvals, and/or permits, and funding may not be immediately available), and finally those that are more long-term in nature (likely requiring more than a year to conduct planning or obtain permits and other approvals, and funding needs to be identified/secured). Following the summary tables, further descriptions and details for each recommendation are presented in Sections 5.3 and 5.4.

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Table 5-1a Summary of Recommended Policies for the Alder Creek Watershed											
		Watershed Criteria									
		Habitat	Water Quality	Ecosystem Processes	Connectivity	Recreation	Stewardship and Education	Flood Protection	Collaboration		
Policies for Development Planning (DP)											
DP-1 Recommendations Related to Land Use Design for Watershed Protection											
DP-1.1	Implement resource-based land use planning principles to minimize impacts on sensitive resources and the resulting mitigation requirements.	•	•	•	•		•	•	•		
DP-1.2	Implement a constraints analysis to identify, avoid, and/or minimize the fill of wetlands, waterways, vernal pool/swale complexes, and other sensitive aquatic resources where feasible.	•	•	•	•		•	•			
DP-1.3	Avoid fragmentation of preserved land.	•		•	•		•		•		
DP-1.4	Provide variable width and tiered buffers for protection along creek corridors and other sensitive water bodies.	•	•	•	•	•	•	•			
DP-1.5	Include an additional landscaped buffer between developed and natural areas.	•	•	•	•	•	•	•			
DP-1.6	Avoid locating more intensive land uses, including industrial uses that would be more likely to create disturbances and/or contribute pollution and runoff, adjacent to buffers.	•	•	•	•						
DP-1.7	Encourage and allow orientation of buildings and developments toward preserved creek corridors and natural lands to highlight the resource as a community amenity and to promote interpretation and stewardship.				•	•					
DP-1.8	Use clear span bridges wherever feasible and bottomless arch culverts to accommodate high flows and future trails, preserve hydrologic and geomorphic processes and functions (e.g., natural floodplain meanders), and preserve wildlife habitat and movement corridors.	•	•	•	•	•	•	•	•		
DP-1.9	Avoid installing utilities across creek corridors or within creek buffers to limit disturbance of sensitive resources caused by installation and future utility operation and maintenance activities.	•	•	•	•			•			
DP-2 Recommendations Related to Water Quality Protection											
DP-2.1	Before construction-related ground disturbance related to watershed development, consider the potential for release, transport, accumulation, and exposure of sediment and potential associated pollutants (e.g., mercury) in downstream stormwater detention basins and aquatic ecosystems (e.g., Alder Creek and its tributaries, Alder Reservoir, Alder Pond, Lake Natoma, and the American River).	•	•	•							
DP-3 Recommendations Related to the Protection of Hydrologic and Geomorphic Processes and Functions											
DP-3.1	Implement controls consistently with the Sacramento Stormwater Quality Partnership's (SSQP) forthcoming Hydromodification Management Plan (HMP) to manage the increases in magnitude, volume, and duration of runoff from development projects (hydromodification) in order to protect receiving waters from increased potential for erosion and other adverse impacts (see cbec (2010) in Appendix E).	•	•	•	•			•			
DP-3.2	Preserve natural floodplain areas (i.e., avoid encroachment) sufficiently to accommodate at least the 200-year flood event.	•	•	•	•			•			
DP-3.3	Promote on-site detention and retention (infiltration) where feasible to mitigate increased stormwater and nuisance flows resulting from development.		•	•				•			
DP-3.4	Implement designs that promote infiltration, reuse, and evapotranspiration of rainfall from impervious areas where feasible.	•	•	•				•			

Table 5-1a
Summary of Recommended Policies for the Alder Creek Watershed (continued)

		Watershed Criteria							
		Habitat	Water Quality	Ecosystem Processes	Connectivity	Recreation	Stewardship and Education	Flood Protection	Collaboration
Policies for Development Planning (DP) (continued)									
DP-3.5	Minimize piping of existing drainages to the extent feasible.	•	•	•	•			•	
DP-3.6	Avoid realigning and straightening waterways and drainages.	•	•	•	•			•	
DP-3.7	Avoid grading in waterways and lower and middle tiered buffers except to restore or enhance the creek profile or habitat.	•	•	•					
DP-3.8	Avoid erosion of constructed or regraded slopes, especially when located near waterways (e.g., earthen bridges, floodwater conveyance structures), by minimizing slope gradients and employing natural stabilization (biotechnical) techniques.	•	•	•				•	
DP-3.9	Design development to conform to natural topographic contours, and maintain natural drainage patterns as much as possible; avoid leveling contours.		•	•				•	
DP-3.10	Modify channels to increase their stormwater conveyance capacity only where absolutely necessary so that the preservation of natural functions is maximized; favor off-stream stormwater detention.	•	•	•	•			•	
DP-3.11	Avoid the concentration of runoff to a few large outlet points (outfalls); favor the use of multiple smaller outlets treating smaller drainage areas.		•	•				•	
DP-4 Recommendations Related to the Protection of Wildlife, Plant Communities, and Habitat									
DP-4.1	Preserve diverse riparian and wetland plant communities and wildlife habitats.	•	•	•	•			•	
DP-4.2	Identify restoration and enhancement opportunities in degraded creek corridors to provide higher value wildlife habitat and natural water quality treatment (e.g., shade creek corridors to minimize water temperature increases and the production of nuisance aquatic plants).	•	•	•			•	•	•
DP-4.3	Incorporate treatment wetlands and other biological water quality BMPs (e.g., extended detention, wet ponds, bioretention, filtration, infiltration, swales) into the stormwater system to provide additional habitat while treating stormwater runoff.	•	•	•			•	•	•
DP-4.4	Incorporate the restoration and enhancement of riparian and wetland communities into the proposed drainage facilities.	•	•	•			•	•	•
DP-4.5	Revegetate disturbed creek corridors in a manner that is consistent with pre-development conditions.	•		•	•				
DP-4.6	Use only native species when revegetating lower tiered creek buffer areas, and encourage the use of native or appropriate drought-tolerant species when revegetating the upper tier or landscaped areas.	•		•	•				
DP-4.7	Where solid bridges are necessary, install wildlife underpasses to maintain wildlife movement through the bridge; for all bridges, maintain natural creek bottoms in waterway crossings (e.g., use bottomless culverts or bridges) where feasible.	•		•	•			•	
DP-4.8	Minimize artificial lighting in and around creek and open space corridors. Limit lighting around public facilities to the extent necessary for public safety. Direct lighting away from creek corridors when lighting is necessary in areas adjacent to the creek corridors.	•			•				

Table 5-1a Summary of Recommended Policies for the Alder Creek Watershed (continued)										
		Watershed Criteria								
		Habitat	Water Quality	Ecosystem Processes	Connectivity	Recreation	Stewardship and Education	Flood Protection	Collaboration
Policies for Development Planning (DP) (continued)									
DP-4.9	Site or orient active play areas, industrial sites, loading docks, and other noise-generating land uses away from creek corridors and other natural open spaces, where feasible.	•							
DP-4.10	Use earthen berms or vegetated barriers rather than solid walls for noise reduction measures adjacent to creek corridors.	•			•				
DP-4.11	Minimize exclusionary fencing around preserved open spaces to allow wildlife passage and to reduce long-term maintenance costs.	•			•				
DP-4.12	Provide a continuous wildlife corridor of sufficient and variable width on both sides of creeks.	•			•				
DP-4.13	Monitor and control invasive plants in the creek and adjacent wildlife corridor.	•	•	•	•		•	•	•
DP-5 Recommendations Related to Recreation Opportunities and Trails									
DP-5.1	Develop a trail system that provides human and ecological connectivity	•		•	•	•	•	•	
DP-5.2	Wherever possible, construct trails and other recreation amenities to Americans with Disabilities Act standards, including providing accessible restroom facilities, ramping at-grade transitions, and avoiding architectural barriers.				•	•	•		
DP-5.3	Consider the development of both Class I trails and adjacent natural-surface single-track trails to separate users, provide a variety of user experiences, and discourage the development of unauthorized social trails.	•			•	•	•		
DP-5.4	Provide grade-separated crossings at intersections with roads with more than two lanes to allow uninterrupted passage of wildlife and trail users.	•			•	•	•		
DP-5.5	Provide adequate vertical clearance under all grade-separated crossings to allow adequate space for the permitted uses (i.e., bicycle, equestrian, and pedestrian travel).				•	•	•		
DP-5.6	Incorporate firebreaks or fuel management zones with roadway or trail crossings when possible.				•	•	•		
DP-5.7	Provide public parking at major creek corridor access points (e.g., trailheads).				•	•	•		
DP-5.8	Site bike trails in areas of low ecological sensitivity (e.g., upland terrace, stable or rocky soils, mature plant community), and site only walking trails in areas of moderate ecological sensitivity (e.g., lowland terrace, river valley, suitable soils, successional plant community).				•	•			
DP-5.9	When possible site trails and bridges outside the 100-year floodplain as defined by the U.S. Army Corps of Engineers. Any trails that are located within the 100-year floodplain shall be subject to permit approval and constructed of concrete and no oil-based paving product.		•		•	•		•	
DP-5.10	Accommodate drainage patterns when siting trails; maintain unobstructed flows of minor (seasonal or ephemeral) drainages crossed by trails.				•	•		•	
DP-5.11	Blend trails with the natural contours of the land; site trails along corridors of gradual cross slope to minimize the need for cut and fill of hillsides.	•	•	•	•	•		•	

Table 5-1a
Summary of Recommended Policies for the Alder Creek Watershed (continued)

		Watershed Criteria							
		Habitat	Water Quality	Ecosystem Processes	Connectivity	Recreation	Stewardship and Education	Flood Protection	Collaboration
Policies for Development Planning (DP) (continued)									
DP-5.12	Maintain a vegetated buffer between trails and waterways where feasible.		•		•	•			
DP-5.13	Site trails to minimize the removal of trees and other vegetation.	•			•	•			
DP-5.14	Encourage the use of existing disturbed areas such as power line and railroad corridors for bike path alignments.	•			•	•			
DP-6 Recommendations Related to Long-Term Management of Preserved Natural Lands									
DP-6.1	Maintain ownership of all preserved natural lands with an appropriate nonprofit, public, or private entity dedicated to managing and protecting land for conservation. Dedicate preserved natural lands to this entity through fee title or easement before development occurs.	•	•	•	•	•	•	•	•
DP-6.2	Place a conservation easement, to be held and managed by a qualified third party (e.g., a conservancy of trust recognized by the state or accredited by the Land Trust Accreditation Commission), over preserved natural lands.	•	•	•	•	•	•	•	•
DP-6.3	Provide an endowment or other proven financing mechanism to fund maintenance of preserved open spaces by a third party.	•	•	•	•	•	•	•	•
DP-6.4	Prepare a long-term management plan for preserved natural lands.	•	•	•	•	•	•	•	•
Policies for Development Design and Implementation (DDI)									
DDI-1 Recommendations Related to Water-Sensitive Urban Design									
DDI-1.1	Recommendations for watershed natural areas, creek buffer areas, parks, and open spaces.	•	•	•	•			•	
DDI-1.2	Recommendations for watershed public rights-of-way and streetscape design	•	•	•				•	
DDI-1.3	Recommendations for lot-scale design	•	•	•	•			•	
DDI-2 Recommendations Related to Tributary Drainage Design									
DDI-2.1	Recommendations to promote and maintain natural surface water drainages		•	•	•			•	
DDI-3 Recommendations Related to Stormwater Detention Basin Design									
DDI-3.1	Design detention basins to capture and hold overland and stormwater runoff during low- and high-flow events.		•	•				•	
DDI-4 Recommendations Related to Stormwater Outfall Design and Location									
DDI-4.1	Incorporate vegetated swales into outfall designs.		•	•				•	
DDI-4.2	Design vegetated riprap where outfall designs call for increased protection.		•	•				•	
DDI-4.3	Install live poles in drainages to improve stabilization.		•	•				•	
DDI-4.4	Incorporate drop inlet structures to reduce erosion potential.		•	•				•	
DDI-5 Recommendations Related to Creek Crossing Designs									
DDI-5.1	Bridges are recommended where multilane roads cross intermittent and perennial creeks and/or important wildlife and trail corridors.	•	•	•	•			•	
DDI-5.2	Bottomless culverts are recommended where multilane roads cross intermittent and ephemeral drainages (i.e., tributary drainages) and construction of a bridge would be cost prohibitive.		•	•	•			•	
DDI-5.3	Fish-friendly culverts are recommended for trails and one-lane roads. The culvert should be relatively short with a mild gradient and have baffles or other rest areas to facilitate fish passage.	•	•	•	•			•	

Table 5-1a Summary of Recommended Policies for the Alder Creek Watershed (continued)											
		Watershed Criteria									
		Habitat	Water Quality	Ecosystem Processes	Connectivity	Recreation	Stewardship and Education	Flood Protection	Collaboration		
Policies for Development Design and Implementation (DDI) (continued)											
DDI-6 Recommendations Related to Trail Designs That Maintain Water Quality											
DDI-6.1	Outslope the trail surface to allow surface runoff to flow in sheets across the trail, avoiding potential erosion issues caused by concentration of runoff on the trail.		•	•		•		•			
DDI-6.2	Incorporate rolling dips and grade reversals into the trail grading plan so that they align with seasonal and ephemeral drainages, thereby maintaining natural, unobstructed flow in these drainages.		•	•	•	•		•			
DDI-6.3	Site trails to protect water quality.		•			•		•			
DDI-6.4	Armor natural trail surfaces with rock at creek and drainage crossings to prevent damage to the channel. Use bridges or bottomless culverts to cross perennial creeks to avoid impacts on riparian and aquatic habitats.	•	•	•	•	•		•			
DDI-6.5	Align trails on the contour of a slope, and keep the average grade of the trail under 5%. Keep the maximum trail grade under 8%.		•	•		•		•			
DDI-6.6	Construct raised boardwalks across flat areas that receive seasonal wetting or inundation when an alternative alignment is not available.		•	•				•			
DDI-6.7	Trash receptacles should be located at regular intervals and intersections to reduce the accumulation of litter. Provide bags to encourage pet owners to pick up after their dogs.		•				•				
DDI-6.8	Provide adequate vertical clearance under all grade-separated crossings to allow adequate space for the permitted uses (e.g., bicycle, equestrian, and pedestrian travel).	•	•	•	•	•		•			
DDI-7 Recommendations Related to Natural (Biotechnical) Methods for Streambank Stabilization and Protection											
DDI-7.1	Utilize flow directing structures to stabilize and protect streambanks.		•	•				•			
DDI-7.2	Utilize ground covers as resistive measures to provide bank stability.		•	•				•			
DDI-7.3	Utilize revetments as resistive measures to absorb creek flow energy by covering or arming the bank with additional structural support.		•	•				•			

Table 5-1b Summary of Recommended Projects for the Alder Creek Watershed				
Project Number	**Project Name**	**Relative Cost[1]**	**Project Readiness[2]**	**Potential Partners**
Watershed-wide Projects (WWP)				
WWP-1	Recommended Watershed-wide Project No. 1 – Convene an Advisory Committee to Recommend Preferred Governance Structure for Watershed Stewardship Group	Low	Immediate	All interested stakeholders (note: ideally the organizing committee should be subset of the stakeholder group that assisted to prepare this Plan)
WWP-2	Recommended Watershed-wide Project No. 2 – Establish Watershed Stewardship Group	Low	Near-term; implement after WWP-1	All interested stakeholders, City of Folsom, Sacramento Area Creeks Council, Folsom ACT, Friends of the Folsom Parkway
WWP-3	Recommended Watershed-wide Project No. 3 – Establish the Alder Creek Watershed Coordinator Position	Low to Medium	Near-term; ideally implement in conjunction with WWP-2	All interested stakeholders, City of Folsom, Sacramento Area Creeks Council, Folsom ACT, Friends of the Folsom Parkway
WWP-4	Recommended Watershed-wide Project No. 4 – Invasive Weed Removal Strategy	Low to medium	Near-term (City/landowner approvals, encroachment permits)	All interested stakeholders, City of Folsom, California State Parks, Folsom ACT, Friends of the Folsom Parkways, California Native Plant Society (Sacramento Weed Warriors Program), USDA/UC Davis, Sacramento Area Creeks Council, neighborhood associations and community facility districts
WWP-5	Recommended Watershed-wide Project No. 5 – Tree Planting Program	Low to medium	Near-term	All interested stakeholders, City of Folsom Parks Dept, Sacramento County Regional Parks, Friends of the Folsom Parkways, Sacramento Tree Foundation, Sacramento Municipal Utility District (shade tree program), Sacramento Valley Conservancy
WWP-6	Recommended Watershed-wide Project No. 6 – Water Use Efficiency Outreach and Education	Low to medium	Near-term	City of Folsom Dept. of Utilities and Sacramento County Water Agency (local water agency), private landowners, Regional Water Authority
WWP-7	Recommended Watershed-wide Project No. 7 – Promote River Friendly Landscaping in the Alder Creek Watershed	Low to medium	Immediate	City of Folsom, Sacramento County, River Friendly Landscape Coalition (including Regional Water Authority)
WWP-8	Recommended Watershed-wide Project No. 8 – Watershed Open Space/Conservation Easement Catalog	Low to medium	Immediate	City of Folsom, Sacramento County, Sacramento Valley Conservancy, private landowners
WWP-9	Recommended Watershed-wide Project No. 9 – Connected Creek Trails, Open Space, and Interpretive Signage	Medium to high	Near- to long-term: Permits, environmental compliance and other approvals would be required	City of Folsom Parks Dept, Sacramento County Regional Parks, California State Parks, USBR, Sacramento Valley Conservancy, Caltrans, Friends of Folsom Parkways, Folsom ACT, private landowners
WWP-10	Recommended Watershed-wide Project No. 10 – Alder Creek Watershed Stewardship Program	Low to medium	Immediate	City of Folsom, GenCorp, Sphere of Influence Landowner Group, Folsom Adopt and Creek/Trail, Friends of the Folsom Parkways, Trout Unlimited, Folsom Lake College, Sacramento Audubon Society, REI, neighborhood associations, local Boy Scout and Girl Scout troops, Folsom-Cordova Unified School District, Sacramento Area Creeks Council, Sacramento Valley Conservancy
WWP-11	Recommended Watershed-wide Project No. 11 – Alder Creek Watershed Monitoring Program	Low to medium	Near-term: requires some planning and funding; collection permits may be required for certain activities	Work should be guided by stakeholder group, with projects and tasks conducted by, or in collaboration with, local municipalities and agency stormwater programs, private landowners, environmental organizations, and community volunteer groups.

Table 5-1b
Summary of Recommended Projects for the Alder Creek Watershed (continued)

Project Number	Project Name	Relative Cost	Project Readiness	Potential Partners
Site-Specific Projects (SSP)				
SSP-1	Recommended Site-Specific Project No. 1 – Alder Pond Restoration and Management	Medium to high	Long-term	California State Parks, U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, California Department of Transportation, Folsom Automall Dealer Association, City of Folsom, and private landowners
SSP-2	Recommended Site-Specific Project No. 2 – Alder Creek Channel and Floodplain Restoration	Medium to high	Long-term	City of Folsom, Sacramento County, California Department of Water Resources (DWR), Division of Safety of Dams (DSOD), and private landowners
SSP-3	Recommended Site-Specific Project No. 3 – Natomas Company Dam / Alder Reservoir Management	Medium to high	Near-term: structural and other analyses. Long-term: implementation of any necessary retrofits	City of Folsom, Sacramento County, DSOD, private landowners
SSP-4	Recommended Site-Specific Project No. 4 – Stormwater Detention Pond Management	Medium to high	Near to long-term	City of Folsom, private landowners, California Native Plant Society (Weed Warriors), USDA/UC Davis

[1] Relative cost: Low = < $5,ooo and/or can be conducted using volunteers and in-kind services/funding; Medium = $5,000 to $100,000; High = > $100,000

[2] Project readiness refers to the project's requirements regarding the need for detailed planning and design, environmental compliance (e.g., CEQA/NEPA), permitting (e.g., Clean Water Act Section 404), and/or other approvals. A project would be considered to have immediate readiness if it would not require any of the above (see Section 5.2 above for additional information on readiness categories).

5.3 Recommended Policies

Recommended policies are intended for application to future development in the watershed. In general, this means projects for which environmental review or permitting has not yet been completed as of the date of this plan.[1] It is anticipated that the recommendations will be used by property owners and developers when formulating or refining land use plans (e.g., master plans and specific plans), and will be considered by local agencies when preparing conditions of approval for future development projects. This Plan is intended as an advisory document to guide future decision-making; as such, nothing in this section constitutes a mandate or requirement for future development.

5.3.1 Policies for Development Planning

This section identifies recommendations for development planning (DP) that support watershed protection and management. The recommendations are based on preliminary watershed assessment results and a review of proposed land use plans (see Chapter 2, Section 2.3.5, Exhibits 2-5 and 2-6). The recommendations generally cover the following categories, which are described in detail below:

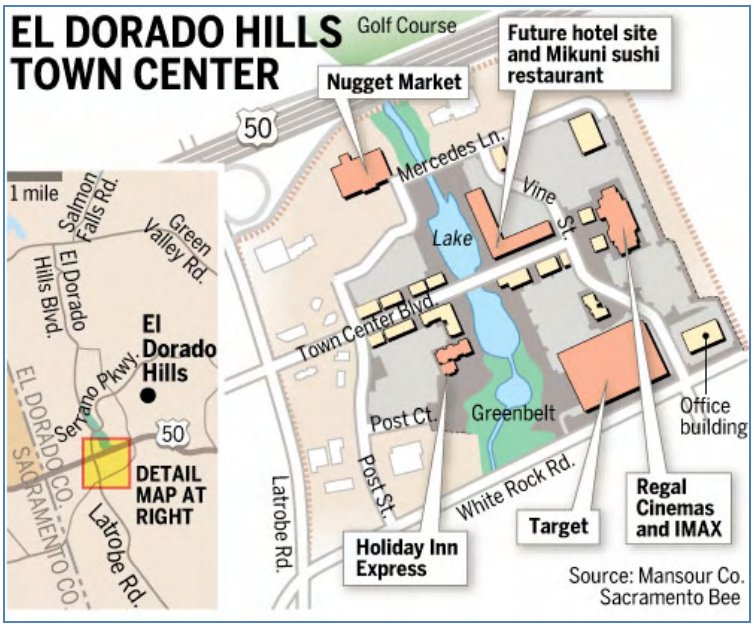
- land use design for watershed protection,
- water quality protection,
- protection of hydrologic and geomorphic processes and functions,
- protection of wildlife, plant communities, and habitat;
- recreation opportunities and trails, and
- long-term management of preserved natural lands.

DP-1 Recommendations Related to Land Use Design for Watershed Protection

DP-1.1 Implement resource-based land use planning principles to minimize impacts on sensitive resources and the resulting mitigation requirements. Prioritize open space and creek corridor preservation based on a consideration of both the ecological functions and values (e.g., hydrological and sediment transport processes, plant habitat, wildlife habitat and movement corridors, infiltration or detention potential, water quality treatment potential, groundwater recharge) of existing natural resources goals. Record the rationale for these decisions for use in regulatory documentation. Refer to Chapter 2 of the *Stormwater Quality Design Manual for the Sacramento and South Placer Regions* for strategies to integrate resource protection into land use design (see references below at the end of Section 5.3).

DP-1.2 Implement a constraints analysis to identify, avoid, and/or minimize the fill and/or piping of wetlands, waterways, vernal pool/swale complexes, and other sensitive aquatic resources where feasible. Preserve surface water features, including small/intermittent tributary creeks and swales in the upper watershed, and integrate these features into land use plans as community and development amenities.

[1] At the onset of this watershed study, there were various projects in construction or close to construction in the City of Folsom area north of Highway 50. Also, GenCorp's Glenborough project south of the freeway and west of Prairie City Road was undergoing environmental review by Sacramento County. Some of the recommendations in this plan will not apply to such projects which were already far along in the planning or implementation phase.



Existing and enhanced surface water features integrated into the site design preserve the natural resources and create an attractive community amenity at the El Dorado Hills Town Center.

One consideration would be to follow a program known as LEED ND (Leadership in Energy and Environmental Design, Neighborhood Development), which integrates the principles of smart growth, urbanism, and green building into the first national rating system for neighborhood design (USGBC 2009). Section 3 of the rating system presents various prerequisites for wetland and water body conservation with the intent to preserve water quality, natural hydrology, habitat, and biodiversity through riparian and pond shoreline buffer zones. Although the LEED building certification system is internationally recognized and

provides third-party verification, other smart-growth programs that aim to protect, conserve, or mitigate damage to open space, water quality, and important ecosystem components also could be considered.

DP-1.3 Avoid fragmentation of preserved land. Provide continuous, interconnected natural corridors along waterways and between preserved habitat patches for movement of wildlife and human communities. Favor the protection of large tracts of open space/habitat, and minimize "edge effects" caused by small isolated parcels.

DP-1.4 Provide variable width and tiered buffers[2] for protection along creek corridors and other sensitive water bodies. Create buffers as wide as possible to protect the sensitive creek channel and riparian zone, provide wildlife habitat, and filter and accommodate urban runoff flows. Base the width of the buffers and the uses allowed within buffer tiers (e.g., natural state, recreation, trails, landscaping, utilities, stormwater management) on:

a. preservation objectives (e.g., water quality and groundwater recharge maintenance, wildlife movement, biodiversity, aesthetics, passive recreational opportunities [trails], fuels management),

b. habitat functions and values,

c. topography,

d. soils (e.g., erosivity, bedrock, percolation rate),

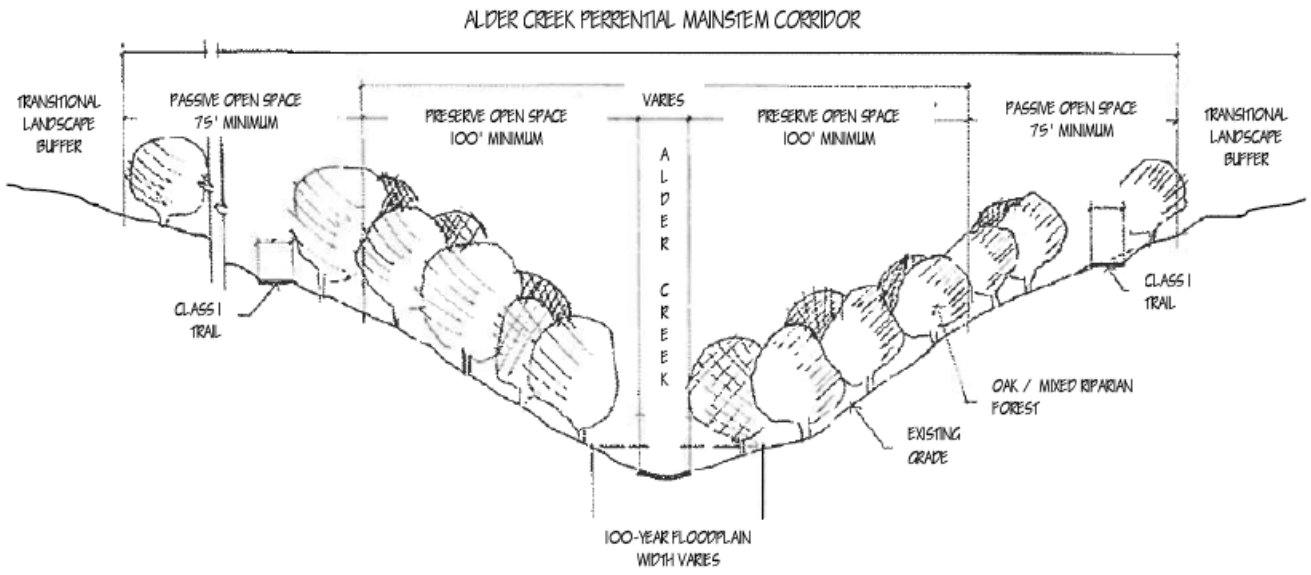
e. flood frequency and magnitude,

f. geomorphic processes and functions, and

g. existing and future adjacent land uses.

The segments of Alder Creek with perennial flows (lower, middle, and upper watershed) should maintain a Preserve Open Space of at least 100 feet or the width of the 100-year flood plain (whichever is greater), and a **Passive Open Space** of at least 75 feet (see Exhibit 5-1a). The segments of ephemeral creeks that are tributary to Alder Creek should maintain a **Preserve Open Space** of 25 feet or the width of the 100-year flood plain (whichever is greater), and a Passive Open Space of at least 50 feet (see Exhibit 5-1b). All prescribed distances should be measured from the top-of-bank.

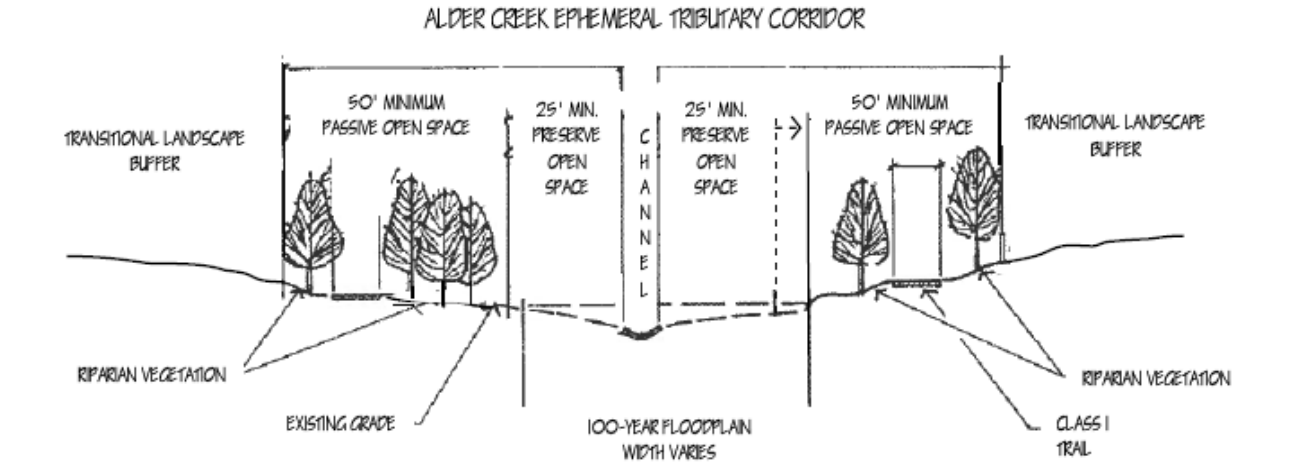
[2] Tiered buffers relate to prescribed distances from the top-of-bank of the creek channel (e.g., lower and upper tiers). Lower tiers are closest to the creek channel and typically preserved and flagged as including the 100-year floodplain and the most sensitive areas to avoid. Upper tiers are used for passive, light recreation features, such as trails, and utility and stormwater facility placement.



Note: Preserve Open Space should be 100-feet or minimum width of the 100-year floodplain, whichever is greater (as described in DP-1.4 above). Trails could located within the Preserve Open Space buffer (as described in DP-1.4 above).

Source: Adapted from Folsom Plan Area Specific Plan (FPASP, in prep., 2009).

Exhibit 5-1a: Recommended Buffers for Alder Creek Perennial Mainstem Corridor



Note: Preserve Open Space should be 25-feet or minimum width of the 100-year floodplain, whichever is greater (as described in DP-1.4 above). Trails could located within the Preserve Open Space buffer (as described in DP-1.4 above).

Source: Adapted from Folsom Plan Area Specific Plan (FPASP, in prep., 2009).

Exhibit 5-1b: Recommended Buffers for Alder Creek Ephemeral Tributary Corridor

It is recommended that the minimum **Preserve Open Space** buffer be maintained in a preserved state with no development activities with the exception of trail alignment encroachments that provide user access to areas within the immediate creek corridor. Under these conditions the trail alignment should always remain outside of the active floodplain.[3] The Preserve Open Space buffer is intended to protect functions by allowing for the filtering of sediment, pesticides, phosphorus and nitrogen, organic matter, and other contaminants that are known to degrade water quality. This buffer also provides for natural meandering of the channel and the protection of vegetation along the streambank, which provides bank stability, erosion control, flood attenuation, and wildlife habitat. The 100-year floodplain and any sensitive resources including wetlands and waters that are associated with the creek corridor should also be maintained in the Preserve Open Space buffer, even if their aerial extent goes beyond the variable tiered buffer width.

Any trail segments within the Preserve Open Space buffer area should be constructed of concrete and not asphalt or any other oil-based product/material. Railings or other above-ground structural components should be prohibited within the Preserve buffer area to reduce the chance of catching debris or obstructing flow conveyance during major flood events. Trail crossings over the creek channel should be designed to allow for adequate flood flow and sediment/debris transport capacity. Areas disturbed by trail construction should be restored to encourage the recruitment of native riparian shrub and tree species to maintain habitat values and provide additional protection to the creek system, including its banks. Erosion control plans should be designed to preserve stable creek banks and the adjacent corridor to minimize erosion potential and sediment inputs into the creek channel.

It is recommended that the **Passive Open Space** buffer be maintained with limited activities. Recommended uses within this buffer would include recreational uses, such as trails and interpretive signs and would allow for the placement of infrastructure, such as water and sewer lines and stormwater detention basins and water quality structures. Contiguous riparian woodlands and scrub that are associated with the creek corridor should also be maintained in the Passive Open Space, even if their aerial extent goes beyond the variable tiered buffer width. Revegetation of any disturbed areas should be planted and maintained with vegetation native and appropriate (e.g., riparian species) to the surrounding area. Buffer averaging would be acceptable except when riparian woodland would be lost.

DP-1.5 Include an additional landscaped buffer between developed and natural areas. Design the buffer tier to be compatible with fuel management goals and regulations by establishing appropriate widths of defensible space, particularly where bordered by high-density and urban commercial areas. Support the establishment of native, local, and drought-tolerant plant species as appropriate; do not plant any invasive plant species.

[3] An active floodplain is the level area with alluvial soils, immediately adjacent to streams, which is overbanked by stream water on periodic basis and is at the same elevation as areas showing evidence of: flood channels free of terrestrial vegetation; rafter debris or fluvial sediments newly deposited on the surface of the forest floor or suspended on trees or vegetation; and recent scarring of trees by materials moved by water.

DP-1.6 Avoid locating more intensive land uses, including industrial uses that would be more likely to create disturbances and/or contribute pollution and runoff, adjacent to buffers.

DP-1.7 Encourage and allow orientation of buildings and developments toward preserved creek corridors and natural lands to highlight the resource as a community amenity and to promote interpretation and stewardship.

DP-1.8 Use clear span bridges wherever feasible and bottomless arch culverts to accommodate high flows and future trails, preserve hydrologic and geomorphic processes and functions (e.g., natural floodplain meanders), and preserve wildlife habitat and movement corridors.

DP-1.9 Avoid installing utilities across creek corridors or within creek buffers to limit disturbance of sensitive resources caused by installation and future utility operation and maintenance activities. Where utilities need to cross creek corridors, they should be installed in conjunction with bridge overcrossings as shown in the photo below.

Clear span bridge with utilities attached shows the preferred method for utility crossings to minimize impacts to the natural resources.

DP-1.10 Identify and give preference to on-site restoration opportunities (while avoiding adverse impacts on existing creek resources) to meet the potential mitigation needs of development projects.

DP-2 Recommendations Related to Water Quality Protection

DP-2.1 Before construction-related ground disturbance related to watershed development, consider the potential for release, transport, accumulation, and exposure of sediment and potential associated pollutants (e.g., mercury) in downstream stormwater detention basins and aquatic ecosystems (e.g., Alder Creek and its tributaries, Alder Reservoir, Alder Pond, Lake Natoma, and the American River). In accordance with local jurisdiction requirements, implement appropriate best management practices (BMPs) during and after construction to minimize the release, transport, accumulation, and exposure of sediment and other pollutants.

DP-3 Recommendations Related to the Protection of Hydrologic and Geomorphic Processes and Functions

Recommendations related to the protection of hydrologic and geomorphic processes and functions were developed based on information provided in the hydrologic and geomorphic component of the watershed assessment report (NHC 2009) and the technical memorandum providing recommendations for future hydromodification analysis methods and tools, and potential mitigation actions (cbec 2010). The reader of this Plan is referred to the NHC (2009) watershed assessment report for information regarding the hydrologic and geomorphic assessment of the watershed and the cbec (2010) technical memorandum for recommendations specific to future hydromodification analysis methods and tools, and potential mitigation actions. Web links for both documents can be found in the Appendix (Appendices C and E, respectively).

DP-3.1 **Background -** The Sacramento Stormwater Quality Partnership (SSQP) is currently in the process of developing a Hydromodification Management Plan (HMP) to comply with the 2008 Sacramento Areawide NPDES Municipal Stormwater Permit (see Chapter 2). The tentative schedule for completing the HMP is mid 2011. However, in the interim, the SSQP are developing Interim Hydromodification Criteria (IHC) for use by the local jurisdictions, development community and other applicants, to evaluate and mitigate for hydromodification impacts for individual projects. As of the date of this Plan (February 2010), the IHC have not been finalized. However, an anticipated possible format for the IHC and application to the Alder Creek Watershed has been developed (see cbec (2010) technical memorandum in Appendix E for additional details).

Recommendation - Implement controls consistently with the SSQP's forthcoming HMP to manage the increases in magnitude, volume, and duration of runoff from development projects (hydromodification) in order to protect receiving waters from increased potential for erosion and other adverse impacts. In selecting controls, consider the existing geomorphic condition of receiving creeks and basins, along with their expected susceptibility to erosion/change as a result of hydromodification from development and other land uses (see cbec (2010) technical memorandum in Appendix E for additional guidance).

DP-3.2 Preserve natural floodplain areas (i.e., avoid encroachment) sufficiently to accommodate at least the 200-year flood event.[4, 5] Avoid constructing levees or similar structures that alter the natural floodplain.

DP-3.3 Promote on-site detention and retention (infiltration) where feasible to mitigate increased stormwater and nuisance flows resulting from development.

DP-3.4 Implement designs that promote infiltration, reuse, and evapotranspiration of rainfall from impervious areas where feasible. Until local requirements are adopted, consider following LEED recommended minimum of 0.9 inch per year (USGBC 2009; see LEED ND GCT Credit 9).

DP-3.5 Minimize piping of existing drainages to the extent feasible. Integrate natural drainage corridors as design features as an alternative when possible.

DP-3.6 Avoid realigning and straightening waterways and drainages. Preserve natural meanders through waterways, and include an appropriate diversity of geometry and alignment in constructed and/or restored drainage features.

DP-3.7 Avoid grading in waterways and lower and middle tiered buffers except to restore or enhance the creek profile or habitat. Limit grading in upper tiers to minor grading for acceptable uses, such as trails and basins.

DP-3.8 Avoid erosion of constructed or regraded slopes, especially when located near waterways (e.g., earthen bridges, floodwater conveyance structures), by minimizing slope gradients and employing natural stabilization (biotechnical) techniques (see additional detail in Section 5.3.1 below).

DP-3.9 Plan development to conform to natural topographic contours, and maintain natural drainage patterns as much as possible; avoid leveling contours.

DP-3.10 Modify channels to increase their stormwater conveyance capacity only where absolutely necessary so that the preservation of natural functions is maximized; favor off-stream stormwater detention.

DP-3.11 Avoid the concentration of runoff to a few large outlet points (outfalls); favor the use of multiple smaller outlets treating smaller drainage areas.

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[4] Assembly Bill 162 (Wolk; see www.legalinfo.ca.gov) was signed and chaptered in late 2007 and took effect on January 1, 2009. The law requires a city or county general plan to include specified mandatory elements that consider the effect of development on natural resources and flood control and calls for protecting life, property, and natural resources from unreasonable risks associated with flooding and for locating new development, when feasible, outside the 200-year floodplain.

[5] Senate Bill (SB) 5, signed into law on October 10, 2007, enacts the Central Valley Flood Protection Act of 2008. Requirements of the California Department of Water Resources and the Central Valley Flood Protection Board (previously known as the State Reclamation Board) under SB 5 are to prepare and adopt a Central Valley Flood Protection Plan by 2012; establish 200-year protection as the minimum urban level of flood protection, effective with respect to specific development projects as of 2015 or 2025; set deadlines for cities and counties in the Central Valley to amend their general plans and their zoning ordinances to conform to the flood protection plan within 24 months and 36 months (i.e., approximately 2014 and 2015), respectively, of its adoption; and obligate Central Valley counties to develop flood emergency plans within 24 months of adoption of the plan.

DP-4 Recommendations Related to the Protection of Wildlife, Plant Communities, and Habitat

DP-4.1 Preserve diverse riparian and wetland plant communities and wildlife habitats.

DP-4.2 Identify restoration and enhancement opportunities in degraded creek corridors to provide higher value wildlife habitat and natural water quality treatment (e.g., shade creek corridors to minimize water temperature increases and the production of nuisance aquatic plants).

DP-4.3 Incorporate treatment wetlands and other biological water quality BMPs (e.g., extended detention, wet ponds, bioretention, filtration, infiltration, swales) into the stormwater system to provide additional habitat while treating stormwater runoff. See the recommended literature resources for ecological stormwater treatment options.

DP-4.4 Incorporate the restoration and enhancement of riparian and wetland communities into the proposed drainage facilities.

DP-4.5 Restore soil and revegetate disturbed creek corridors in a manner that is consistent with pre-development conditions.

DP-4.6 Use only native species when revegetating lower tiered creek buffer areas, and encourage the use of native or appropriate drought-tolerant species when revegetating the upper tier or landscaped areas. Do not use any invasive species (see <http://www.cnps.org>, <http://plantnative.org>, and <http://plants.usda.gov>).

DP-4.7 Where solid bridges are necessary, install wildlife underpasses to maintain wildlife movement through the bridge; for all bridges, maintain natural creek bottoms in waterway crossings (e.g., use bottomless culverts or bridges) where feasible.

DP-4.8 Minimize artificial lighting in and around creek and open space corridors. Limit lighting around public facilities to the extent necessary for public safety. Direct lighting away from creek corridors when lighting is necessary in areas adjacent to the creek corridors.

DP-4.9 Site or orient active play areas, industrial sites, loading docks, and other noise-generating land uses away from creek corridors and other natural open spaces, where feasible.

DP-4.10 Use earthen berms or vegetated barriers rather than solid walls for noise reduction measures adjacent to creek corridors.

DP-4.11 Minimize exclusionary fencing around preserved open spaces to allow wildlife passage and to reduce long-term maintenance costs.

DP-4.12 Provide a continuous wildlife corridor of sufficient and variable width on both sides of creeks.

DP-4.13 Monitor and control invasive plants in the creek and adjacent wildlife corridor.

DP-5 Recommendations Related to Recreation Opportunities and Trails

DP-5.1 Develop a trail system that:

a. Meets the needs of recreational users and bicycle commuters, helps reduce motorized vehicle trips, and links residential neighborhoods with local and regional destinations, such as employment centers, multimodal terminals, schools, and recreational facilities; and

b. Provides for connectivity to the American River Parkway; to the planned Blue Oak Hills Trail south of White Rock Road (Sacramento Valley Conservancy vision); to other regional trail systems; to points of interest such as the paved trail around Lake Natoma, Folsom Lake, Old Town Folsom, Deer Creek Hills Preserve, Prairie City Off-Highway Vehicle Park; and to other historic and natural destinations.

DP-5.2 Wherever possible, construct trails and other recreation amenities to Americans with Disabilities Act standards, including providing accessible restroom facilities, ramping at-grade transitions, and avoiding architectural barriers.

DP-5.3 Consider the development of both Class I trails and adjacent natural-surface single-track trails to separate users, provide a variety of user experiences, and discourage the development of unauthorized social trails.

DP-5.4 Provide grade-separated crossings at intersections with roads with more than two lanes to allow uninterrupted passage of wildlife and trail users.

DP-5.5 Provide adequate vertical clearance under all grade-separated crossings to allow adequate space for the permitted uses (i.e., bicycle, equestrian, and pedestrian travel).

DP-5.6 Incorporate firebreaks or fuel management zones with roadway or trail crossings when possible.

DP-5.7 Provide public parking at major creek corridor access points (e.g., trailheads).

DP-5.8 Site bike trails in areas of low ecological sensitivity (e.g., upland terrace, stable or rocky soils, mature plant community), and site only walking trails in areas of moderate ecological sensitivity (e.g., lowland terrace, river valley, suitable soils, successional plant community).

DP-5.9 When possible site trails and bridges outside the 100-year floodplain as defined by the U.S. Army Corps of Engineers. Any trails that are located within the 100-year floodplain shall be subject to permit approval and constructed of concrete and no oil-based paving product.

DP-5.10 Accommodate drainage patterns when siting trails; maintain unobstructed flows of minor (seasonal or ephemeral) drainages crossed by trails.

DP-5.11 Blend trails with the natural contours of the land; site trails along corridors of gradual cross slope to minimize the need for cut and fill of hillsides.

DP-5.12 Maintain a vegetated buffer between trails and waterways where feasible.

DP-5.13 Site trails to minimize the removal of trees and other vegetation.

DP-5.14 Encourage the use of existing disturbed areas such as power line and railroad corridors for bike path alignments.

DP-6 Recommendations Related to Long-Term Management of Preserved Natural Lands

DP-6.1 Maintain ownership of all preserved natural lands with an appropriate nonprofit, public, or private entity dedicated to managing and protecting land for conservation. Dedicate preserved natural lands to this entity through fee title or easement before development occurs.

DP-6.2 Place a conservation easement, to be held and managed by a qualified third party (e.g., a conservancy of trust recognized by the state or accredited by the Land Trust Accreditation Commission), over preserved natural lands.

DP-6.3 Provide an endowment or other proven financing mechanism to fund maintenance of preserved open spaces by a third party.

DP-6.4 Prepare a long-term management plan for preserved natural lands.

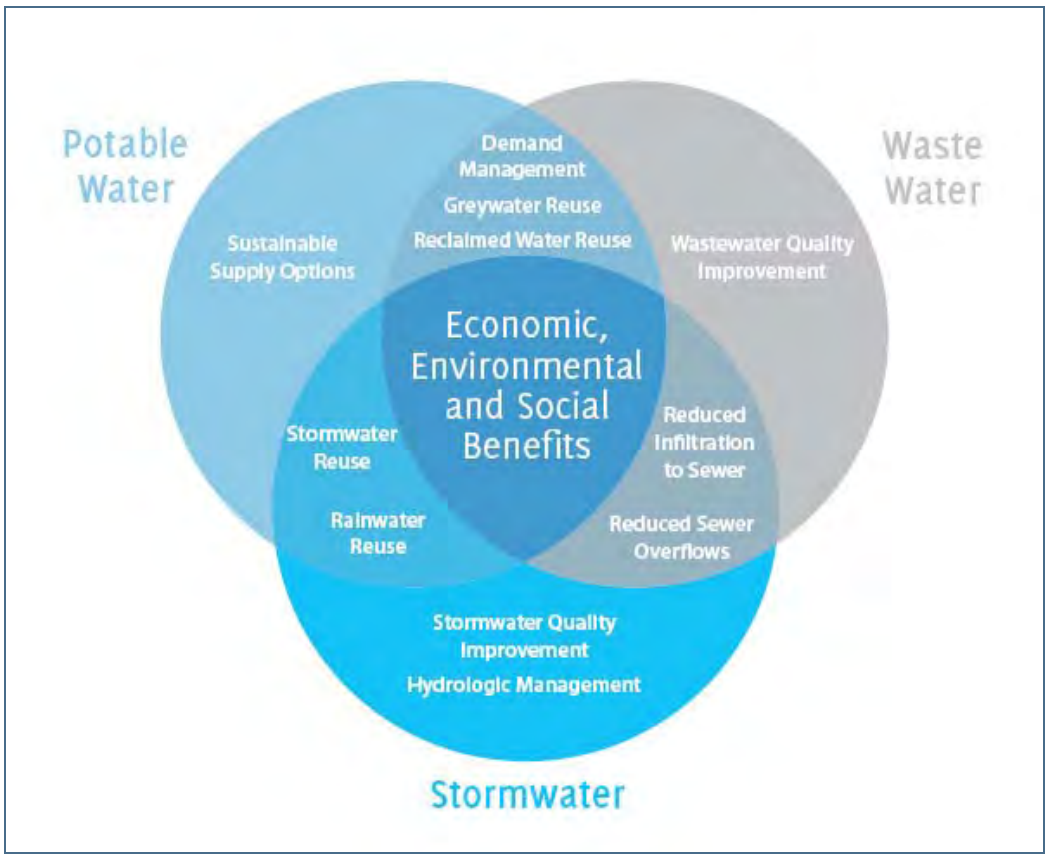
5.3.2 Policies for Development Design and Implementation

This section identifies recommendations for development design and implementation (DDI) that support watershed protection and management. The following recommendations have been developed to accompany the recommendations for development planning presented above by providing a higher level of detail to address site-level design considerations for projects elements being designed in the Alder Creek watershed. The recommendations are based on preliminary watershed assessment results and a review of proposed land use plans. The recommendations generally cover the following categories, which are described in detail below:

- water-sensitive urban design,
- tributary drainage design,
- stormwater detention basin design,
- stormwater outfall design and location,
- creek crossing design,
- trail designs that maintain water quality, and
- natural (biotechnical) methods for streambank stabilization and protection.

DDI-1 Recommendations Related to Water-Sensitive Urban Design

Water-sensitive urban design (WSUD) includes but also goes beyond the traditional LID measures, which address stormwater management, to achieve a healthy natural-urban water balance. It is a holistic approach for integrating the economic, environmental, and social benefits of conserving potable water, managing stormwater, and minimizing wastewater to achieve high water quality.



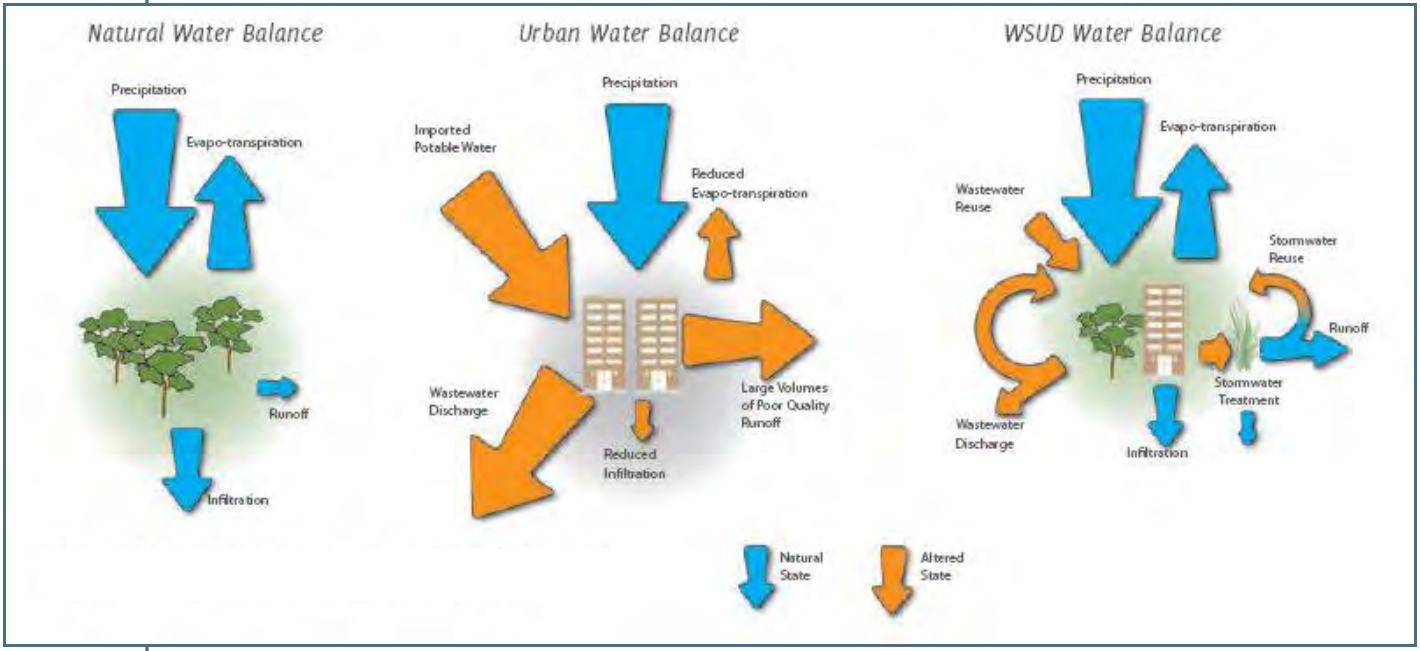
Source: Hoban and Wong (AECOM) 2006

Conceptual diagram showing integrated management of the urban water cycle.

A healthy watershed has many important functions, such as reducing flooding by providing areas for stormwater to collect, filtering pollutants from urban runoff, providing diverse habitat for a variety of wildlife species, and providing a nature experience for community members. WSUD strategies consider these functions for a healthy watershed and avoid or minimize urban development impacts on the natural water cycle by:

- minimizing disturbance to natural landforms, wetlands, watercourses, and riparian zones;
- protecting the quality of surface water and groundwater to maintain and enhance aquatic ecosystems and enable reuse opportunities;
- reducing downstream flooding and drainage impacts on aquatic ecosystems by managing peak flows and stormwater runoff;
- promoting efficient use of water by reducing potable water demand and encouraging alternative water supplies;
- minimizing wastewater generation and ensuring that the treatment of wastewater is to a standard suitable for effluent reuse or release to receiving waters;
- controlling soil erosion during construction and postconstruction phases of land development; and
- using stormwater in the landscape to maximize visual and recreational amenity and promote an understanding of water in urban environment.

The concepts discussed in this section are recommendations based on work done in other areas (e.g., Australia) and are intended to compliment, but not replace locally-adopted technical standards and guidance for stormwater management and treatment. Refer to the Stormwater Quality Design Manual for Sacramento and South Placer Regions (Sacramento Stormwater Quality Partnership and City of Roseville 2007) and the local permitting agency for current standards. If conflicts appear between this document and the others, the local standards will prevail.

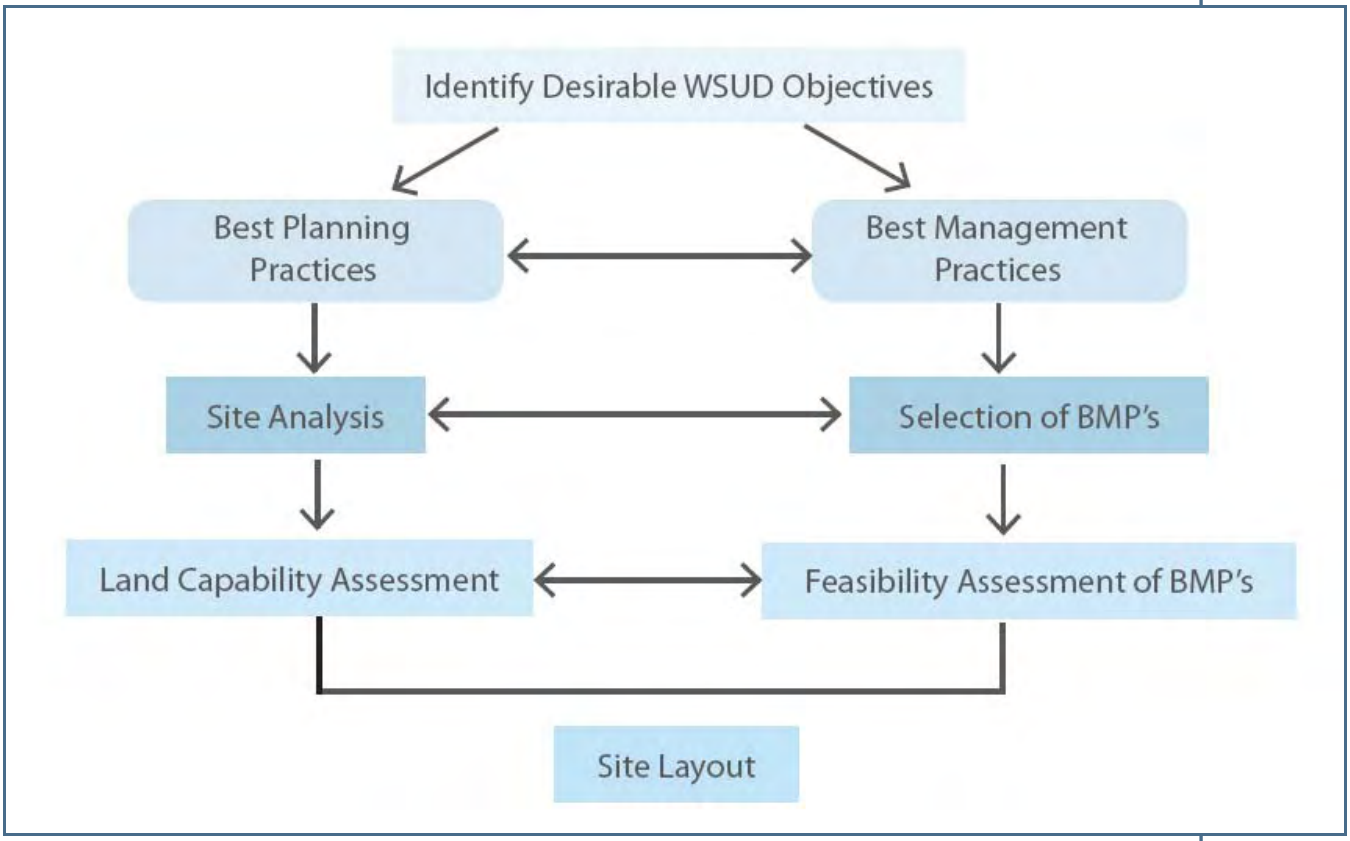


Source: Hoban and Wong (AECOM) 2006

Changes in traditional urban water cycle by integrating WSUD strategies.

WSUD employs a range of best planning practices (BPPs) and BMPs. BPPs relate to the site assessment, planning, and design components of the WSUD strategies and can be implemented at strategic planning levels. BMPs relate to the structural and nonstructural elements of WSUD strategies and need detailed engineering before construction and implementation. WSUD also uses a best practice hierarchy for implementation as follows:

- Retention and restoration: Retain or restore natural channels, wetlands, and riparian zones.
- Source controls (nonstructural): Implement educational and enforcement measures to minimize water use and polluting activities.
- Source controls (structural). Locate structural techniques as near to the source (or use) to minimize water use, minimize wastewater generation, minimize stormwater runoff quantity, maximize stormwater quality using infiltration and natural physical treatment processes, and maximize reuse of treated wastewater and stormwater.



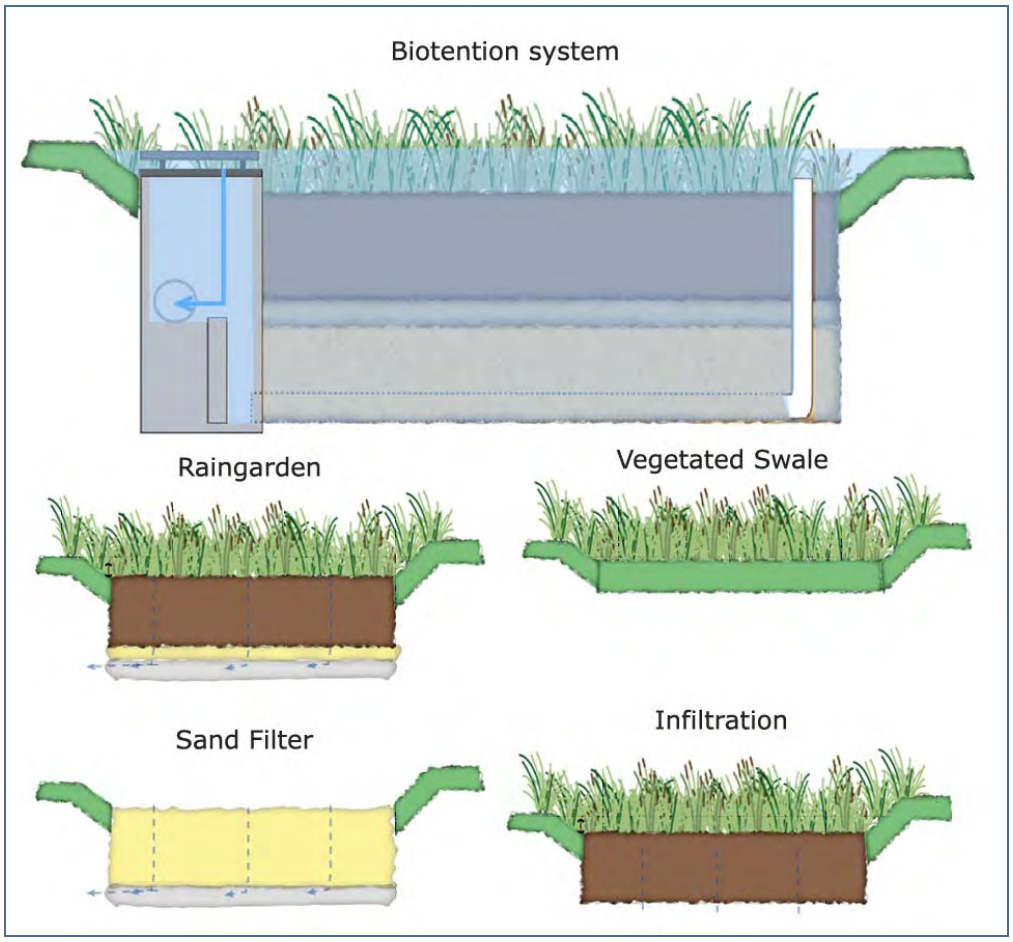
Source: Hoban and Wong (AECOM) 2006

Integrating WSUD BPPs and BMPs at the earliest stages of the conceptual urban design process, and adhering to the WSUD best practice hierarchy, will improve the likelihood of delivering a successful water-sensitive development.

The recommended approaches for implementing WSUD techniques that promote water use efficiencies and water quality protection are organized into the following subsections:

- watershed natural areas, creek buffer areas, parks, and open spaces;
- public-rights-of-way and streetscape design; and
- lot-scale design.

The recommendations presented in this section of the Plan serve only as examples. Various other low-impact development (LID) principles might be suitable, depending on site conditions. Refer to the Stormwater Quality Design Manual for Sacramento and South Placer Regions (Sacramento Stormwater Quality Partnership and City of Roseville 2007). See also San Mateo County and City of Portland green streets standards and the U.S. Environmental Protection Agency's green infrastructure literature.



Source: AECOM

Various stormwater BMPs that increase infiltration of stormwater and slow runoff.

However, it must be noted that the full benefit of all these strategies can be achieved only when they are selected from all the subsections as an integrated design approach. When the various BPPs and BMPs are selected for the various areas, it is critical to ensure that the following guiding principles of WSUD are met:

- Reduce demand for potable water. Water conservation includes demand management and use of alternative sources to substitute for potable water where quality is not an issue for end use.
- Minimize the generation of wastewater. Minimizing wastewater flows can reduce conveyance and treatment requirements, sewer overflows, and discharge of nutrients to aquatic environment.
- Reduce and treat stormwater. Runoff should be reduced, infiltration should be increased, and water quality should be improved through passive and active treatment methods to comply with local agency requirements.

DDI-1.1 Recommendations for watershed natural areas, creek buffer areas, parks, and open spaces:

a. In accordance with local jurisdiction requirements, implement low impact development (LID) [6] techniques and controls to manage the increases in magnitude, volume, and duration of runoff from development projects (hydromodification) in order to protect receiving waters from increased potential for erosion and other adverse impacts. In selecting controls, consider the existing geomorphic condition of receiving creeks and basins, along with their expected susceptibility to erosion/change as a result of hydromodification from development and other land uses (see NHC 2009).

b. Use WSUD/LID strategies on flat to gently sloping sites (up to 5%) whenever possible. The range of stormwater treatment diminishes as slopes increase up to 15%. Make efforts to minimize the extent of public areas, such as roads and open public spaces, with slopes greater than 5%. On terrain steeper than 5%, align roads tangentially to contour lines to achieve longitudinal road grades of less than 5%, which will improve the effectiveness of at-source stormwater BMPs. Where it is not practical to achieve public space slopes of 5%, consider:

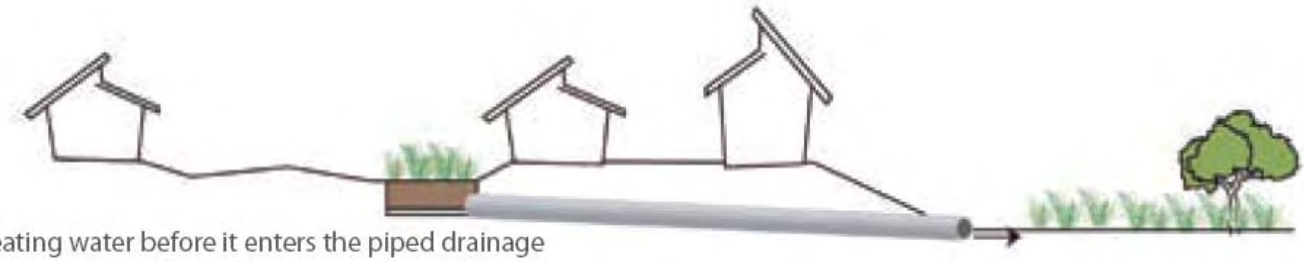
   1. managing stormwater runoff at-source with a higher capital cost and

   2. using conventional stormwater conveyance infrastructure to convey flows to downstream lowland locations where slopes are gentler and better suited to more cost-effective treatment options.

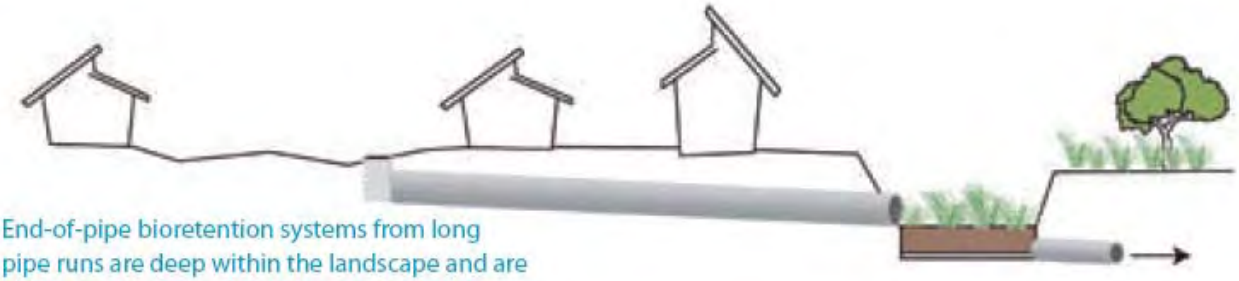
End-of-pipe wetland may be appropriate if suitable open space is available.

[6] For the purpose of this document, the definition of "low impact development" shall be consistent with that in the *Stormwater Quality Design Manual for the Sacramento and South Placer Regions* (Sacramento Stormwater Quality Partnership and City of Roseville 2007): "Low impact development is a stormwater management strategy that emphasizes conservation and use of existing natural site features integrated with distributed, small-scale stormwater controls to more closely mimic natural hydrologic patterns in residential, commercial, and industrial settings."

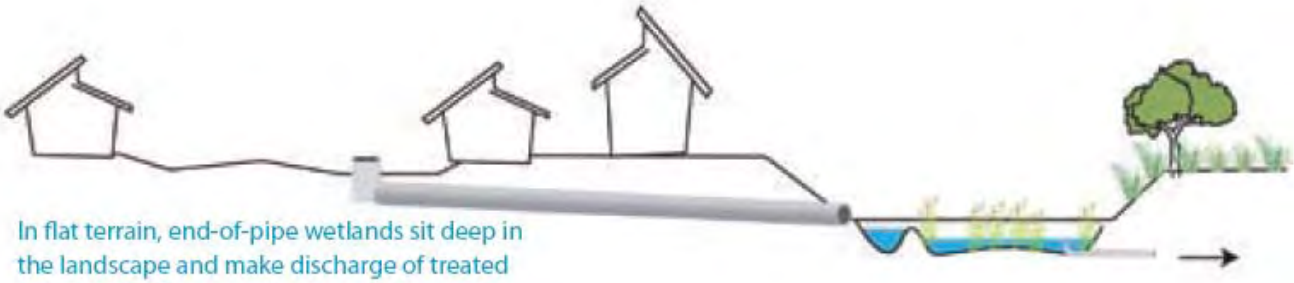
c. Avoid conveying stormwater on flat sites, which can be expensive because it requires the use of continuous, large-diameter pipes to allow for gradient slope and gravity conveyance. Where feasible, overcome the need for expensive infrastructure on flat sites by incorporating a deep, centrally located water feature into which the stormwater drainage pipe networks can discharge.



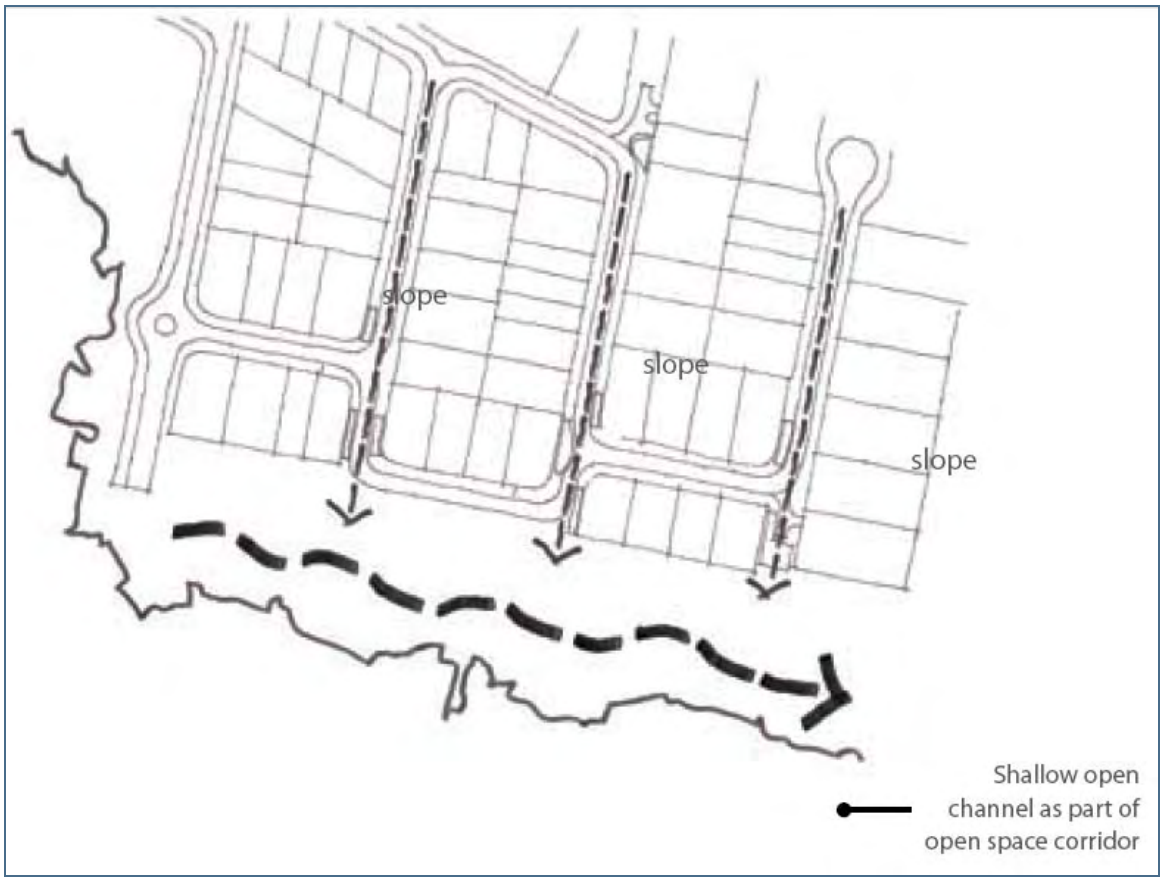
Treating water before it enters the piped drainage system reduces the problems associated with end-of-pipe treatment



End-of-pipe bioretention systems from long pipe runs are deep within the landscape and are difficult to drain into receiving environments.



In flat terrain, end-of-pipe wetlands sit deep in the landscape and make discharge of treated water difficult.



d. Implement designs that promote infiltration, reuse, and evapotranspiration of rainfall from impervious areas where feasible.

e. Use designs that allow runoff to flow in sheets to creek buffers. In areas where upslope surface water flows must be intercepted or concentrated, incorporate techniques to return water to sheet flow (e.g., energy dissipaters, level spreaders).

Example of boardwalk trail over sensitive resource area

f. Incorporate treatment wetlands and other biological water quality BMPs (e.g., extended detention, wet ponds, bioretention, filtration, infiltration, swales) into the stormwater system to provide additional habitat while treating stormwater runoff. See Sacramento Stormwater Quality Design Manual for guidance.

DDI-1.2 Recommendations for watershed public rights-of-way and streetscape design

a. Reduce impervious parking footprints by minimizing the size of individual parking areas, providing bicycle and carpool parking spaces, tucking parking under buildings, and incorporating multistory parking structures where appropriate and allowed.

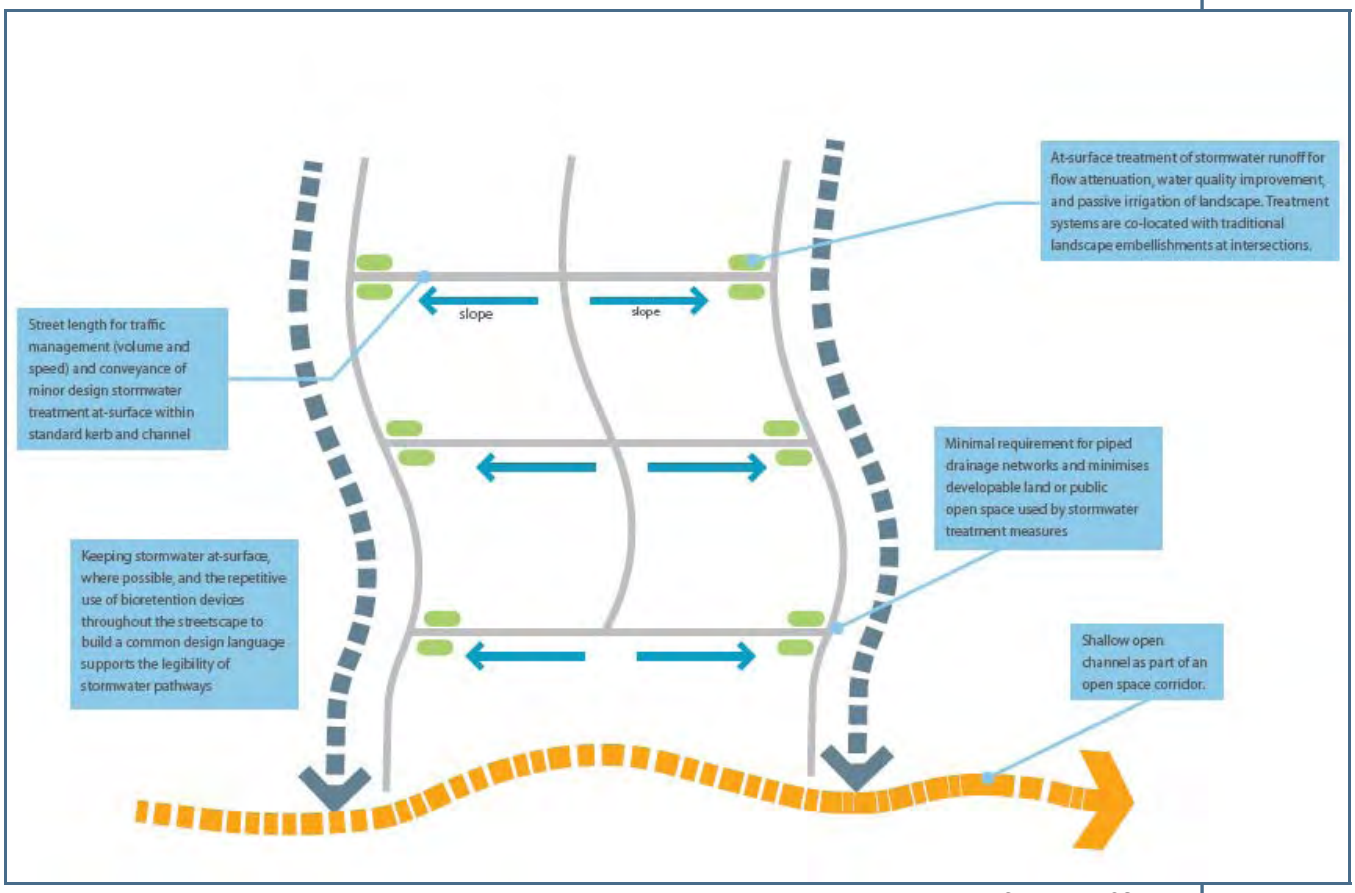
Example of tuck-under parking.

Examples of pervious parking surfaces (grass pavers and pervious concrete).

b. Design curbless streets or streets with regular curb-cuts in the biofiltration area to help in reducing runoff speed and quantity by allowing the water to collect and infiltrate into the ground slowly.

Examples of curbless street and street with regular curb-cuts to allow stormwater to flow from streets into the infiltration areas.

c. Use landscaped areas at entry focal points of local streets to incorporate stormwater treatment systems to save valuable land area.



Source: AECOM

Source: AECOM

Examples of bioretention systems along roadways

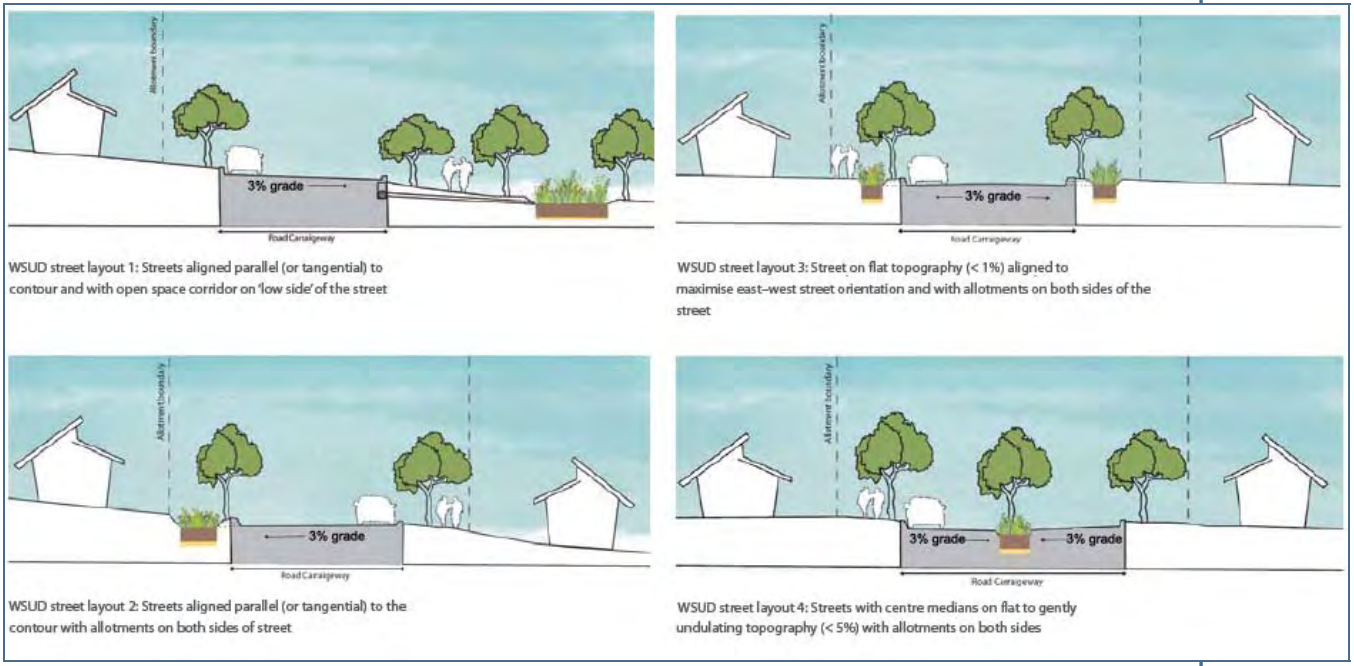
d. When considering use of bioretention systems in streetscapes, ensure that the following key designs are considered:

   1. safe and unencumbered access from streets to lots for pedestrians, cyclists, and vehicles;

   2. safe egress to the street that avoids cars parked on the street;

   3. ease of access for utility maintenance; and

   4. streetscape landscapes that incorporate stormwater treatment and convey a sense of place and continuity.



Source: AECOM

Recommended approaches for integrating WSUD strategies in street design based on site considerations.

e. Co-locate bioretention treatment in traditional landscaped areas, such as street intersections, street medians, front setbacks on corner lots, and bulbouts for parking.

Small biofiltration systems integrated with entrance landscaping, front setback of corner lots, parking bulbouts, and landscaped medians.

DDI-1.3 Recommendations for lot-scale design

a. Promote on-site detention and retention (infiltration) where feasible to mitigate increased stormwater and nuisance flows resulting from development.

b. Incorporate water conservation implementation techniques into lot-scale design to reduce urban development's reliance on imported water from surface water and groundwater systems. The following table shows a suggested hierarchy of source-to-use matches for a typical household.

c. Mimic hydrology and natural processes by using small-scale, decentralized practices that allow rainwater to infiltrate, evaporate, and transpire and therefore reduce runoff (see table below). Some of the measures to consider in lot-scale design are shown in the images below.

Situation	Possible treatment measures
Roof runoff	Rainwater tanks Swales and buffer strips Bioretention swales Small bioretention systems (e.g., rain gardens) On-site infiltration measures
Impervious surfaces (e.g., car parks, driveways, paths, courtyards)	Porous materials in place of impervious materials Where the use of impervious materials is unavoidable, channel runoff to: Rain gardens On-site infiltration measures

Examples of small-scale stormwater systems in residential lots using rainwater barrel and rain garden.

Using disconnected roof drain to channel water to vegetated area and pervious pavement.

d. Cluster symbiotic land uses to enhance the potential for water recycling by co-locating land uses that can benefit from using recycled water with suitable sources of recycled water. Some examples of symbiotic land uses are as follows:

    1. major industrial water users clustered around a centralized wastewater treatment and reclamation plant,

    2. large warehouses colocated with recycled water–demanding land uses, and

    3. high-density multifamily residential use colocated with commercial office use.

e. Achieve effective application of WSUD to industrial sites by:

    1. structurally separating work areas from roof areas and car parks to prevent industrial pollutants from contaminating stormwater so that standard stormwater BMPs can be applied and

    2. maximizing stormwater harvesting and reuse opportunities.

Example of stormwater harvesting through wetlands.

f. Avoid reliance on a single bioretention system because of the greater risk of failure and capital cost involved. Using decentralized, smaller treatment systems is more effective with respect to life cycle cost and maintenance.

DDI-2 Recommendations Related to Tributary Drainage Design

Although larger perennial creeks (e.g., Alder Creek) are often valued and protected during development design, smaller tributaries, such as ephemeral and intermittent feeder creeks and drainage swales, are often piped and conveyed underground. Communities that recognize the importance of these tributary drainages expect them to be incorporated into development design to promote and maintain the natural movement of water through the watershed. Many existing communities are implementing efforts to "daylight" underground piped tributary drainages by removing the pipes and restoring the historic natural channel. Daylighting efforts are expensive and can be avoided through thoughtful planning and design that recognizes the multiple benefits of tributary drainages and incorporates them into development design. Examples of these benefits include:

- providing an aesthetic amenity in neighborhood design,
- providing improved floodwater conveyance capacity,
- preserving habitat corridors,
- providing a focus for linear greenways/parks, and
- reducing long-term stormwater system maintenance and replacement costs.

Incorporating natural drainages into development design provides multiple benefits, such as flood management, unimpaired wildlife movement, and recreational opportunities (e.g., trails).

Restored tributary drainages can provide recreational opportunities.

DDI-2.1 Recommendations to promote and maintain natural surface water drainages

a. Restore disturbed tributary drainages as a component of development on undeveloped sites.

b. Daylight piped tributary drainages in existing developed areas.

c. Incorporate tributary drainages into the stormwater management system design.

d. Locate and design linear greenways and parks to include tributary drainages.

Example of a tributary drainage incorporated into a neighborhood design.

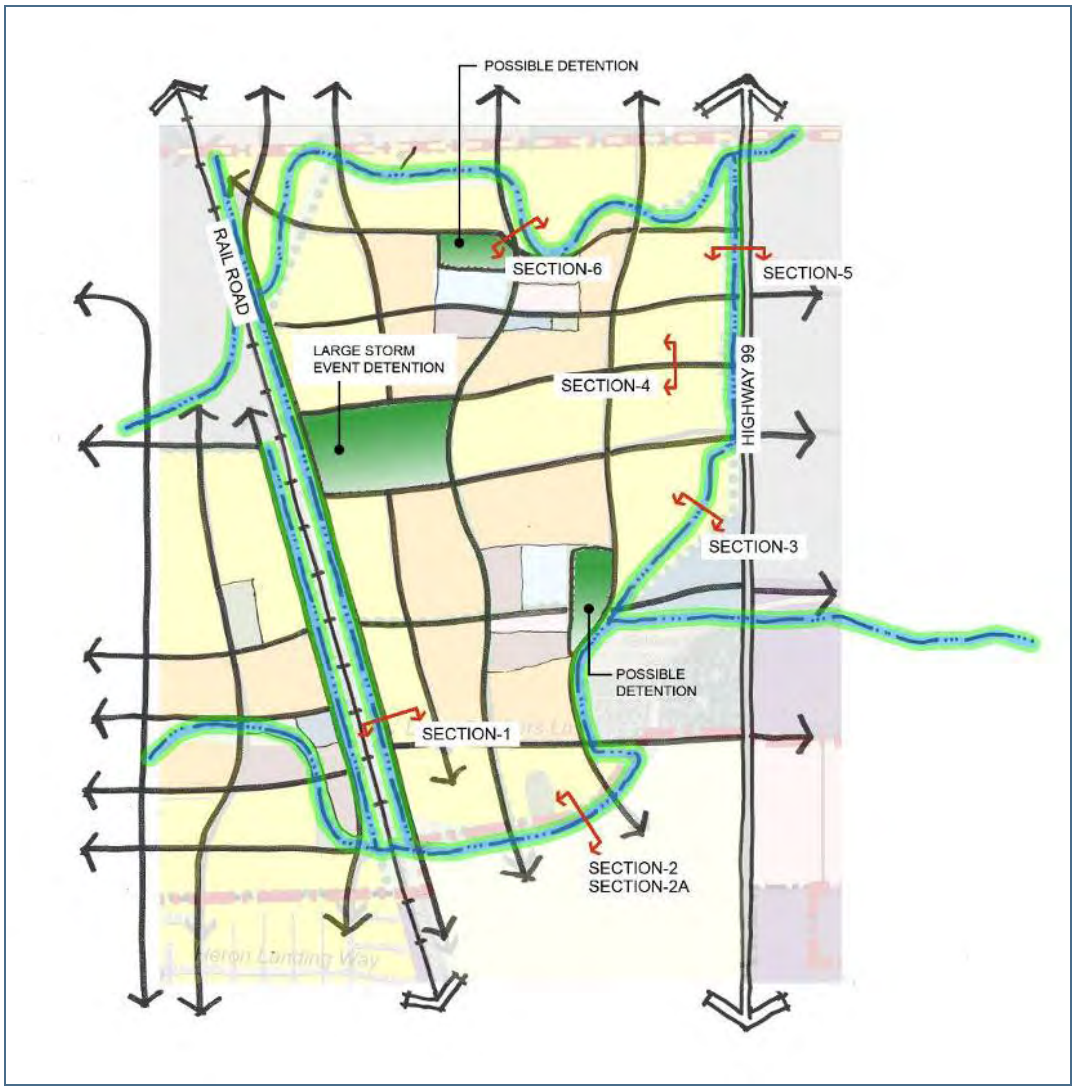
Source: AECOM

Example of a tributary drainage incorporated into linear greenway and park design.

DDI-3 Recommendations Related to Stormwater Detention Basin Design

Offline stormwater detention basins can offer a substantial amount of flood protection by attenuating peak flows and/or providing additional water storage during runoff events. Offline stormwater detention basins can be designed a number of ways, depending on watershed characteristics and adjacent land uses. Offline stormwater detention basins can be constructed adjacent to the creek or away from the creek. Basins constructed adjacent to the creek are typically separated from the creek by an overflow weir. The basin can be used for low-flow detention, high-flow detention, or both.

Stormwater detention basins vegetated with wetland species provide multiple benefits, such as wildlife habitat, water quality improvement, and visual interest.



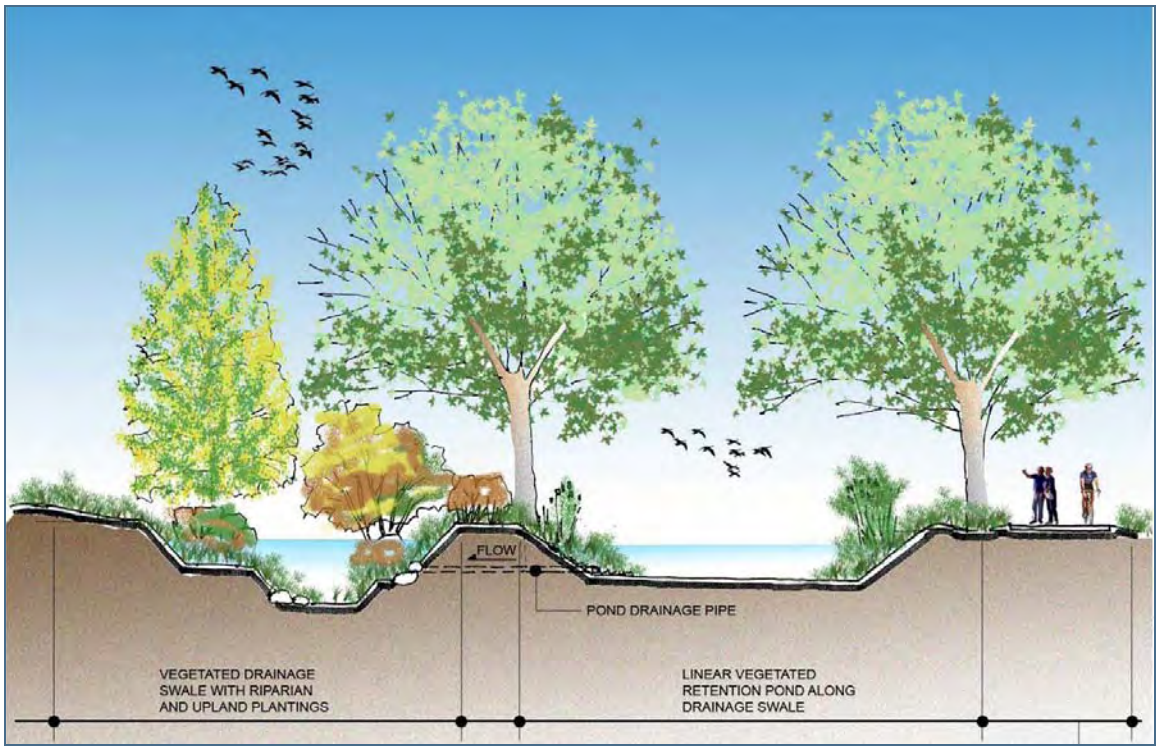
Source: AECOM

Example of concept plan for stormwater detention basins adjacent to existing creeks.

DDI-3.1 Design detention basins to capture and hold overland and stormwater runoff during low- and high-flow events. The water in the detention basin either infiltrates into the ground or, during high-flow events, spills over the weir and discharges into the creek. Stormwater is conveyed in the creek channel during low-flow events. During high-flow events, the water in the creek spills over the weir into the detention basin, where it is held and provides groundwater recharge. The additional detention allows the creek to handle significant flows within its existing banks. Low-flow detention basins can also be sited away from the creek and can be incorporated as design features in neighborhood, park, and open space designs. Basins can be connected in a series, eventually discharging to the creek. These dispersed low-flow detention basins are particularly valuable for treating summer nuisance flows.

Source: AECOM

Detention basins can be design features in parks.



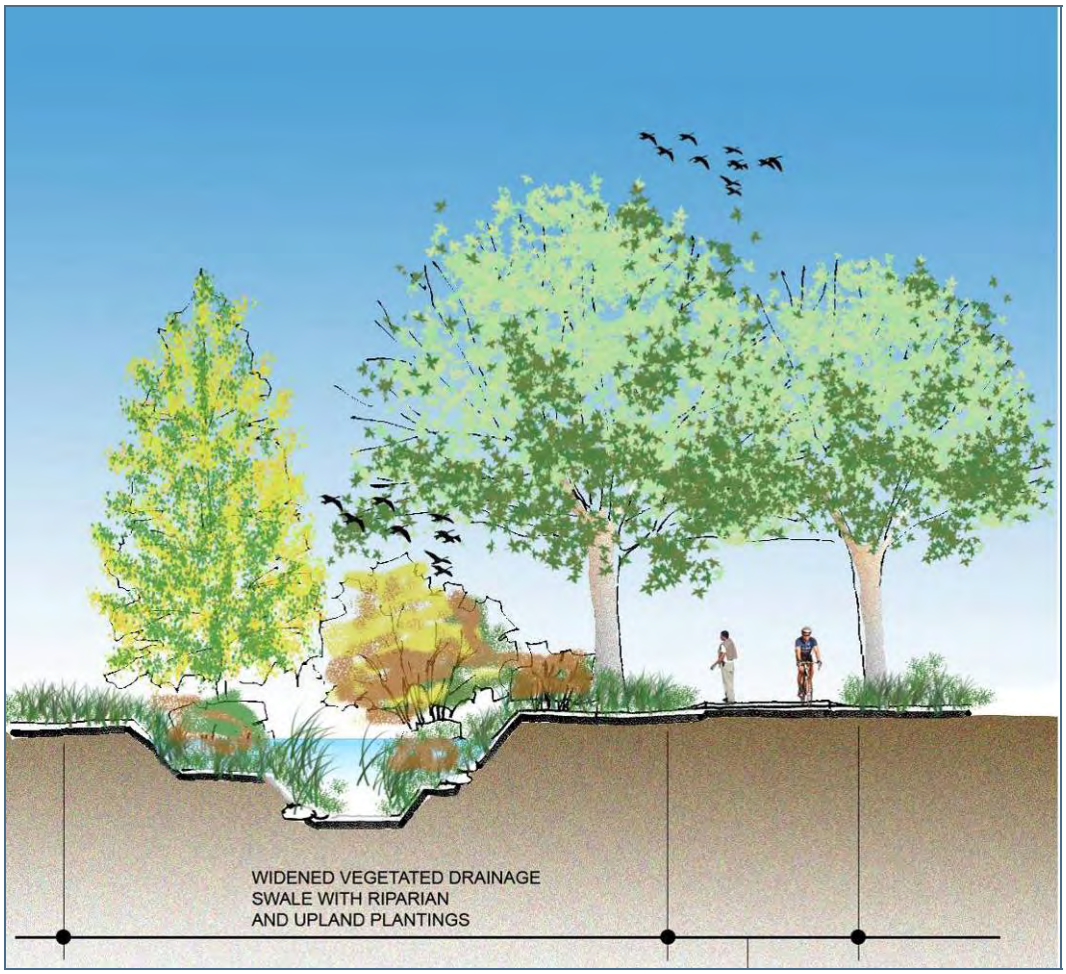
Source: AECOM

Example cross-section of a detention basin adjacent to a creek channel.

DDI-4 Recommendations Related to Stormwater Outfall Design and Location

The type of stormwater outfall design and location play important roles in reducing erosion potential and creek channel alteration. A stormwater system with many dispersed drainage outfalls is preferred over a system design with a few large outfalls. Dispersed and distributed stormwater drainages decrease the overall impact of discharging concentrated stormwater to the receiving creek. It is recommended that smaller drainage areas be used so that drainage swales and culverts flow into the creek in a fashion that is similar to natural drainage patterns. The benefit of an approach that uses many dispersed smaller discharges rather than a few large outfalls is that the many smaller outfalls maintain a more natural flow regime in the receiving creek. Stormwater systems with a few large outfalls result in unnaturally large pulses of water into the receiving creek, causing channel alteration, reformation, and often substantial scour at the outfall location.

Vegetated swales and drainages are generally the recommended design for conveying stormwater runoff to the creek.



Source: AECOM

Vegetated swales and drainages can be constructed next to trails.

As discussed in above "DDI-1 Water-Sensitive Urban Design," a holistic approach to stormwater system design is preferred. To the greatest extent possible, stormwater system design should include vegetated swales or drainages and/or filtration buffers that stormwater flows through before discharging to the creek. Design features such as vegetated swales and bioswales provide water quality treatment for rainfall runoff, summer nuisance flows, and first-flush events of the rainy season. Piping and direct discharge of stormwater to creeks should be minimized or avoided. Regardless of the size or type, outfalls should be designed with treatments that protect the outfall integrity and prevent erosion. The following recommendations for stormwater outfall design will provide multiple benefits, including energy dissipation, increased channel roughness, erosion protection, shade, terrestrial and aquatic habitat, minimal maintenance requirements, and enhanced aesthetics.

DDI-4.1 Incorporate vegetated swales into outfall designs. A vegetated swale increases the surface roughness for overland flow and reduces velocity. The vegetation provides a medium for filtration and trash removal.

DDI-4.2 Design vegetated riprap where outfall designs call for increased protection. Vegetated riprap installed at the outfall provides a medium for filtration and

energy dissipation while providing bank protection and riparian habitat. Vegetated riprap should be installed at all piped stormwater discharge points.

DDI-4.3 Install live poles in drainages to improve stabilization. A live pole drain is a bundle of live cuttings (typically willow) that is installed in small drainages to route flow along a particular path. The roots stabilize the drainage, and the vegetative shoots provide roughness that dissipates energy reducing the amount of sediment that would be discharged into the creek.

DDI-4.4 Incorporate drop inlet structures to reduce erosion potential. A drop inlet structure provides subsurface piped stormwater conveyance and discharges at the base of the slope. Significant energy dissipation occurs in the pipe, resulting in less erosion potential at the discharge point.

DDI-5 Recommendations Related to Creek Crossing Designs

Careful planning and design are required where roads and trails cross creeks and drainages. The creek crossing design process should consider and provide sufficient space for aquatic, terrestrial, and human connectivity in the creek corridor. Bridges are the preferred treatment for creek crossings; however, other options are available. The following recommendations provide suggested design considerations and concepts for creek crossings.

Source: AECOM

Pedestrian bridges and walkways allow trails to access and cross habitat areas.

DDI-5.1 Bridges are recommended where multilane roads cross intermittent and perennial creeks and/or important wildlife and trail corridors. Locate bridges at naturally stable channel reaches to reduce constraints on natural geomorphic processes. Design bridge spans and vertical heights to allow for uninhibited creek meander migration and water flow, provide unimpeded wildlife movement, maintain continuous vegetative cover, and accommodate trails for human use. The number of support structures used in the creek should be minimized to decrease the potential for erosion and scouring near the bridges.

DDI-5.2 Bottomless culverts are recommended where multilane roads cross intermittent and ephemeral drainages (i.e., tributary drainages) and construction of a bridge would be cost prohibitive. Bottomless culverts have a natural creek bed bottom to allow the movement of creek bed material (e.g., sediment, cobbles), aquatic species, and wildlife.

DDI-5.3 Fish-friendly culverts are recommended for trails and one-lane roads. The culvert should be relatively short with a mild gradient and have baffles or other rest areas to facilitate fish passage.

Bottomless box culverts provide sediment transport and movement benefits that piped culverts do not.

Example of a bridge over a perennial stream that maintains a natural bottom and accommodates wildlife passage.

Photo source: City of Folsom

Example of at-grade trail running along Willow Creek under the Sibley Street bridge in the City of Folsom

DDI-6 Recommendations Related to Trail Designs That Maintain Water Quality

Well-designed trails can provide year-round use with little or no impact on soil stability or water quality. Paved and natural surface trails should be designed and constructed so as not to impede natural drainage patterns. All trail designs should include the following design elements.

Trail bridge over creek and wetland area.

DDI-6.1 Outslope the trail surface to allow surface runoff to flow in sheets across the trail, avoiding potential erosion issues caused by concentration of runoff on the trail. Allow sheet flow across paved trails in areas with a cross slope gradual enough to avoid transporting sediments across the trail; install energy dissipaters at drainage outfalls to minimize erosion.

Outsloping the trail surface allows runoff to flow in sheets across the trail.

DDI-6.2 Incorporate rolling dips and grade reversals into the trail grading plan so that they align with seasonal and ephemeral drainages, thereby maintaining natural, unobstructed flow in these drainages. In some cases (e.g., hillside seeps) raised boardwalks can be constructed to accommodate natural flow. For paved trails on a raised bed, install culverts at each drainage.

DDI-6.3 Site trails to protect water quality.

a. Site trails and create barriers to discourage the development of unauthorized social trails or shortcuts accessing creeks and other points of interest.

b. Site high-activity areas (e.g., interpretive displays, public access points to creek corridors) at a distance away from sensitive resources that allows for interpretation while minimizing disturbance.

c. Site equestrian trails to parallel creeks without crossing them.

d. Implement designs that allow runoff from equestrian trails to be filtered by vegetation.

e. Provide information making trails safe and river-friendly for the equestrian population.

DDI-6.4 Armor natural trail surfaces with rock at creek and drainage crossings to prevent damage to the channel. Use bridges or bottomless culverts to cross perennial creeks to avoid impacts on riparian and aquatic habitats.

DDI-6.5 Align trails on the contour of a slope, and keep the average grade of the trail under 5%. Keep the maximum trail grade under 8%.

DDI-6.6 Align trails on the contour of a slope. Avoid constructing fall line trails (trails that run directly downslope) because they concentrate and redirect runoff and cause erosion. Construct raised boardwalks across flat areas that receive seasonal wetting or inundation when an alternative alignment is not available.

DDI-6.7 Trash receptacles should be located at regular intervals and intersections to reduce the accumulation of litter. Provide bags to encourage pet owners to pick up after their dogs.

DDI-6.8 Provide adequate vertical clearance under all grade-separated crossings to allow adequate space for the permitted uses (e.g., bicycle, equestrian, and pedestrian travel).

Align trails on the contour to maintain moderate to easy grades.

Providing bags for pet waste helps protect water quality.

An excellent resource for trail planning and design is *Trail Solutions: IMBA's Guide to Building Sweet Singletrack.* This 272-page book is the International Mountain Bike Association's (IMBA's) premier trail-building resource. It combines cutting-edge trail

design and construction techniques with proven fundamentals in a colorful, easy-to-read format. It is available on IMBA's Web site: www.imba.com.

DDI-7 Recommendations Related to Natural (Biotechnical) Methods for Streambank Stabilization and Protection

Biotechnical soil stabilization measures are composed of rock, soil, and live vegetation in various combinations to employ natural processes to provide streambank stabilization and protection. These measures provide bank stability, enhance riparian and aquatic habitat value, and improve site aesthetics.

Biotechnical soil stabilization measures can be either resistive (measures that absorb creek energy) or redirective (measures that divert creek energy). The following types of treatments are used with these measures.

DDI-7.1 Utilize flow directing structures to stabilize and protect streambanks. Flow-directing structures are primarily redirective measures used to influence the direction of creek flow. Examples of flow-directing structures include:

- transverse structures (e.g., spur dikes, vanes, bendway weirs, large woody debris, and stone weirs),
- longitudinal structures (e.g., longitudinal stone toe, coir fiber rolls, vegetated gabion baskets, live cribwalls, vegetated mechanically stabilized earth, live siltation, and live brush layering), and
- channel planform measures (e.g., vegetated floodways and meander restoration).

DDI-7.2 Utilize ground covers as resistive measures to provide bank stability. Use live vegetation (e.g., live cuttings, container plants, seeding) to improve soil stability and to increase channel roughness. Ground covers include planted and seeded vegetation, live staking, live pole planting, live fascines, turf reinforcement mats, erosion control blankets, and geocellular containment systems.

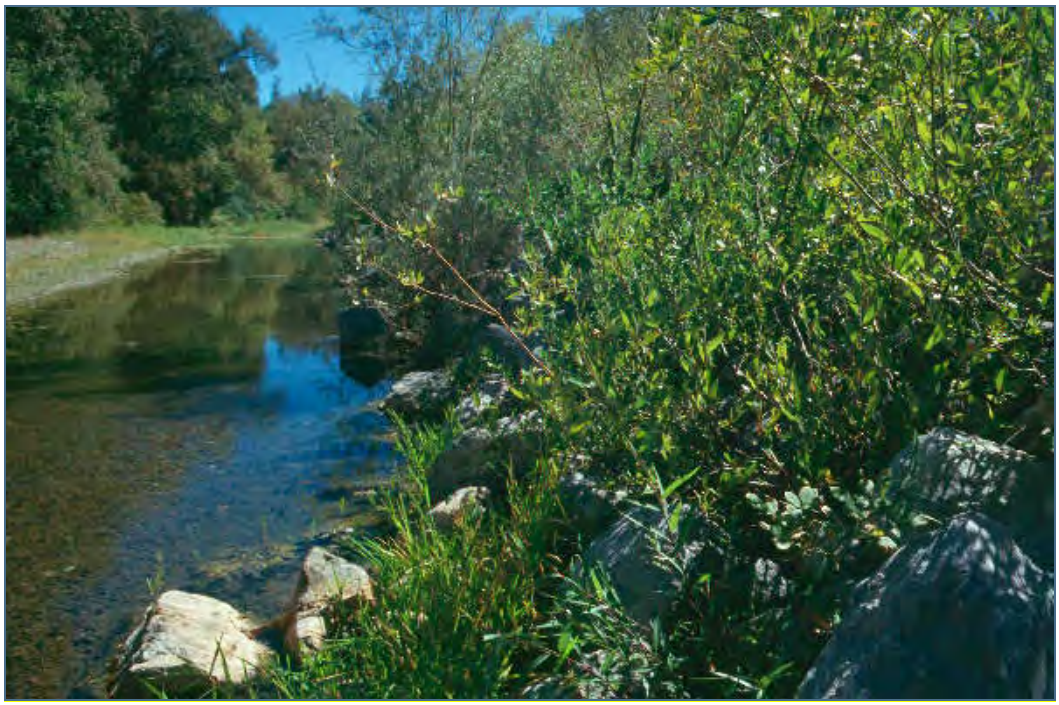
DDI-7.3 Utilize revetments as resistive measures to absorb creek flow energy by covering or arming the bank with additional structural support. Revetments include rootwad revetments, live brush mattresses, vegetated articulated concrete blocks, vegetated riprap, soil- and grass-covered riprap, vegetated gabions, cobble or gravel armor, and trench fill revetment.

Implementing natural (biotechnical) methods for bank stabilization and protection requires careful planning and design based on a thorough understanding of the hydrology, geomorphology, and vegetation of the creek being enhanced or restored. The following references are useful guides for planning, designing, and implementing natural (biotechnical) methods.

- *BioDraw 3.0: A Compendium of Biotechnical Soil Stabilization Solutions*. Salix Applied Earthcare. Available: www.salixaec.com.

- *E-SenSS: Environmentally Sensitive Creekbank Stabilization*. Salix Applied Earthcare. Available: www.salixaec.com.

- U.S. Soil Conservation Service. 1996. Chapter 16: Creekbank and Shoreline Protection. Part 650, 210-EFH, *Engineering Field Handbook*.



Vegetated riprap provides bank stability and habitat.

Recommended Literature Resources/References for Policies Described Above

1. ***Stormwater Quality Design Manual for the Sacramento and South Placer Regions***. Sacramento Stormwater Quality Partnership and City of Roseville. 2007 (May). A guidance document to aid with the selection, siting, design, operation, and long-term maintenance of stormwater quality control measures. Available: <www.sacramentostormwater.org>.
2. ***LEED Neighborhood Development Reference Guide*** – *A national set of standards for neighborhood location and design.* U.S. Green Building Council. 2009. Pilot Version LEED for Neighborhood Development Reference Guide. Available: <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148>
3. ***A Review of Low Impact Development Policies: Removing Institutional Barriers to Adoption, State Water Resources Control Board*** – A brief summary of the current regulatory environment regarding hydrograph modifications. Available: <http://pepi.ucdavis.edu/mapinfo/pdf/CA_LID_Policy_Review_Final.pdf>
4. ***The Importance of Protecting Vulnerable Streams and Wetlands at the Local Level, Center for Watershed Protection*** – A brief excerpt summarizing the importance of headwater streams. Available: <http://www.northinlet.sc.edu/training/media/resources/Article6%20Importance%20of%20Protecting%20Local%20Level.pdf>
5. ***Conservation Thresholds for Land Use Planners, Environmental Law Institute*** – A summary of ecological functions regarding patch size, edge effects, and buffers; includes size and shape recommendations. Available: <http://www.eli.org/pdf/research/thresholds/top_implementation_strategies.pdf>
6. ***Planning for a Green Buffer along Blue Water, U.S. Natural Resources Conservation Service*** – The basics of designing and planning for riparian buffers. Available: <ftp://ftp-fc.sc.egov.usda.gov/CT/water/complete-bufferbook.pdf> (see Chapter 5)
7. ***Planner's Guide to Wetland Buffers for Local Governments, Environmental Law Institute*** – A scientific literature review of wetland buffers and local government legislative choices for preserving buffers. Available: <http://www.elistore.org/reports_detail.asp?ID=11272&topic=Wetlands>
8. ***Setback Recommendations to Conserve Riparian Areas and Streams in Western Placer County, Placer County Planning Department*** – A study and report about local riparian buffers, which is also applicable for much of the Alder Creek watershed. Available: <http://www.placer.ca.gov/Departments/CommunityDevelopment/Planning/PCCP/BackgroundData/~/media/cdr/Planning/PCCP/BioStudies/setbackguidancereport%20pdf.ashx>
9. ***Stormwater Treatment Options, Center for Watershed Protection*** – A summary of recommended ecological stormwater treatment options: extended detention, ponds, constructed wetlands, bioretention, filtration, infiltration, swales. Available: <http://www.cwp.org/Store/index.htm>
10. ***The Next Generation of Stormwater Wetlands, Center for Watershed Protection*** – Lessons learned about stormwater wetland design. Available: <http://www.cwp.org/Store/index.htm>
11. ***Trail Funding Sources,*** California Department of Transportation – List of sources from trail guidelines document. Available: <http://www.dot.ca.gov/hq/TransEnhAct/test/index.htm>
12. ***San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook*** – A guidance document that provides designers, builders, municipal staff members, and other interested groups practical and state-of-the-art information on creating low-impact development roadways and parking lots. San Mateo County. Available: <http://www.flowstobay.org/ms_sustainable_streets.php>.
13. ***Portland Green Street Program*** – A stormwater strategy for streets that meets regulatory compliance and resource protection goals by using a natural systems approach to manage stormwater, reduce flows, improve water quality, and enhance watershed health. City of Portland. Available: <http://www.portlandonline.com/bes/index.cfm?c=44407&>.
14. ***U.S. Environmental Protection Agency Green Infrastructure Program*** – Green infrastructure is an approach to wet weather management that is cost effective, sustainable, and environmentally friendly. Green infrastructure management approaches and technologies infiltrate, evapotranspire, capture, and reuse stormwater to maintain or restore natural hydrology. Available: <http://cfpub.epa.gov/npdes/home.cfm?program_id=298>.

5.4 Recommended Projects

This section of the Plan presents a number of recommended projects for which on-the-ground activities could be implemented to achieve watershed management goals and protection criteria. These recommended projects include activities that could be implemented at various locations throughout the watershed and site-specific projects that are intended to be implemented at a specific location.

5.4.1 Watershed-wide Projects

Watershed-wide projects (WWP) include a variety of activities and programs that could be implemented by stakeholders, community members, school groups, and others. Many of these projects do not require intensive planning/design efforts, permits or environmental compliance, or large funding sources. As a result, they can be implemented quickly when identified and organized by stakeholders.

Photo source: City of Folsom

Adopt-a-Creek/Trail Program volunteers collect trash along a Folsom area creek

WWP-1 Recommended Watershed-wide Project No. 1 – Convene an Advisory Committee to Recommend Preferred Governance Structure for Watershed Stewardship Group

Location

Watershed-wide

Description

While the Plan describes interest from and significant opportunity for public agencies, landowners, organizations, and the general public to participate in activities to protect the watershed, no one individual or entity has emerged as the main organizing body for coordinating or prioritizing these activities. As such, it is recommended that an advisory committee be convened to recommend a preferred governance structure for a future watershed stewardship group.

Recommendations

The advisory committee would likely be made up of a subset of the stakeholder group established in 2007 to assist with development of the Alder Creek Watershed Management Action Plan. The committee should explore and study alternatives and select a preferred governance structure for a future watershed stewardship group. The governance structure could take one of several forms including, but not limited to:

- Public Agency: The agency would serve as the recipient for any grant funding and manage volunteers according to agency policy.
- Non-profit Organization: The organization would serve as the recipient for grants and donations including funding, in-kind and volunteer services.
- Fiscally-Sponsored Project of a Non-Profit Organization: The establishment of a watershed group would be part of a project fiscally sponsored by a 501(c) 3 non-profit organization in or near the watershed. The sponsoring organization would accept donations on behalf of the project.
- New entity: Establish a new organization that has a governing board and the appropriate authorities to conduct the types of tasks identified in WWP-2. This scenario is recommended when the fiscally-sponsored project of a non-profit is successful and outgrows the needs of the sponsoring organization, or when the responsibilities of the Watershed Coordinator position are beyond those of the agency or organization housing the position.

Potential Partners

All interested stakeholders (note: ideally the organizing committee should be subset of the stakeholder group that assisted to prepare this Plan)

Watershed Criteria

☒ Habitat	☒ Water Quality	☒ Recreation
☒ Flood Protection	☒ Ecosystem Processes	☒ Connectivity
☒ Collaboration	☒ Stewardship & Education	

WWP-2 Recommended Watershed-wide Project No. 2 – Establish Watershed Stewardship Group

Location	Watershed-wide
Description/ Recommendations	As discussed above under WWP-1, there is a need for an organizing body to be established to coordinate and/or prioritize activities described in this Plan. As such, it is recommended that a watershed stewardship group be established. The roles of a new watershed stewardship group could include: • Oversight for implementation of the Plan, including management of projects identified in the Plan as appropriate • Fundraising to support a watershed coordinator (see WWP-3), provide other resources and implement projects • Direct the work of the watershed coordinator position • Solicit and receive grants and donations, direct projects, and manage volunteers • Liaison with public agencies/property owners/developers/general public/regulatory agencies about the watershed and the need to protect it • Conduct adaptive management tasks and prepare future updates to the Plan Refer to Chapters 6 and 7 for more details about implementation and adaptive management activities listed above.
Potential Partners	All interested stakeholders, City of Folsom, Sacramento Area Creeks Council, Folsom ACT, Friends of the Folsom Parkway
Watershed Criteria	☒ Habitat ☒ Water Quality ☒ Recreation ☒ Flood Protection ☒ Ecosystem Processes ☒ Connectivity ☒ Collaboration ☒ Stewardship & Education

WWP-3 Recommended Watershed-wide Project No. 3 – Establish the Alder Creek Watershed Coordinator Position

Location

Watershed-wide

Description

Ideally, a Watershed Coordinator position should be established to coordinate the implementation of the Plan. The Watershed Coordinator position, full- or part-time, could be housed with a public agency such as the City of Folsom, with a nonprofit organization, or other entity as described in WWP-1. The position would likely be grant-funded to start, with funding and organizational stability provided over time through a combination of public and/or private support. The Watershed Coordinator would be responsible for coordinating and implementing the recommendations in the Plan. As described in WWP-2, it is recommended that an advisory group of stakeholders be created to direct the work of the coordinator and help set priorities. The Coordinator's main responsibilities would include:

- Develop, implement, oversee and coordinate activities to implement the Plan;
- Coordinate communications with and seek input from stakeholders;
- Provide leadership in community outreach and assist with developing and disseminating educational materials about Alder Creek watershed protection and stewardship activities;
- Work with community organizations and the public to identify and develop stewardship and monitoring activities that involve volunteers;
- Represent the watershed in meetings with elected officials, citizens' advisory groups, community organizations, and others to inform and advise them on watershed planning issues and projects; and
- Apply for grant funding and manage grant implementation and reporting.

Recommendations

Seek funding and establish the Watershed Coordinator position. Work with public agencies and organizations to seek grants or other funding to establish the position within an appropriate entity or operating structure (e.g., watershed stewardship group; see WWP-1 above)) to house and support the position over the long-term. The Watershed Coordinator would work within the governance structure (as described above) as follows:

- Public Agency: The Watershed Coordinator would be a full or part-time employee with a public agency.
- Non-profit Organization: The Watershed Coordinator would be a staff position with a 501(c) 3 non-profit organization in or near the watershed.
- Fiscally-Sponsored Project of a Non-Profit Organization: The Watershed Coordinator would be part of a project fiscally sponsored by a 501(c) 3 non-profit organization in or near the watershed.
- New entity: The Watershed Coordinator could be located within a new organization that has a governing board and the appropriate authorities to house the position, receive grants and donations, and manage volunteers (see WWP-1).

Potential Partners

All interested stakeholders, City of Folsom, Sacramento Area Creeks Council, Folsom ACT, Friends of the Folsom Parkway

Watershed Criteria

☒ Habitat	☒ Water Quality	☒ Recreation
☒ Flood Protection	☒ Ecosystem Processes	☒ Connectivity
☒ Collaboration	☒ Stewardship & Education	

WWP-4 Recommended Watershed-wide Project No. 4 – Invasive Weed Removal Strategy

Location

Watershed-wide

Description

Locations and densities of invasive weed species have not been mapped throughout most of the watershed; however, invasive weeds are known to occur along Alder Creek and its tributaries, including in stormwater detention ponds along tributaries in developed portions of the watershed north of U.S. 50.

If left unmanaged, invasive weed species can out-compete other plant species for surrounding space and resources and decrease local diversity to levels that impair habitat quality. Left unchecked, weed species will spread to other areas. Some species can cause significant decreases in stream channel conveyance capacity. Removal strategies for each species need to be identified. The timing and methods of removal will help to determine the work force needed to establish a successful removal strategy. Removal of some weed species could provide volunteer stewardship opportunities, whereas removal of other weed species may require the hiring of professional services. Suppression and/or eradication of invasive weeds requires long-term stewardship of affected areas. Successful management of invasive weed species prevents decreased riparian habitat quality and stream channel function.

Recommendations

Build on and expand the existing stakeholder-led process for mapping, removing, and monitoring invasive weeds. Additionally, educate watershed residents on the benefits of landscaping with native plants; discourage the use of nonnative, invasive plants in landscaping; and pursue grants to fund the professional removal of invasive plants when necessary.

Minimize the use of fertilizers in public rights-of-way, parks, schools, and other municipal lands, and educate watershed residents on the appropriate use of fertilizers. Increased nutrient inputs into streams can be a significant factor in increasing invasive aquatic plants.

Evaluate strategies to reduce invasive aquatic plants in stormwater ponds in developed portions of the watershed, and minimize the use of on-stream detention ponds in future development to reduce the potential for aquatic invasive plants to spread in the watershed.

Potential Partners

All interested stakeholders, City of Folsom, California State Parks, Folsom ACT, Friends of the Folsom Parkways, California Native Plant Society (Sacramento Weed Warriors Program), USDA/UC Davis, Sacramento Area Creeks Council, neighborhood associations and community facility districts

Watershed Criteria

☒ Habitat	☒ Water Quality	☒ Recreation
☒ Flood Protection	☒ Ecosystem Processes	☐ Connectivity
☒ Collaboration	☒ Stewardship & Education	

WWP-5 Recommended Watershed-wide Project No. 5 – Tree Planting Program

Location

Watershed-wide, including riparian, upland, and urban areas

Description

Urban and open space tree planting projects provide many benefits, including heat island cooling, riparian and stream shade (water cooling and nuisance species management), wildlife habitat, streambank stability, detritus and woody debris for aquatic food web, greenhouse gas reduction, and runoff reduction.

City of Folsom Parks and Friends of Folsom Parkways have been collaborating on several tree planting projects throughout the City.

The Sacramento Tree Foundation offers several programs that can be implemented in the Alder Creek watershed, including the Greenprint program, which involves doubling the region's tree canopy over the next 40 years; the Shade Tree program for schools, parks, and other places; the Nature program, which involves restoring native tree woodlands; and the Seed-to-Seedling program for growing acorns into oaks in classrooms throughout the watershed. The Sacramento Tree Foundation, through its programs, also offers technical support for species selection, planting and maintenance (planting and irrigation), and planting supplies.

Recommendations

Collaborate with the Sacramento Tree Foundation on a tree planting program to address the entire Alder Creek watershed. This recommended project involves working in coordination with the foundation to develop a comprehensive plan to identify and implement urban and open space tree planting and maintenance projects throughout the watershed.

Coordinate with the City of Folsom, Friends of Folsom Parkways, Sacramento County, and Sacramento Area Creeks Council on potential tree planting projects to enhance Alder Creek and surrounding parts of the watershed.

Potential Partners

All interested stakeholders, City of Folsom Parks Dept, Sacramento County Regional Parks, Friends of the Folsom Parkways, Sacramento Tree Foundation, Sacramento Municipal Utility District (shade tree program), Sacramento Valley Conservancy

Watershed Criteria

☒ Habitat	☒ Water Quality	☒ Recreation
☒ Flood Protection	☒ Ecosystem Processes	☒ Connectivity
☒ Stewardship & Education	☒ Collaboration	

WWP-6 Recommended Watershed-wide Project No. 6 – Water Use Efficiency Outreach and Education

Location Watershed-wide

Description Although much of the watershed is undeveloped, numerous residents will be moving into the watershed, and several schools will be constructed as the watershed is developed in the coming years. The City of Folsom currently provides a watershed education and outreach program that targets residents (see flyer excerpt below). Watershed outreach materials and watershed education curricula should continue to be developed to educate residents and students about the links between efficient uses of water and groundwater/surface water conditions and how these links affect habitat. Public service announcements and printed materials targeting clean water messages to watershed residents should also continue to be developed and distributed by local stormwater agencies, homeowners associations, and similar groups. See City of Folsom, Water Conservation Division for information on existing programs: <http://www.folsom.ca.us/depts/utilities/iconserve_water_conservation/default.asp>.

Recommendations Work with developer groups and municipal agencies to continue to develop and deploy water use efficiency messages and materials to watershed residents. Modify existing environmental program elementary and high school curricula to include information linking surface water and groundwater; the effects of this connection on habitat; and details on efficient watering methods, such as building and maintaining rain gardens for schools and homes.

Potential Partners City of Folsom Dept. of Utilities and Sacramento County Water Agency (local water agency), private landowners, Regional Water Authority

Watershed Criteria

☒ Habitat	☒ Water Quality	☐ Recreation
☐ Flood Protection	☒ Ecosystem Processes	☐ Connectivity
☒ Stewardship & Education	☒ Collaboration	

Problem: The average homeowner overwaters by 200 to 300 percent.
Solution: Evaluate your sprinkler system and make repairs immediately. Never set sprinklers to run for long periods. An effective run time for most Folsom properties is three to five minutes, plus additional short sessions if the landscape needs more water. If your timer doesn't allow you to use multiple start times, replace it with one that does.

Problem: "Quick Green" fertilizers.
Solution: Use organic or slow release fertilizers as the high nitrogen formulas damage soil and increase the lawn's need for water.

Problem: Overwatering grass during summer.
Solution: As the weather warms up, start watering infrequently with as little water as possible. This will encourage deeper root growth. A deeper root zone will give the plant a larger water gathering capability and reduce the need for watering.

Problem: Overwatering trees during summer.
Solution: Just like grass, a healthy root zone is encouraged by not overwatering. By following a prudent watering schedule, trees will survive a drought.

Excerpt from a City of Folsom water management flyer

WWP-7 Recommended Watershed-wide Project No. 7 – Promote River Friendly Landscaping in the Alder Creek Watershed

Location Watershed-wide

Description The extensive amount of impervious area that now covers the northern portion of the watershed has increased stormwater flows, which presents risks to aquatic habitat and water quality. Summer nuisance flows bring pollutants into the creeks and support vegetative overgrowth, which impairs aquatic health and decreases the flood conveyance capacity of the creeks during winter storms.

Recommendations Work with private landowners to provide river friendly landscaping training and encourage incorporation of water-efficient landscapes (including planting of native plants), LID practices, stormwater treatment, and shade trees into new communities where possible. Encourage private landowners to incorporate rain gardens into their lawn landscapes. Establish garden sites at public locations with at least one large enough to accommodate tour groups and hold river-friendly landscaping workshops. Such sites can demonstrate water-efficient native plantings, turf alternatives, and LID runoff source-control practices, such as use of rain gardens, swales, and pervious pavement.
[Fair Oaks Park has a water conservation demonstration garden where community river friendly landscaping workshops are offered a couple of times a year, see: www.riverfriendly.org (click on "events") for info on these workshops].

Potential Partners City of Folsom, Sacramento County, River Friendly Landscape Coalition (including Regional Water Authority)

Watershed Criteria

☒ Habitat	☒ Water Quality	☐ Recreation
☐ Flood Protection	☒ Ecosystem Processes	☐ Connectivity
☒ Collaboration	☒ Stewardship & Education	

Photos Source: City of Folsom
Installation of drought tolerant plants and water efficient drip irrigation by the City of Folsom on Oak Avenue Parkway in the Alder Creek Watershed is expected to save thousands of gallons of water each year

WWP-8 Recommended Watershed-wide Project No. 8 – Watershed Open Space/Conservation Easement Catalog

Location	Watershed-wide
Description	Most of the watershed is undeveloped. However, as the watershed is developed in the future, open space dedications, mitigation lands, and similar land set-asides will likely be required as a condition of granting development approvals or to mitigate impacts on sensitive resources. A tool to track open space lands and mitigation requirements/commitments throughout the watershed should be developed to track these areas and allow for more strategic open space planning throughout the watershed.
Recommendations	Develop and maintain a watershed-wide open space, conservation easement, and mitigation land commitment catalog for the Alder Creek watershed in coordination with other regional efforts including the Sacramento Valley Conservancy, South Sacramento County Habitat Conservation Plan, and Laguna Creek Watershed Council. This recommended project will serve as a tool to identify and document conservation lands, track mitigation requirements and commitments, and identify lands/projects that could be opportunity sites for future conservation easements, mitigation areas, and open space targets. Important plans and/or projects to consider in the development of this planning tool are the South Sacramento County Habitat Conservation Plan, Sacramento Valley Conservancy's 21st Century Open Space Vision, Sacramento County and City of Folsom general plans, and other regional/general plans in the watershed and surrounding region.
Potential Partners	City of Folsom, Sacramento County, Sacramento Valley Conservancy, private landowners
Watershed Criteria	☒ Habitat ☒ Water Quality ☒ Recreation ☒ Flood Protection ☒ Ecosystem Processes ☒ Connectivity ☒ Collaboration ☒ Stewardship & Education

WWP-9 Recommended Watershed-wide Project No. 9 – Connected Creek Trails, Open Space, and Interpretive Signage

Location

Watershed-wide trail system along creeks connecting neighborhoods, schools, parks, and business/retail centers with creeks and open space

Description

Pedestrian and multi-use trails already serve the portions of the watershed north of U.S. 50. Many of the trails are in good shape, and others may benefit from enhancement (e.g., vegetation management, tree planting, replacement of signs or provision of new signs, addition of pet waste bag dispensers/signs and garbage cans).

The watershed is uniquely positioned between the American River Parkway, Folsom Lake SRA (Lake Natoma), and the Sierra Nevada foothills to the east and the Deer Creek Hills Preserve to the south. Importantly, the Alder Creek corridor provides an important linkage of connectivity between these regionally important open space areas consistent with Sacramento Valley Conservancy's Twenty First Century Open Space Vision and more specifically the Blue Oak Hills Project and Regional Trail (see description below). A summary of Sacramento Valley Conservancy's Blue Oak Hills Project and Regional Trail is provided below.

Recommendations

Work with the responsible agencies, developer groups, and others to identify preferred future trail alignments and connections including existing and new crossings of U.S. 50 (at Folsom Boulevard, Prairie City Road, future Oak Avenue extension, and Bidwell Street), Prairie City Road, future Easton Valley Parkway and White Rock Road.

An overarching goal of this work should be to provide continuous open space and trail connections from the American River Parkway/Folsom SRA (Lake Natoma) through the watershed to adjoining trails planned by the Sacramento Valley Conservancy to Deer Creek Hills Preserve to the south.

The Alder Creek watershed stewardship program should also identify community stewards (e.g., local Girl Scout or Boy Scout troops, adopt-a-trail groups) to adopt trail reaches and assist with interpretive signage projects to ensure accurate and consistent themes and educational messages of watershed natural history, local ecology, and watershed stewardship.

Potential Partners

City of Folsom Parks Dept, Sacramento County Regional Parks, California State Parks, USBR, Sacramento Valley Conservancy, Caltrans, Friends of Folsom Parkways, Folsom ACT, private landowners

Watershed Criteria

☒ Habitat	☒ Water Quality	☒ Recreation
☒ Flood Protection	☒ Ecosystem Processes	☒ Connectivity
☒ Collaboration	☒ Stewardship & Education	

Sacramento Valley Conservancy
Blue Oak Hills Project and Regional Trail[7]

Sacramento Blue Oak Hills Project

Sacramento Valley Conservancy (SCV) has identified the eastern Sacramento County area from U.S. 50 (at the American River Parkway) to Deer Creek Hills as the most significant unprotected open space remaining in Sacramento County. The project represents a significant example of the county's ranching, gold mining and Native American heritage, and as such, is a cultural resource area worthy of protection. The area contains significant biological, cultural, recreational and scenic resources.

SVC also finds that the most desirable land use for this property is continued cattle ranching with areas identified for compatible public recreation, including a regional trail connecting the American River Parkway to the Deer Creek Hills Preserve. This can be achieved with the majority of the area remaining in private ownership, through cooperative use of stewardship agreements, conservation easements and other methods designed to preserve ranching and open space.

The SCV acknowledges that all private property owners in the area deserve fair consideration and return on their properties. Accordingly, the SVC has identified the area as its number one priority for open space preservation efforts and will make its staff and resources available to landowners, public agencies and community groups and will act as a clearinghouse for mapping, planning resources and information sharing. The SCV has also stated that it will assist, as requested, in brokering willing seller agreements and providing advice and technical assistance related to easements, stewardship agreements, purchases, etc. in the area and will own and/or manage property and/or public use in the area when appropriate.

Blue Oak Hills Regional Trail

General Guidelines

Definition and Scope

The Blue Oak Hills Regional Trail is a system of multi-use trails in eastern Sacramento County connecting the American River Parkway at Lake Natoma with the Deer Creek Hills Preserve. It consists of an over 13-mile major trunk trail with connecting laterals to adjacent natural, scenic, recreational and community resources.

Design

- All trails should be Multi-Use non-motorized facilities (Class I, paved bicycle trails with adjacent or nearby equestrian and hiking trails), similar to the American River Parkway.**
- All segments of the trail system should be accessible and meet Federal and State accessibility guidelines.
- All trails should have continuous and consistent directional and interpretive signage.
- All street crossings should be under or over grade, including, but not limited to Folsom Boulevard, Prairie City Road, Easton Parkway, White Rock Road and any other road that

[7] Text was provided by Sacramento Valley Conservancy, 2009

intersects the main trail within the Folsom SOI Area. (This includes aggregate conveyor crossings South of White Rock Road)

- A minimum corridor width of 500 feet should be provided, including many areas with much larger nodes of scenic open space and natural resources along the trail route.*** However, it is recognized that at some locations, the trail corridor may be narrower if dictated by topography or other constraints.

- Areas surrounding and within the immediate view shed of the trail should be natural open space as often as possible. The trail should also link to such community facilities as major regional park sites, school sites, community centers, and the Prairie City State Vehicle Recreation Area.

- Trail corridors and facilities should be located and designed to minimize conflicts with ranching operations and other adjacent land uses.

Management, Operation and Maintenance

- SVC is willing to hold easements or fee title to the trail and to surrounding natural open space areas.

- SVC is willing to manage and maintain the trail and surrounding open space areas, either alone, or in partnership with public agencies and/or private landowners, such as ranchers or aggregate companies.

- SVC is willing to work with private landowners and public agencies to help establish long-term endowments, cooperative agreements for in-kind services for trail installation and maintenance, and partnerships to assist with developing community resources and educational opportunities.****

* Without a trail walk by SVC's expert team, and a trail log on each specific section of the regional trail, these specifications are guidelines only. The trail walk and trail log will simply identify an appropriate route matched to the topography and features of the section, including maximizing predictability for the planning process for surrounding uses and roadway intersections, minimizing future trail maintenance and trail construction impacts, and providing for meeting federal accessibility guidelines to accommodate all types of users.

** Bicycle trails North of White Rock Road will be paved; south of White Rock Road may be leveled dirt to maintain rustic character of that section. Some sections of the trail might provide motorized access to the Prairie City State Vehicle Recreation Area, but only if safe separation of motorized and non-motorized uses could be provided.

*** Areas near or over 160 acres are viable cattle grazing units. Cattle grazing will be used to help maintain both a traditional cultural activity and agricultural resource, and to help maintain the natural resources and provide fire risk reduction at low cost.

****Some local examples of partnerships involving public agencies, nonprofits and private landowners and companies include the Deer Creek Hills Preserve and the Cache Creek Nature Preserve.

WWP-10 Recommended Watershed-wide Project No. 10 – Alder Creek Watershed Stewardship Program

Location

Watershed-wide

Description

Much of the Alder Creek watershed is undeveloped and provides locally and regionally important watershed values (e.g., wildlife habitat, open space, water quality). However, most of this area is planned for development in the near future. Future development plans include an open space network along the Alder Creek corridor with a trail network designed to preserve some of these values.

Development of the planned Glenborough community will include the creation of an Alder Creek educational center within preserved open space near Prairie City Road. This center will be a significant resource to educate watershed residents on the creek and the ecological values provided by the watershed. Additionally, the center will provide a convenient facility for organizing and mobilizing support for watershed stewardship projects. The Alder Creek Living Classroom Plan is an educational tool being developed by GenCorp Realty Investment that is intended to encourage the recreational and educational use and exploration of the Easton Open Space Preserve.

Future development within the Folsom Sphere of Influence area south of U.S. Highway 50 may provide similar opportunities to organize interest in watershed stewardship or, at least, provide additional watershed stakeholders with an interest in watershed stewardship.

Interconnected trails, open space areas, and creek corridors should provide ample watershed education opportunities and potential projects that could be implemented by watershed residents with an interest in watershed stewardship.

Recommendations

Work with Folsom Adopt and Creek/Trail and Friends of the Folsom Parkways to expand the stewardship activities of these two groups to areas south of US 50. This effort would also include continuing to seek out opportunities for partnerships and sponsorships with businesses in the watershed, including REI, which has provided several grants to these groups for projects that improve creekside trails and provide recreation and natural resources interpretive/educational opportunities for the community.

Acknowledge and support a formal watershed stewardship and education program, *The Alder Creek Living Classroom Plan*, in conjunction with the Alder Creek education center planned for the Easton community. Increased watershed education and stewardship among neighborhood residents, local schools, and other watershed stakeholders will likely affect how local residents value this natural resource area and likely will decrease the amount of pollution in the area. Increased appreciation of the watershed will likely encourage stewardship projects intended to improve watershed values.

Watershed education curricula focused on clean water and habitat lessons for students has been developed by the Sacramento Splash program, and this curricula could be adapted for use in schools across the watershed.

Potential Partners

City of Folsom, GenCorp, Sphere of Influence Landowner Group, Folsom Adopt and Creek/Trail, Friends of the Folsom Parkways, Trout Unlimited, Folsom Lake College, Sacramento Audubon Society, REI, neighborhood associations, local Boy Scout and Girl Scout troops, Folsom-Cordova Unified School District, Sacramento Area Creeks Council, Sacramento Valley Conservancy, Sacramento Splash program

Watershed Criteria

☒ Habitat	☒ Water Quality	☒ Recreation
☒ Flood Protection	☒ Ecosystem Processes	☒ Connectivity
☒ Collaboration	☒ Stewardship & Education	

WWP-11 Recommended Watershed-wide Project No. 11 – Alder Creek Watershed Monitoring Program

Location Watershed-wide

Description As the Alder Creek watershed is developed and recommendations in this Plan are implemented, it will be important to monitor and document the various attributes of the watershed to determine how the resource conditions respond to changes, measure the overall performance and success of the Plan's recommendations, and modify the approach as necessary. Chapter 7 of this Plan describes recommended watershed indicators and targets, monitoring and reporting, and project tracking and Plan updating process that are integral to the adaptive management component of the Plan.

Recommendations Develop and maintain a watershed-wide monitoring plan for the Alder Creek Watershed. This action will serve to document ambient conditions, identify trends, evaluate project effectiveness, and inform adaptive management of the watershed. See Chapter 7 of this plan for additional information.
The stakeholder group or future stewardship group and/or watershed coordinator (see recommendations WWP-1 through WWP-3 above) should actively seek funding and collaborative partnerships to support these actions.

Potential Partners Work should be guided by the stakeholder group, with projects and tasks conducted by, or in collaboration with, local municipalities and agency stormwater programs, private landowners, environmental organizations, and community volunteer groups.

Watershed Criteria

☒ Habitat	☒ Water Quality	☒ Recreation
☒ Flood Protection	☒ Ecosystem Processes	☒ Connectivity
☒ Collaboration	☒ Stewardship & Education	

5.4.2 Site-Specific Projects

A number of site-specific projects (SSP) have been identified to address existing problems that were identified during the watershed assessment. All of these projects would require additional evaluation, planning and design, permits and environmental compliance, and medium to large funding sources. As a result, several steps for successful project implementation are described below.

Elements for Successful Project Implementation

Successful projects require good communication, careful planning, efficient implementation, monitoring to support adaptive management, and resources, including funding and in-kind contributions of materials and labor. Highlighted below are suggestions to consider for each project.

Communication

Maintaining regular communication with those affected by the project (e.g., neighbors, community members, resource agencies, and other stakeholders) is a critical part of a successful project. Good communication reduces the likelihood of misunderstandings and gains knowledge, support, and resources for the project. Neighbors may have similar interests and concerns and may want to join in a coordinated effort. Stakeholder and community involvement can bring additional resources.

Funding

Projects come in all shapes and sizes, and not all projects require large amounts of funding. The first step to funding a project is determining a sense of the project's scale and complexity. It is helpful to determine whether anyone else has addressed the same issue. If so, what was done and was it successful? Additional discussion on funding sources is provided in Chapter 6 of this Plan.

Planning and Design

The steps summarized below offer a strategy for project planning and design. Depending on the type and complexity of the project, it is often advisable to hire professional contractors (qualified ecological restoration consultants and engineers) to carry out the planning and design work. Simple projects may not require as intensive project planning and design as described below.

- Goals and Objectives. Planning begins by determining the goals and objectives for the project. For large projects, it may be appropriate to involve key stakeholders and other interested community members in the earliest stages of planning. These goals and objectives should be consistent with the Plan goals and objectives.
- Inventory and Analysis. The next step is to conduct an inventory and analysis of the project site. A review of the watershed assessment reports will provide some of the information needed for planning purposes. Conducting site reconnaissance and identifying opportunities and constraints on the site will further guide project design.
- Master Plan, Conceptual Design, and Regulatory Compliance. A master plan can serve as a guide for the design, regulatory compliance and permitting, funding, implementation, and monitoring stages for the project. Early conceptual designs should be developed to meet stated goals and objectives and be based on a thorough understanding of the resource issues on the site, as well as the required regulatory compliance and permitting for the project. Once a concept design is developed that meets all the needs of the project and the regulatory agencies, the next step is to move forward with the development of detailed designs and begin the regulatory compliance and permitting process (see Regulatory Compliance and Permitting below for more detail). This is also a point at which the master plan can be used to support requests for project funding, if funding has not already been secured to take the project through final design, implementation, and monitoring. Up to 20% of a project budget can typically be used to develop detailed plans and specifications.
- Design. Prepare detailed designs for the project, including plans, specifications, and cost estimates that contractors can use to bid on the project, if work is to be implemented by hired contractors. These documents are used to ensure that construction is in conformance to the plans and specifications, and that permits and other regulatory compliance requirements are met during implementation.

Regulatory Compliance and Permitting

Most projects will require regulatory compliance and permitting, which can be simple to complex depending on the scope and size of the proposed project. Project proponents should discuss their project with someone knowledgeable about the regulatory process prior to commencing work. Permits required for certain types of projects proposed include:

- U.S. Army Corps of Engineers (USACE) Clean Water Act Section 404 permit and Regional Water Quality Control Board (RWQCB) Clean Water Act Section 401 certification – address any activity that involves discharge of dredged or fill material into waters of the U.S., including wetlands;
- California Department of Fish and Game (DFG) Section 1602 Streambed Alteration Agreement – addresses any activity that would result in the modification of the bed, bank, or channel of a stream, river, or lake, including water diversion and damming and removal of vegetation from the floodplain to the landward extent of the riparian zone;
- U.S. Fish and Wildlife Service (USFWS)/National Marine Fisheries Service (NMFS) consultation regarding Endangered Species Act (ESA) – addresses any activity that would adversely affect federally-listed species;
- DFG consultation regarding California Endangered Species Act (CESA) – addresses any activity that would result in adverse effects to state-listed species; and
- NPDES Construction Permit with the State Water Resources Control Board – addresses activities that would disturb 1 acre or more.

In addition to permit requirements, the California Environmental Quality Act (CEQA) applies to projects carried out or approved by California public agencies. Refer to Chapter 2 of this Plan for more detailed information about environmental and regulatory compliance. In addition, the Sacramento River Watershed Program (SRWP) online regulatory permitting guide (www.sacriver.org) is a useful resource.

Construction/Implementation

A first step in project construction/implementation is to develop a construction schedule that is appropriate for the type of project being implemented and that meets permit requirements. To protect sensitive resources and have successful outcomes, different projects require different timing. For example, earth-moving activities in or near streams are typically restricted to the dry months of the year, while planting vegetation should be done during the wet months. Additionally, if sensitive species, such as nesting raptors, are located at or near the project site, construction activities may be subject to a limited timeframe. Developing a reasonable construction schedule can help ensure that the project is completed on time, on budget, and without regulatory compliance issues. Maintaining oversight of daily work and checking to see that work is consistent with plans provides the opportunity to make corrections and modifications in the field as needed.

Monitoring

Project monitoring provides information that can be used to determine when the work completed has been successful in accomplishing the goals set for a project, and thus builds knowledge and understanding for the next project. Monitoring aids in the understanding of a project's impact on the overall condition of Alder Creek and its tributaries. More detailed information about monitoring and project documentation is discussed in Chapter 7 of this Plan.

SSP-1 Recommended Site-Specific Project No. 1 – Alder Pond Restoration and Management

Location

Adjacent to U.S. Highway 50 and the Folsom Automall, downstream of Folsom Boulevard

Description

Alder pond and the surrounding land is owned by the U.S. Bureau of Reclamation (and managed by State Parks as part of Folsom Lake SRA) and the Folsom Automall. Alder Pond is located at the downstream end of the watershed and is formed by the backwater of Lake Natoma. It receives flows from the creek, including runoff generated from areas of the watershed that have been affected by gold mining, grazing, urbanization, and other land uses. Operations of Lake Natoma as an afterbay and the resulting diurnal fluctuations in the water levels in Alder Pond have limited native vegetation in the riparian zone.

Historical gold mining in the watershed has likely resulted in mercury contamination. The backwater environment at Alder Pond may promote the conversion of mercury to methylmercury, the form of mercury that is taken up into the food web, by providing the required anaerobic conditions in the accumulated bottom sediments. The U.S. Bureau of Reclamation, in cooperation with the U.S. Geological Survey, collected water samples from Alder Pond to measure mercury, salts, and nutrient concentrations. Alder Creek was found to exhibit high nutrient concentrations, which promote nuisance aquatic plant growth. Excess growth of algae and aquatic plants are regularly observed in the pond.

The U.S. Army Corps of Engineers (USACE), in coordination with the City of Folsom and the Folsom Automall, previously identified a restoration project for Alder Pond (Lake Natoma Restoration Project) under the USACE's Continuing Authorities Program. In April of 2008, the City of Folsom sent a letter to the USACE to reaffirm the City's support for the project; however, as of February 2010, the project has not moved beyond the preliminary planning stages.

Recommendations

Work with key stakeholder partners to prepare and implement a restoration and management plan to remedy past stream alteration effects by restoring/improving the physical (wetland hydrology and soil composition) and biological (aquatic, riparian, seasonal wetland, and terrestrial components of the upper floodplain) functions and values in Alder Pond and Alder Creek. Folsom Lake SRA General Plan/Resource Management Plan would provide guidelines for this project. The restoration and management project should include:

- investigation and consideration of potential changes in flows in Alder Creek resulting from increased runoff and proposed enlargement of the culverts under Folsom Boulevard;
- removing invasive nonnative vegetation and planting native vegetation;
- decreasing water warming and productivity by creating shaded riverine aquatic habitat;
- evaluating and developing sediment management guidelines; and
- addressing ongoing causes of habitat and water quality degradation.

This project should be coordinated with SSP-2 and SSP-3 and should consider potential changes in creek flows that could result from upstream developments.

Potential Partners

California State Parks, U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, California Department of Transportation, Folsom Automall Dealer Association, City of Folsom, and private landowners

Watershed Criteria

☒ Habitat	☒ Water Quality	☒ Recreation
☒ Flood Protection	☒ Ecosystem Processes	☒ Connectivity
☒ Collaboration	☒ Stewardship & Education	


Locator Map
Folsom
American River
Folsom Blvd
Lake Natoma
Alder Creek
Alder Reservoir
Alder Pond
Aerojet Rd
Prairie City Rd
Scott Rd
Parkshore Rd
White Rock Rd
E Bidwell St
50
Alder Creek
Automall
50
Auto Mall
Alder Pond
Lake Natoma
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100
200
FEET
NORTH
Aerial Image: USGS 2007
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SSP-2 Recommended Site-Specific Project No. 2 – Alder Creek Channel and Floodplain Restoration

Location

Reach of Alder Creek in the middle watershed, adjacent to U.S. Highway 50, and downstream of Natomas Company Dam

Description

The reach of Alder Creek below the Natomas Company Dam has become altered as a result of the Natomas Company Dam and Alder Reservoir, and the placement of mining dredger tailings. The dam has been capturing sediments, altering sediment transport dynamics, and creating a sediment starved creek downstream (see Appendix C). The placement of the dredger tailings has created a floodplain condition that is terraced well above the low flow channel. The resulting condition is one where the channel has become incised (degraded) and widened and is currently effectively disconnected from the active floodplain.

Recommendations

The altered and degraded reach of Alder Creek should be reconfigured to restore channel and floodplain interactions, functions, and processes. (See the conceptual cross sections illustrating altered and restored channel conditions are provided on the adjacent diagram.) This project should be coordinated with Recommended Site-Specific Project No. 3 – Natomas Company Dam / Alder Reservoir Management (see below).
This project should be coordinated with SSP-1 and SSP-3 and should consider potential changes in creek flows that could result from upstream developments.

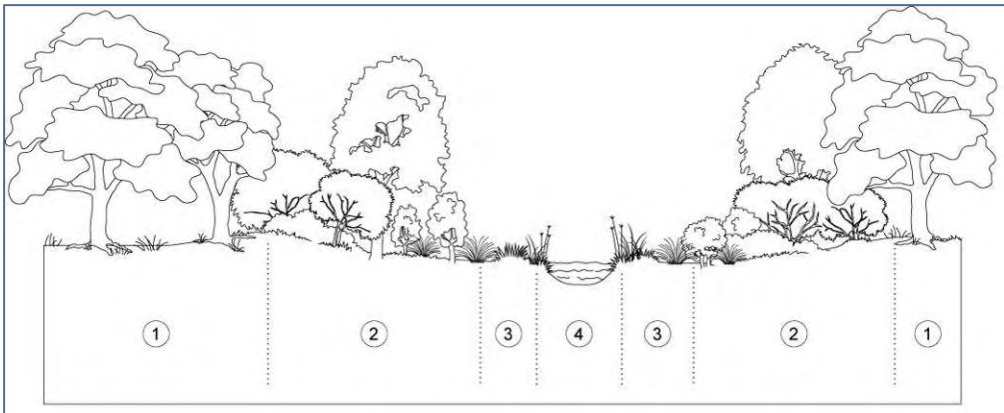
Potential Partners

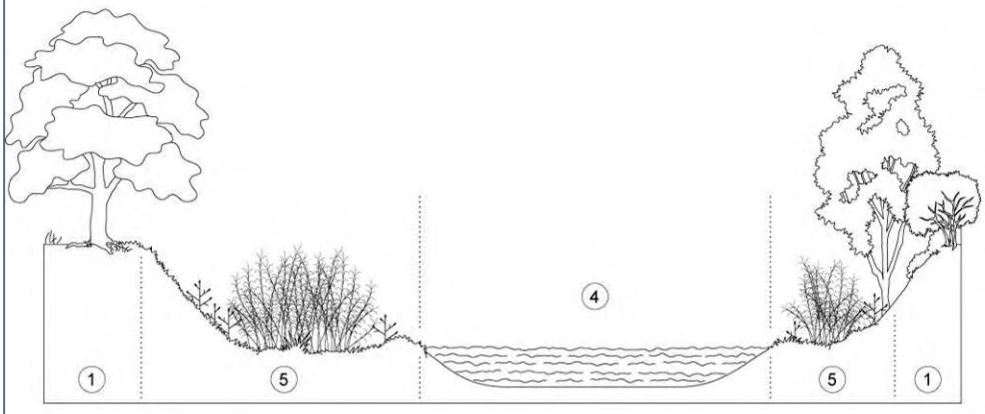
City of Folsom, Sacramento County, DWR, Division of Safety of Dams (DSOD), and private landowners

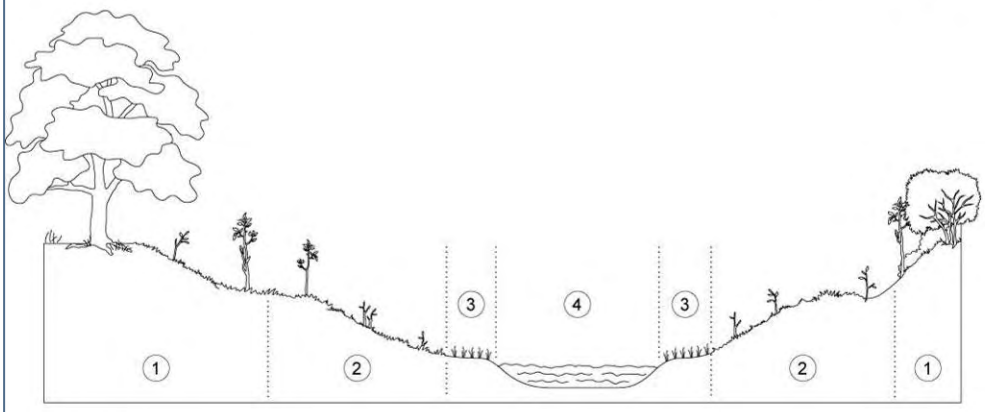
Watershed Criteria

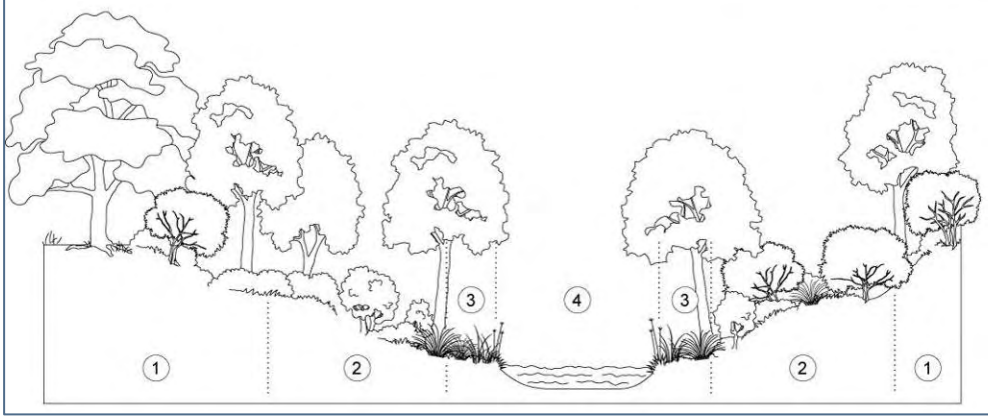
☒ Habitat	☒ Water Quality	☒ Recreation
☒ Flood Protection	☒ Ecosystem Processes	☒ Connectivity
☒ Collaboration	☒ Stewardship & Education	

The Alder Creek channel downstream of Natomas Company Dam is incised and disconnected from it floodplain.









Key:

① Blue Oak Woodland
② Mixed Riparian Forest
③ Herbaceous Riparian
④ Low-Flow Channel
⑤ Invasive Vegetation

Historic Condition

- Small flow channel
- Wide floodplain
- Floodplain frequently inundated during storm events

Existing Impacted Condition

- Incised, overwidened channel
- Limited active floodplain
- Disconnected historic floodplain
- Steep eroding banks
- Invasive vegetation

Restoration Implementation

- Restore channel dimension (based on future flow regime)
- Stabilize/recontour streambanks
- Restore active floodplain
- Remove invasive plants
- Revegetate with native plants

Future Restored Condition

- Self-sustaining, weed resistant native vegetation
- Functioning floodplain
- Stable banks
- Shaded channel
- Restored wildlife/bird/aquatic habitat

SSP-3 Recommended Site-Specific Project No. 3 – Natomas Company Dam / Alder Reservoir Management

Location

Natomas Company Dam and Alder Reservoir are located in the middle watershed adjacent to U.S. Highway 50.

Description

The Natomas Company Dam and associated Alder Reservoir are located on City of Folsom owned land on Alder Creek in the middle watershed. The dam appears to have been constructed sometime prior to 1937, the time period during which it appears on historical maps, plan designs, and aerial photographs.

The California Water Code designates the regulatory Dam Safety Program to DWR, Division of Safety of Dams (DSOD). The principal goal of this program is to avoid dam failure and thus prevent loss of life and destruction of property. The DSOD reviews plans and specifications for the construction of new dams and for the enlargement, alteration, repair, or removal of existing dams, and must grant written approval before the owner can proceed with construction. Dams under DSOD jurisdiction include artificial barriers (together with appurtenant works) that are 25 feet or more in height or have an impounding capacity of 50 acre-feet or more. Due to the unknown size of the dam and associated water impoundment volume of Alder Reservoir, it is currently unknown whether or not the dam falls under the jurisdictional oversight of the DSOD. Additionally, evaluation of the dam has not been conducted to determine stability or potential for risk of failure.

Similar to Alder Pond, Alder Reservoir receives flows from the creek, including runoff generated from areas of the watershed that have been affected by gold mining, grazing, urbanization, and other land uses. Accordingly, many of the issues described above for Alder Pond also apply to Alder Reservoir.

Recommendations

Alder Reservoir provides habitat for fish and wildlife and has the potential to serve as a special recreational amenity for community; however, additional evaluation and planning is required.

Evaluate Natomas Company Dam. Due to the age of the dam and potential jurisdictional status with the DSOD, geotechnical engineering inspections and evaluations are recommended to determine if the dam is within the jurisdictional oversight of the DSOD and/or meets stability requirements per DSOD or other acceptable engineering and geotechnical criteria. If the dam is within the jurisdictional oversight of the DSOD, it is recommended that the City consult with the DSOD to conduct a review of the dam and make any necessary improvements. If the dam does not meet stability requirements, regardless of whether or not it is within the jurisdictional oversight of the DSOD, the City, in coordination with Sacramento County and adjacent landowners, should make necessary improvements to ensure that it meets minimum stability requirements.

Evaluate and prepare a long term management plan for Alder Reservoir that addresses water quality, pond sediments, aquatic and riparian vegetation, and recreational access.

This project should be coordinated with SSP-1 and SSP-2 and should consider potential changes in creek flows that could result from upstream developments.

Potential Partners

City of Folsom, Sacramento County, DSOD, private landowners

Watershed Criteria

☒ Habitat	☒ Water Quality	☒ Recreation
☒ Flood Protection	☒ Ecosystem Processes	☒ Connectivity
☒ Stewardship & Education	☒ Collaboration	


Locator Map
Folsom
American River
Folsom Blvd
E Bidwell St
Lake Natoma
Alder Creek
Alder Reservoir
Alder Pond
Aerojet Rd
50
Scott Rd
Placerville Rd
White Rock Rd
Prairie City Rd
Alder Creek
Alder Reservoir
Natomas Company Dam
50
0
100
200
FEET
NORTH
Aerial Image: USGS 2007
X 07110004.01 044 2/10

SSP-4 Recommended Site-Specific Project No. 4 – Stormwater Detention Basin Management

Location

Several locations throughout the developed portion of the upper watershed to the north of U.S. Highway 50.

Description

Several of the stormwater detention basins throughout the developed portion of the upper watershed are experiencing eutrophicaton. Eutrophication is a process by which plant growth increases in a lake or pond (or basin). In time, eutrophication may cause plants to completely fill in the area where a lake or pond once stood. As the overcrowded plants die off, the dead and decaying vegetation drops to the bottom and depletes the pond's oxygen supply. This, in turn, leads to anaerobic conditions that no longer support a healthy ecosystem. The accumulated dead plant material eventually changes a deep pond to a shallow one, reducing the capacity and hydrologic function. The accelerated growth and overcrowding of plants is most commonly due to nutrient loading that enters the pond through various pathways. Sources of nutrients include runoff from urban areas, areas where turf and garden fertilizers are overused, waterfowl and domestic animal feces, and erosion.

Recommendations

Eutrophication can be most effectively slowed by reducing the nutrient loading that is the source of the problem. Several recommendations have been provided previously in this chapter that are intended to address water quality issues associated with stormwater runoff.

Consistent with Recommended WWP-4 – Invasive Weed Removal Strategy described above, build on and expand the existing stakeholder-led process for mapping, removing, and monitoring of invasive weed to also include nuisance aquatic vegetation in ponds and basins.

Develop and implement management plan for stormwater detention basins. Source control (as described above) and vegetation control will be key elements of the plan. Vegetation can be controlled through several means, each of which is summarized below.

Mechanical: Mechanical controls involve cutting or pulling plants. This control method is sometimes temporarily effective, but is intensive and usually limited to the shoreline or shallow water species when stands are not too dense. Because most aquatic plants are perennial, they have underground portions that can re-sprout new shoots, so it is essential to harvest below-ground growth (roots andrhizomes) for effective control.

Biological: The most widely used biological control agent for aquatic vegetation is the grass carp (white amur). However, the California Department of Fish and Game does not permit the stocking of grass carp in ponds or basins that are located in the 100-year floodplain; therefore, their use would not be permitted in most stormwater basins.

Chemical: When properly applied, herbicides control aquatic vegetation without harming fish and wildlife. In some instances, herbicides can selectively control particular weed species without killing others. Aquatic herbicides also can fit into an aquatic plant management plan when it is desirable to treat some vegetated areas and leave others untreated.

Habitat alteration: Habitat alteration methods involve periodic drawdown of water to dry up the plant stock, and altering light penetration through dyes or tree planting that shades the understory and limits plant production.

Aeration: Aeration adds dissolved oxygen to the water column, which increases the

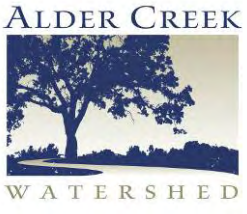
overall health of the pond/basin ecosystem.

Potential Partners City of Folsom, private landowners, California Native Plant Society (Weed Warriors), USDA/UC Davis

Watershed Criteria

☒ Habitat	☒ Water Quality	☒ Recreation
☒ Flood Protection	☒ Ecosystem Processes	☒ Connectivity
☒ Collaboration	☒ Stewardship & Education	

Detention basin on the north side of U.S. 50 with extensive stands of nuisance aquatic vegetation.



Implementation Strategies

Chapter 6

6 Implementation Strategies

This chapter of the Alder Creek Watershed Management Action Plan discusses strategies for implementation of the Plan, including stakeholder involvement, options for a governance structure and tasks for a watershed group or coordinator such as prioritizing projects and seeking funding. Potential funding sources are identified for supporting a watershed group and/or coordinator and implementing projects. Additionally, several steps are outlined for developing finance strategies.

6.1 Stakeholder Involvement in Supporting and Implementing the Plan

As discussed previously in Chapters 1 and 3, this Plan was made possible due to participation by many watershed stakeholders. Continued stakeholder involvement to implement the Plan will be critical to the success of this Plan and the ultimate watershed projection effort. This section identifies the primary watershed stakeholders and discusses options for their involvement in light of a future watershed stewardship group, and describes implementation tasks which should be conducted, ideally by a watershed coordinator working for the stewardship group.

6.1.1 Watershed Stakeholders

Collaborative partnerships and support will be critical for the Plan to be implemented. Success of the endeavor will depend on continued development and maintenance of strong collaborative relationships with the following entities:

Public Agencies (Land Use Management Authority)

- City of Folsom Departments of Public Works, Community Development and Parks
- Sacramento County Departments of Water Resources, Planning and Community Development, and Regional Parks, all within the Municipal Services Agency
- Sacramento Stormwater Quality Partnership
- Sacramento County Water Agency (Zone 40)
- Sacramento Regional County Sanitation District
- Regional Water Authority
- California State Parks
- U.S. Bureau of Reclamation
- U.S. Army Corps of Engineers

Landowners/Developers

- GenCorp Realty Investments
- Folsom Sphere of Influence Area Landowners

Local Stewardship Groups and Educational Resources

- Friends of the Folsom Parkways
- Folsom Adopt a Creek/Trail (ACT)
- Folsom Cordova Unified School District

- Los Rios Community College District – Folsom Lake College

Regional Environmental Advocacy Organizations

- Sacramento Area Creeks Council
- Sacramento Valley Conservancy
- Save the American River Association (SARA)
- Sacramento Regional Conservation Corps

Others

- Folsom Automall Dealers Association

6.1.2 Stakeholder Support for the Plan

As stated n Chapter 1, this Plan is intended as an advisory document, to be endorsed and supported as each stakeholder agency and/or organization wishes. The recommendations presented in Chapter 5 include a menu of ideas built on a foundation of research, assessment, and community input, which is intended to protect, restore, enhance and/or promote stewardship of watershed's natural resources in the future. Nothing in this Plan constitutes a mandate or requirement.

It is expected that commitment to this Plan will come in different forms. For example, some agencies and organizations may elect to adopt all or part of the Plan, some may integrate or reference key Plan components into other planning documents, and others may simply agree to conduct their land use planning and management activities consistent with the spirit of the Plan.

6.1.3 Stakeholder Involvement in Plan Implementation

After the Plan is endorsed or otherwise supported by the various agencies and groups in the watershed, the goal is for stakeholders to continue to work together to further develop and prioritize the projects, create partnerships, seek funding, and implement the actions for the betterment of the watershed community.

It is anticipated that some of the entities listed in Section 6.1.1 above will be actively involved in implementing policies and projects identified in Chapter 5, whereas others will be involved only occasionally, depending on the needs of specific projects. Some may be able to provide all or partial funding to implement one or more of the projects identified in Chapter 5, particularly when those projects address their mission and help them to comply with environmental regulations. Other entities may be able to offer in-kind services (e.g., staff, facilities, equipment) needed to implement an action or as a match for a grant proposal.

6.2 Establishment of a Watershed Group and Coordinator

6.2.1 Options for Watershed Group Governance Structure

While the Plan describes interest from and significant opportunity for public agencies, landowners, organizations, and the general public to participate in activities to protect the watershed, no one individual or entity has emerged as the main organizing body for coordinating or prioritizing these activities. And no funding presently exists to support such a group. As such, it is recommended that an organizing committee be convened shortly after completion of the Plan to discuss and recommend a governance structure for a future

watershed stewardship group. The larger stakeholder group could then be consulted for agreement on a final direction. A recommendation is included in Chapter 5 (see WWP-1) describing the potential work to be conducted by such an organizing committee. The future watershed stewardship group could conduct the following types of activities:

- oversight for implementation of the watershed management action plan;
- fundraising to support a watershed coordinator, provide other resources and implement projects;
- liaison with public agencies/property owners/developers/general public/regulatory agencies about the watershed and the need to protect it; and
- manage future amendments to the plan.

The governance structure for the future stewardship group could take one of several forms and ultimately will depend on funding. Examples include: leadership by a primary public agency or a non-profit organization, a joint powers authority, and establishment of a new organization (e.g., watershed council) with a governing board. A recommendation is included in Chapter 5 (WWP-2) describing the various models in more detail.

6.2.2 The Role of a Watershed Coordinator

A Watershed Coordinator is needed to coordinate the implementation of the Plan. The Watershed Coordinator position, full- or part-time, could be with a public agency, such as the City of Folsom, with a nonprofit organization, or other entity as described above (see also WWP-1). The position would likely be grant-funded to start, with funding and organizational stability provided over time through a combination of public and/or private support. The Watershed Coordinator would be responsible for coordinating and implementing the recommendations in the Plan. It is likely that an advisory group of stakeholders would be created to provide overall guidance and help set priorities. A recommendation is included in Chapter 5 (see WWP-3) describing the potential role of a Watershed Coordinator. The Coordinator's responsibilities could include:

- develop, implement, oversee and coordinate activities to implement the Plan;
- coordinate communications with and seek input from stakeholders;
- provide leadership in community outreach and assist with developing and disseminating educational materials about Alder Creek watershed protection and stewardship activities;
- work with community organizations and the public to identify and develop stewardship and monitoring activities that involve volunteers;
- represent the watershed in meetings with elected officials, citizens' advisory groups, community organizations, and others to inform and advise them on watershed planning issues and projects; and
- apply for grant funding and manage grant implementation and reporting.

6.3 Implementing the Management Action Plan

Once a governance structure has been agreed upon and established, various tasks need to be conducted related to plan implementation. Ideally, such tasks would be performed by a watershed coordinator working for the stewardship group. Alternatively, the watershed group could divide up the work amongst several individuals or committees. This section describes just a couple of the tasks that should be conducted, as examples.

6.3.1 Prioritizing Projects for Implementation

Prioritization of projects for implementation could take on various forms depending on the particular interests, goals, and objectives of the implementing stakeholder/partner. The identification of watershed protection criteria (see Section 5.1, "Process Used to Develop Recommendations," in Chapter 5) as well as other considerations (e.g., linkages, partners, permitability, funding, etc.) provides a logical framework for objectively prioritizing potential recommendations for implementation based on a project's ability to meet multiple criteria. A list of watershed protection criteria and other considerations that could be used as prioritization criteria are presented below for possible use.

Project Implementation Prioritization Criteria

As described in Chapter 5, recommendations for the protection of the Alder Creek watershed were identified through a dynamic process that relied on the results from the watershed assessment and input from stakeholders regarding their "preferred future" for the watershed. The list of recommendations was selected to satisfy a wide range of watershed protection criteria and these same criteria could be used to prioritize projects. Watershed protection criteria presented in chapter 5 include the following:

- Habitat – Protection, restoration, and enhancement of vegetation communities and aquatic resources, which provide habitats for numerous plant, wildlife, and fish species.
- Water Quality – Protection and maintenance of water quality, which provides many beneficial uses in and downstream of the watershed.
- Ecosystem Processes – Protection, restoration, and enhancement of essential ecosystem processes throughout the watershed, including interrelated physical, chemical, and biological processes that are vital for the maintenance of habitats and water quality. For example, floodplain processes involves the overbanking of water from the creek channel onto the adjacent floodplain, which results in the exchange of nutrient and materials (e.g., sediments, organic matter) and supports riparian vegetation recruitment and succession.
- Connectivity – Protection, restoration, and enhancement of hydrologic, biologic, and human connectivity throughout the watershed and the larger region.
- Recreation – Protection, restoration, enhancement, creation of important recreational amenities and opportunities throughout the watershed and the region for the enjoyment of the public.
- Stewardship and Education – Development, implementation, and promotion of important education, interpretation, and stewardship opportunities throughout the watershed for the enjoyment and enrichment of the public.

- Flood Protection – Protection, restoration, and enhancement of the watershed's ability to effectively convey floodwaters and provide flood control services for the surrounding community.
- Collaboration – Residents, businesses, organizations, landowners, and government agencies working collaboratively to implement policies and practices to achieve this vision and protect local waterways.

Other considerations that could be used to prioritize the implementation of projects include:

- Watershed Connectivity – Recommended projects that achieve improved hydrologic, habitat, and recreational connectivity provide increased watershed function and value.
- Dependency – All recommended projects shall be evaluated for their potential dependency on other the implementation of other project (e.g., a potential projects' success being limited by another factor [existing up or downstream] that should be addressed first [in sequence]).
- Sponsor or Partner – Recommended projects that have a sponsor or partner identified have an increased chance of being implemented.
- Permitability – Projects that do not need permits or can be easily permitted shall be identified as having increased readiness (i.e., capable of being implemented in the near-term).
- Fundability – Projects that have funding or can clearly meet funding source requirements (through an agency or grant source) shall be identified as having increased readiness.

An example project screening matrix tool that includes the prioritization criteria is provided in Table 6-1 below.

Table 6-1
Project Implementation Prioritization Criteria

Project # Title	Watershed Protection								Watershed Linkages		Other Considerations		
	Habitat	Water Quality	Ecosystem Processes	Connectivity	Recreation	Stewardship and Education	Flood Protection	Collaboration	Connectivity	Dependency	Partner or Sponsor	Permitability	Fundability
SSP-1 Alder Pond Restoration and Management	■	■	■	■	■	■	■	■	Hydro-logical	Dependent on all upstream activities	Multiple	Near to long-term: permits, environmental compliance would be required	Needs funding

6.3.2 Fundraising

Funding is an overarching major internal concern for watershed groups. Funding is needed to obtain dedicated staff, pay the bills, and implement projects that will protect the watershed. Fundraising is vital to securing the financial needs for a future organization, but there are

benefits beyond the monetary aspects. Fundraising is a communication, outreach and relationship tool for organizations.

When members are solicited or special events are held the watershed group is communicating the organization's mission. Fundraising efforts find, recruit, and link people who want to support the organization's work. Fundraising establishes, maintains, and sustains relationships between the organization and donors. Fundraising also educates others who may not already understand the issues. Once awareness is heightened, fundraising can then inspire and motivate people to support the organization's mission and efforts.

Dedicated fundraising efforts take time and energy to be effective. There are a variety of ways to begin a fundraising program and to maintain communication and relationships. Once a fundraising plan is put in motion, organizations begin to expand their network of people committed to common causes.

In an effort to assist groups in raising these needed funds, the Ohio Environmental Council compiled a "Fundraising Cookbook" which features fundraising success stories from various conservation and community groups. It provides an easy-to-follow list of key "ingredients" needed to organize a profitable fundraiser. By highlighting successful grassroots groups, other groups can replicate proven examples of how to raise hundreds, thousands—even tens of thousands—of dollars through creative and innovative fundraisers. For more information, see: http://www.theoec.org/PDFs/water/comor_reports_fundcookbook.pdf.

6.4 Potential Funding Sources

This section describes various sources of funding and other resources available for implementing watershed programs and projects. Table 6-2, presented at the end of this chapter, provides summary information on specific programs in each category.

6.4.1 Resource and Collaborative Opportunities with Watershed Stakeholders

The best potential source of in-kind services, cost-sharing, and funding are those individuals and groups with an interest or stake in the watershed, as listed in Section 6.1.1 above.

The key to securing assistance from these types of agencies and groups is aligning goals and needs. Often, the agencies will be required through regulatory permits (e.g., NPDES stormwater permits) or other mandates to conduct various regulatory compliance projects and activities (e.g., focused water quality monitoring in areas identified as best representative of the watershed, education, and outreach); such work could be conducted in the Alder Creek watershed with many benefits to multiple stakeholders.

Some of the projects recommended in Chapter 5 might be expanded on or enhanced to include additional objectives that better suit the needs of the various participating agencies. One strategy for identifying collaborative opportunities is to review an agency's capital improvements projects list, master plan or other plan and identify any projects on their books that seem to be complimentary or similar to a project recommended in Chapter 5. Another strategy is to add projects from this Management Action Plan to the Integrated Regional Water Management Plan database, maintained by the Regional Water Authority (see more details in the next section). Inclusion on the IRWMP database does not guarantee funding, but it enables others to learn about the Alder Creek watershed projects and encourages collaboration on grant pursuits.

6.4.2 State and Federal Grant Programs

Grants from state agencies (primarily the State Water Resources Control Board [State Water Board] and DWR) will be an important source of funding provided voters continue to approve bond measures to set aside public dollars for environmental protection. In fact, funding for development of this Plan was provided by a Proposition 50 Watershed Protection Grant made possible by the California Department of Water Resources (DWR) and the California Bay-Delta Authority (CALFED). Other Proposition 50 grants that would be appropriate for projects in the Alder Creek watershed include the California River Parkways Grant Program.

The reliability of such grants is in question, however, because of the recent downturn in the state's economy. Also, the general trend has been toward grant processes becoming more and more competitive. For more information, see: http://calwater.ca.gov/calfed/contracts_and_grants.html.

The Alder Creek watershed is contained wholly within the American River Basin Integrated Regional Water Management Plan (ARB IRWMP) area. The Regional Water Authority (RWA) coordinates and encourages regional collaboration in this area for water resources planning and project development. The goal is to ensure a sustainable regional water supply while providing other environmental and recreational benefits. The IRWMP plan was created in 2006 and will be updated in 2010 to integrate multiple water management strategies to solve multiple priority challenges. To be competitive for state grants in this area (including Proposition 84 grants offered by the State Water Board and DWR), Alder Creek watershed projects meeting the RWA criteria should be included in the RWA's database of potential projects for the ARB IRWMP. Work is needed to establish and maintain a relationship with RWA and submit project information as needed. For more information, see http://www.rwah2o.org/rwa/programs/irwmp/.

At the federal level, the U.S. Environmental Protection Agency (EPA) Region 9 on occasion has competitive grant announcements for protecting and restoring watersheds through comprehensive watershed protection and management approaches. For more information, see http://www.epa.gov/region09/water/watershed/funding.html.

Grant writing requires specialized skills, and preparation of proposals requires dedication and time. The State Water Board requires the use of a standardized application form (Financial Assistance Application Submittal Tool), which is intended to simplify the process but can nonetheless be time consuming. Further, successful grant proposals typically involve collaborative partnerships to demonstrate multiple benefits.

6.4.3 Supplemental Environmental Projects Mitigation Funding

Most federal and state actions against businesses or individuals regarding failure to comply with environmental laws are resolved through settlement agreements. As part of a settlement, a violator may voluntarily agree to undertake an supplemental environmental project (SEP) as mitigation for the violation. A SEP furthers EPA's and the State Water Board's goal of protecting and enhancing public health and the environment. In California, California Water Code Section 13385(i) allows limited use of SEPs associated with mandatory minimum penalties. Section 13399.35 of the code also allows limited use of SEPs for up to 50% of a penalty assessed. The State Water Board updated its SEP policy, which includes qualification and nexus criteria for selecting projects, in February 2009. For more information, see

http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2009/rs2009_0013_sep_finalpolicy.pdf.

Both EPA and the State Water Board collect and compile ideas for potential SEPs. The list of projects is available for reference by managers in EPA, the State Water Board, and the nine regional water quality control boards when they are approached by a violator seeking mitigation opportunities for settlements. This program offers a good opportunity for management activities in the Alder Creek watershed. After the State Water Board's SEP policy and guidelines about project eligibility are reviewed, a list of potential projects in the Alder Creek watershed should be developed and submitted to the State Water Board (and EPA, if desired) as soon as possible; updated information should then be submitted to the State Water Board annually. For more information, see http://www.epa.gov/oecaerth/civil/seps/index.html.

6.4.4 Low-Interest Loans

Low-interest loans may be a good option for landowners and government agencies in the watershed who wish to purchase land for conservation or to construct infrastructure improvements related to watershed protection. The primary mechanism for these opportunities is the Clean Water State Revolving Fund (CWSRF), created by the 1987 Clean Water Act Amendments. The CWSRF is a loan program that provides low-cost financing to eligible entities in state and tribal lands for water quality projects, including watershed protection and restoration. Under the CWSRF program, every year EPA Region 9 takes funds appropriated by Congress and provides grants to the states of Arizona, California, Hawaii, and Nevada to capitalize individual state CWSRFs. For more information, see http://www.epa.gov/owm/cwfinance/cwsrf/.

In California, the State Water Board (Department of Financial Assistance) manages the program and distributes loans or other types of assistance for projects according to its program priorities. Nationally in recent years, interest rates for CWSRF loans have averaged 2.2%, compared to market rates that averaged 4.6%. At these rates, a CWSRF-funded project would cost 20% less than projects funded at the market rate. CWSRFs can fund 100% of the project cost and provide flexible repayment terms for up to 20 years. See the State Water Board's Web site for more information:
http://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/index.shtml.

A recent local success story was the purchase of the Howard Ranch in the Cosumnes River watershed by The Nature Conservancy. A CWSRF allowed the nonprofit organization to purchase 19 square miles of land, with the goal to resell the land to ranchers after placing conservation easements that will ensure minimal development or disturbance to the valuable vernal pools on the property in perpetuity. For more information, see http://www.epa.gov/owm/cwfinance/cwsrf/innovations.htm.

6.4.5 Foundation or Corporate Support

The key to attracting funding and services from private foundations and corporations is making sure that the watershed projects and services meet the mission of the organization being approached. The request for money also should be responsive to eligibility criteria and funding cycles. The first step is to identify foundations and large companies/employers in the local and regional area with an interest in supporting programs that benefit public and environmental health and community education. Some foundations serve as agents for connecting philanthropists with nonprofit organizations. An example is the Sacramento Region Community

Foundation; the group's Web site provides links to foundation resources in the region: http://www.sacregcf.org/.

The National Center for Charitable Statistics manages a comprehensive Web site that lists private foundations in the Sacramento area: http://nccsdataweb.urban.org/PubApps/geoShowOrgs.php?id=C06067&code=C06067&v=pf.

In addition, various Web-based resources can be helpful in this quest. For example, the Web sites of many banks and lending institutions offer grant information on behalf of the foundations for which the institution serves as trustee or grant-making agent. The California Association of Nonprofits is a good source of information on these resources: http://www.canonprofits.org/.

Also, the on-line Philanthropy Journal provides advice and guidance for nonprofit fundraising: http:// www.philanthropyjournal.org/resources/fundraising-giving.

6.4.6 Other Tools

EPA's Financing Alternatives Comparison Tool (FACT) was established to easily and quickly assess what the most cost-effective way is to finance a water or wastewater infrastructure project. Although not set up specifically for a watershed program, the tool may provide insights for future financing mechanisms for larger watershed projects and land acquisition. Users can compare more than a dozen different financing options, including CWSRF loans, bonds, grant/loan combinations, and more. The tool produces a comprehensive analysis that compares various financing options for projects by incorporating financing, regulatory, and other important costs. Two new developments available are FACT Lite and the Users Guide. FACT Lite is exactly what its name implies: a simpler, easier version of FACT but with the same powerful ability to compare financing costs. The Users Guide is a comprehensive guide on effectively using FACT and FACT Lite. All FACT materials can be found on EPA's CWSRF Web site: http://www.epa.gov/owm/cwfinance/cwsrf/fact.htm.

Table 6-2
Potential Funding Sources for Alder Creek Watershed Recommended Actions

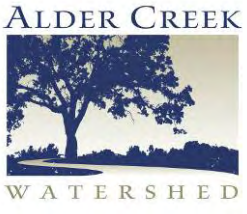
Grant Source	Agency	Eligible Applicants	Project Types	Web Site
State and Federal Funding				
CALFED grants	CALFED implementing agencies	Nonprofit organizations; community groups; tribes or tribal governments; and local, state, and federal agencies	Projects that carry out the various CALFED program objectives	http://calwater.ca.gov/calfed/contracts_and_grants.html
Targeted watershed grants	EPA	States, local government, and Indian tribal governments	Watershed restoration and protection projects, such as implementing best management practices, conducting streambank restoration, and implementing TMDLs	http://www.epa.gov/region09/water/watershed/funding.html
Rivers, Trails, and Conservation Assistance Program	NPS	Nonprofit organizations; community groups; tribes or tribal governments; and local, state, and federal agencies	Rivers & Trails staff assistance includes help in building partnerships to achieve community-set goals, assessing resources, developing concept plans, engaging public participation, and identifying potential sources of funding	http://www.nps.gov/ncrc/programs/rtca/

Table 6-2 Potential Funding Sources for Alder Creek Watershed Recommended Actions				
Grant Source	**Agency**	**Eligible Applicants**	**Project Types**	**Web Site**
Regional Surface Trans-portation Program	RTPA, Caltrans	Cities, counties, transit operators, Caltrans, and SACOG	Bicycle/pedestrian transportation and trail projects	http://www.dot.ca.gov/hq/transprog/federal/rstp/Official_RSTP_Web_Page.htm
Clean Water State Revolving Fund	EPA	State agencies and tribal governments	Water quality projects, including watershed protection or restoration	http://www.epa.gov/owm/cwfinance/cwsrf/ and http://www.swrcb.ca.gov/water_issues/programs/grants_loans/srf/econ_recovery_info.shtml
Supplemental Environmental Project	EPA and State Water Board	The discharger or third parties paid by the discharger	Environmentally beneficial projects related to a violation in exchange for mitigation of the penalty to be paid	http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2009/rs2009_0013_sep_finalpolicy.pdf and http://www.epa.gov/oecaerth/civil/seps/index.html
Urban Streams Restoration Program	DWR	Local public agency and citizen's group (both required)	Projects to reduce urban flooding/erosion, restore environmental values, and promote community stewardship of urban streams	http://www.water.ca.gov/urbanstreams/
California Riparian Habitat Conservation Program	California Wildlife Conserva-tion Board	Nonprofit organizations, local government agencies, and state and federal agencies	Bank stabilization and revegetation, restoration of riparian vegetation on flood-prone land, modification of the existing land form to allow a stream to regain its historic connection with its floodplain, and removal of nonnative invasive plant species	http://www.stateconservation.org/nccc/?q=r&id=14402
Land and Water Conservation Fund	NPS via State Parks	Cities, counties, and districts	Acquisition, development, operation, and maintenance of outdoor recreation areas and facilities; priority development projects include trails, picnic areas, natural areas, and cultural areas for recreational use	http://www.nps.gov/lwcf/
Proposition 84 grants	DWR SWRCB	Nonprofit organizations; community groups; tribes or tribal governments; and local, state, and federal agencies	Projects that implement Sacramento and San Joaquin River Basin – Delta water quality improvement projects that protect drinking water supplies.	http://baydeltaoffice.water.ca.gov/sdb/prop84/index_prop84.cfm#Faqs http://www.waterboards.ca.gov/water_issues/programs/grants_loans/asbs/index.shtml

Table 6-2
Potential Funding Sources for Alder Creek Watershed Recommended Actions

Grant Source	Agency	Eligible Applicants	Project Types	Web Site
Local and Regional Funding				
Foundations	Various	Landowners, government agencies, schools, nonprofit groups	Watershed projects and services meet the mission of the organization being approached for funding (e.g., public and environmental health and community education)	http://www.sacregcf.org/ and http://nccsdataweb.urban.org/PubApps/geoShowOrgs.php?id=C06067&code=C06067&v=pf
General Matching Grants Program	National Fish and Wildlife Foundation	Federal, state, and local agencies; universities; and tribal and nonprofit organizations/agencies	Projects that sustain, restore, and enhance our nation's fish, wildlife, and plants and their habitats	http://www.nfwf.org/AM/Template.cfm?Section=GrantPrograms
Acres for America	Wal-Mart Stores and National Fish and Wildlife Foundation	Federal, state, and local agencies; universities; and tribal and nonprofit organizations/agencies	Projects to conserve important habitat for fish, wildlife, and plants through acquisition of interest in real property	http://www.nfwf.org/AM/Template.cfm?Section=Charter_Programs_List&Template=/TaggedPage/TaggedPageDisplay.cfm&TPLID=32&ContentID=11974
Bring Back the Natives	National Fish and Wildlife Foundation with USFWS, BLM, and USDA	Federal, state, and local agencies; universities; and tribal and nonprofit organizations/agencies	Projects that initiate partnerships with private landowners, demonstrate successful collaborative efforts, and address watershed health issues that would lead to restoring habitats	http://www.nfwf.org/AM/Template.cfm?Section=Charter_Programs_List&TEMPLATE=/CM/ContentDisplay.cfm&CONTENTID=13995
Bikes Belong Coalition	Private	Nonprofit organizations and public agencies	Bicycle paths, trails, routes, lanes, parking, and transit	http://www.bikesbelong.org/grants

Notes: BLM = U.S. Bureau of Land Management; Caltrans = California Department of Transportation; DWR = California Department of Water Resources; EPA = U.S. Environmental Protection Agency; NPS = National Park Service; RTPA = Regional Transportation Planning Agency; SACOG = Sacramento Area Council of Governments; State Parks = California Department of Parks and Recreation; State Water Board = State Water Resources Control Board; TMDL= total maximum daily load; USDA = U.S. Department of Agriculture; USFWS = U.S. Fish and Wildlife Service.
Source: Compiled by AECOM in 2009.



Framework for Monitoring and Adaptive Management

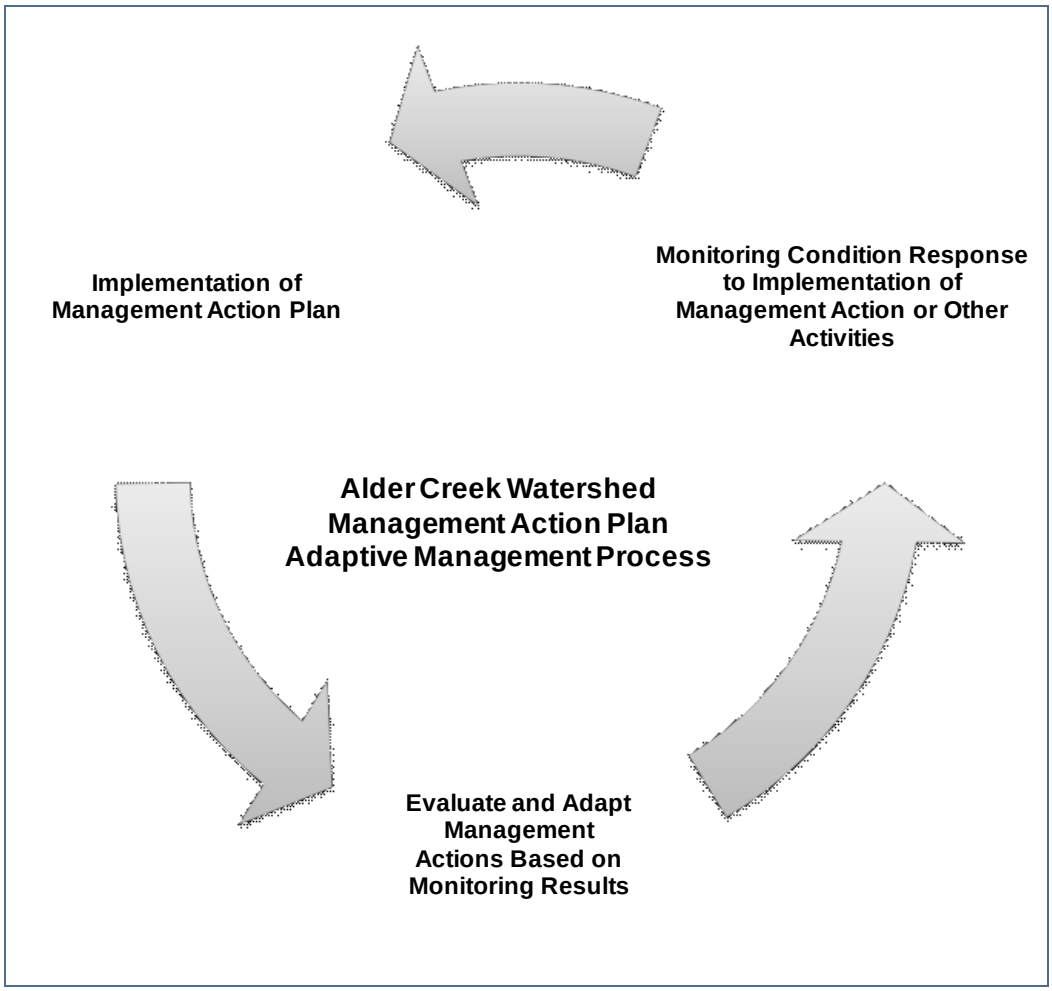
Chapter 7

7 Framework for Monitoring and Adaptive Management

As the Alder Creek watershed is developed and recommendations in the Alder Creek Watershed Management Action Plan are implemented, it will be important to monitor and document the various attributes of the watershed to determine how the resource conditions respond to changes, measure the overall performance and success of the Plan's recommendations, and modify the approach as necessary. This chapter describes the recommended watershed indicators and targets, monitoring and reporting, and project tracking and Plan updating process that are integral to the adaptive management component of the Plan.

7.1 Adaptive Management Process

Adaptive management was developed as an approach and process that incorporates monitoring, research, and evaluation to allow projects and activities, including watershed management actions, to go forward in the face of some uncertainty regarding consequences (Holling 1978, Walters 1986, Shilling et al. 2005). Adaptive management typically is conducted in a stepwise framework composed of actions that are evaluated periodically, with subsequent management decisions and actions implemented to ensure that the management goals and objectives are achieved. A simplified graphic depicting the adaptive management process is shown in the figure below.



An adaptive management program includes stakeholder participation and recognizes that science, management and coordination, and stakeholder coordination are essential to the overall accomplishment of project goals and objectives.

The general components of the adaptive management approach for watershed protection projects are:

- selecting indicators for each of the watershed protection criteria;
- setting measurable or observable targets or criteria (numerical or descriptive) for the indicators;
- monitoring the indicators;
- documenting and tracking management practices;
- using monitoring results to evaluate management actions and report on progress toward meeting targets for each indicator (i.e., indicator report); and
- revising management actions, as necessary, to achieve goals and objectives in response to monitoring and evaluation of indicators.

The remainder of this chapter provides additional details related to these components.

7.2 Watershed Indicators, Targets, and Monitoring

7.2.1 Indicators and Targets

Watershed indicators are selected for management plans to provide clear metrics or measures that can be monitored to determine whether watershed goals and objectives are being met. Performance criteria, or "targets," are assigned for each indicator and are used to evaluate monitoring results against and to determine whether an action was successful at achieving the stated objective. Seventeen indicators and associated targets have been selected to measure the success of the Alder Creek Watershed Management Action Plan. These indicators and associated targets are consistent with the Alder Creek Watershed Project's Project Assessment and Evaluation Plan, which outlined how the scope of the grant project was developed to achieve CALFED Bay-Delta Program and DWR goals and priorities (Alder Creek Watershed Project, 2007–2010 Project Assessment and Evaluation Plan). The Alder Creek watershed indicators and targets are presented in Table 7-1.

7.2.2 Monitoring

Adaptive management decisions rely on an effective monitoring program. The goals for the Alder Creek watershed monitoring program are to:

- ensure logistical feasibility;
- embrace citizen-based monitoring;
- maximize efficiency in observation, measurement, and learning;
- fill knowledge and data gaps;
- provide information sufficient to support adaptive management decisions; and
- summarize and interpret what has been learned in a manner that is responsive to management needs and supports future use of the information.

To fulfill these goals, future project-wide and watershed-wide monitoring plans should include descriptions of:

- indicators to be monitored,
- protocols for monitoring the indicators, and
- content and frequency of reports summarizing monitoring information.

Table 7-1 describes the proposed monitoring efforts for the Alder Creek watershed. Work should be guided by the stakeholder group, with projects and tasks conducted by, or in collaboration with, local municipalities and agency stormwater programs, private landowners, environmental organizations, and community volunteer groups (Table 7-1 lists some potential collaborative opportunities). The stakeholder group or future stewardship group and/or watershed coordinator (see Chapter 5, recommendations WWP-1 through WWP-3) should actively seek funding and collaborative partnerships to support these actions.

Table 7-1
Alder Creek Watershed Protection Criteria, Indicators, Targets, and Monitoring Procedures

Watershed Protection Criteria	Indicators	Targets	Recommended Monitoring Procedures
Flood control	Floodwater conveyance	Provide adequate floodwater conveyance capacity and flood protection for surrounding communities	The lack of flow and precipitation data in the watershed is problematic for stormwater management planning and monitoring purposes. Set-up stations in the watershed to collect flow and precipitation data that could be used to assess pre-development baseline conditions as well as to evaluate performance of flood control and hydromodification management controls in the future.
	Channel maintenance	Reduce long-term maintenance requirements	Ongoing evaluation by local agency staff as a part of routine maintenance work to determine whether policies and projects implemented in conformance with this Plan are effective in achieving reduced long-term maintenance requirements. For example, monitor sediment accumulation and invasive weed growth in representative channels and detention basins.
	Channel stability	Maintain natural hydrograph and minimize channel alteration due to hydromodification	Collect additional watershed-wide hydrogeomorphology data as needed to supplement the 2007-08 watershed assessment results (see Chapters 2 and 4 and Appendices C and E) in order to provide a comprehensive assessment of pre-development baseline conditions for reference by public agencies, property owners, and developers as more detailed development and drainage plans are prepared. Monitor channel conditions in the creeks during and after development to evaluate performance of hydromodification management controls in the future and compare to baseline conditions.

Table 7-1 Alder Creek Watershed Objectives, Indicators, Targets, and Monitoring Procedures			
Watershed Protection Criteria	**Indicators**	**Targets**	**Recommended Monitoring Procedures**
Water quality (see also "Ecosystem processes," below)	All constituents	Maintain or reduce concentrations over time; meet standards and objectives identified in Sacramento and San Joaquin River Basin Plan	Periodic review and tracking of stormwater management implementation (new developments and retrofits), use of best management practices, Low Impact Development techniques, and flow controls to ensure that objectives are being met. (coordinate with Sacramento Stormwater Quality Partnership)
	Nutrients and contaminants	Maintain or reduce concentrations over time; meet standards and objectives identified in Sacramento and San Joaquin River Basin Plan	Representative water quality monitoring at key locations in the watershed, including locations sampled during the 2007-2008 watershed assessment. (coordinate with Sacramento Stormwater Quality Partnership)
	Temperature	Maintain or reduce water temperatures	Representative water quality monitoring at key locations in the watershed, including locations sampled during the 2007-2008 watershed assessment. (coordinate with Sacramento Stormwater Quality Partnership)
	Dissolved oxygen	Maintain or increase dissolved oxygen concentrations	Representative water quality monitoring at key locations in the watershed, including locations sampled during the 2007-2008 watershed assessment. (coordinate with Sacramento Stormwater Quality Partnership)
Habitat	Sensitive habitats	Maintain or increase protection of sensitive habitats (e.g., vernal pools, riparian forest, wetlands)	Periodic review and GIS-based tracking of new development planning and implementation, conservation easement establishment, and open space dedication. (coordinate with Sacramento Splash)
	Habitat connectivity	Maintain or improve habitat connectivity throughout watershed (i.e., increase extent of corridors and contiguous areas)	Periodic review and GIS-based tracking of new development planning and implementation, conservation easement establishment, and open space dedication.
	Biological diversity	Maintain or increase diversity and abundance of native plants, wildlife, and fish	Periodic review and GIS-based tracking of California Natural Diversity Database, and California Native Plant Society database, and periodic field/photographic surveys. (coordinate with California Native Plant Society)
	Invasive weeds	Maintain or reduce extent of invasive weeds throughout watershed	Periodic review, GIS-based tracking, and photographic surveys of weed removal and management projects and areas with new introduction/colonization. (coordinate with California Native Plant Society and Folsom ACT)

Table 7-1
Alder Creek Watershed Protection Criteria, Indicators, Targets, and Monitoring Procedures

Watershed Protection Criteria	Indicators	Targets	Monitoring Procedures and Potential Monitors
Ecosystem processes	Floodplain connectivity	Maintain or increase floodplain connectivity (relatively frequent inundation and overbanking events [e.g., 2- to 5-year reoccurrence interval])	Periodic review and tracking of stormwater management implementation (new developments and retrofits), use of best management practices, Low Impact Development techniques, and flow controls to ensure that objectives are being met and designed and constructed in accordance with approved Master Plans.
	Native plant recruitment	Maintain or increase natural recruitment of native plant species (e.g., riparian recruitment)	Periodic review and GIS-based tracking of native plant recruitment along the creek corridor. (coordinate with California Native Plant Society)
	Bioassessment metrics	Maintain positive trend in physical, chemical, and biological metrics compared to baseline and similar creeks in region	Bioassessment monitoring (using SWAMP protocol; see watershed assessment report) at key locations in the watershed, including locations sampled during the 2007-2008 watershed assessment.
Recreation	Trails	Increase trail network and improve connectivity	Periodic review and GIS-based tracking of corridor establishment, trail planning, and implementation. (coordinate with Friends of Folsom Parkways and Sacramento Valley Conservancy)
	Open space	Increase open space areas, including areas that provide connectivity to larger region and areas available for passive outdoor recreation (e.g., wildlife viewing, photography)	Periodic review and GIS-based tracking of conservation easement establishment, open space dedication. (coordinate with South Sacramento Habitat Conservation Planning efforts)
Environmental stewardship	Stewardship activities	Create and promote opportunities and activities for watershed volunteers	Periodic review and tracking of stewardship activity implementation. (coordinate with Folsom ACT, Friends of Folsom Parkways and Sacramento Area Creek Council's annual Creek Week events)
	Education programs	Create and promote educational programs for watershed community	Periodic review and tracking of program implementation. (coordinate with schools within the Folsom Cordova Unified School District)
	Interpretive displays/programs	Create and promote interpretive displays and programs throughout watershed	Periodic review and tracking of interpretive display installation and program implementation. (coordinate with local agency Parks departments, State Parks, and Friends of Folsom Parkways)

Notes: GIS = geographic information system; SWAMP = Surface Water Ambient Monitoring Program.

7.3 Tracking and Documenting Implementation of the Plan

Tracking the implementation of management actions and documenting/reporting on monitoring results are critical components of the adaptive management and monitoring framework. Together, these efforts will provide feedback regarding the success of the overall watershed protection and stewardship effort.

Ideally, an evaluation and review of how well the objectives of the Plan are being achieved should be prepared every 5 years following the date of Plan completion. Evaluation results could be reported in the form of an "indicator report." The indicator report would document actions and describe the status (i.e., health) of the Alder Creek watershed and the status of the watershed protection efforts (through the evaluation of the indicators). Components of the report could include:

- documenting or tracking implementation and/or completion of the actions recommended in the Plan;
- monitoring fiscal accounting and Plan expenditures (e.g., funding of individual actions);
- evaluating the effectiveness of the stakeholders' coordination efforts with local governments, other property management and regulatory agencies, and private landowners in the watershed;
- evaluating how well the objectives are being achieved (by evaluating indicators);
- documenting important new scientific or policy-related information that has a bearing on resource management in the watershed; and
- recommending updates to the Plan to incorporate new information and improve its effectiveness.

If an indicator report is prepared, it should be reviewed and approved by the stakeholder group. The indicator report could then serve as the basis for minor updates to this Plan and for appropriate adjustment to ongoing stewardship practices.

Information on indicators is provided in the following guidance documents and indicator reports that have been prepared for other watersheds / aquatic resources:

- California Watershed Assessment Manual and Guide (http://cwam.ucdavis.edu/)
- U.S. Environmental Protection Agency Environmental Indicators Gateway (http://www.epa.gov/indicators/)
- Pollution Scorecard (http://www.scorecard.org/env-releases/water/iwi-report-descriptions.tcl)
- San Joaquin River (http://www.sfei.org/watersheds/reports/556indicators-report-finalFINAL.pdf)
- Santa Clara Valley Water District (http://www.svep.org/2004/Dev_Watershed_Indicators.pdf)
- Chesapeake Bay (http://www.chesapeakebay.net)
- Inland Bays (http://www.inlandbays.org/cib_pm/comments.php?id=37_0_17_0_C)

7.4 Future Revisions to the Plan

Watershed planning documents such as this Plan eventually become dated and require revisions so that they can continue to provide practical direction in relation to changing natural resource and land use conditions and evolving environmental regulations. A common and unfortunate situation is that the update of planning documents is often neglected because of budgetary or personnel constraints, waning stakeholder involvement, or other reasons. To address this problem, this section suggests a hierarchy of update procedures in which the level of process and required involvement is proportionate to the level of change that is proposed.

This Plan reflects the best information available during the planning process, but new information will become available over time, and adjustments should be made to keep this Plan "living" and current. Such new information may include:

- feedback generated by adaptive management in the Alder Creek watershed,
- other scientific research that directs improved techniques of resource management,
- documented threats to fish and wildlife species and their habitats,
- future development in the watershed,
- management and expansion of infrastructure in the watershed (e.g., roads, water and sewer lines), or
- new legislative or policy direction.

When new information warrants a change to this Plan, it is important that an appropriate process for updating the Plan be followed. Public outreach and input should be conducted in proportion to the proposed policy change established by this Plan, and unless a reasonable and clear update process exists, this Plan could become outdated and irrelevant. If the appropriate procedure for a particular, proposed update is not apparent, the determination of which of the following procedures to use should be made by the stakeholder group.

7.4.1 Minor Updates

A process is recommended to accommodate minor updates to this Plan. Minor updates could include adoption of limited changes to the recommended policies and/or actions through adaptive management, based on other scientific information or local policy/legislative direction. This procedure would be applicable to updates that generally meet the following criteria:

- No change is proposed to the overall purpose and intended uses of this Plan.
- Appropriate coordination and consultation occurs in the stakeholder group, including an informational presentation about the proposed update as needed.
- Appropriate consultation occurs with other neighboring and/or regional stakeholders.

A minor update could be attached to this Plan as an addendum or documented in an indicator report, described previously.

7.4.2 Major Updates

A major update or a new plan should involve a procedure comparable to the initial plan development process but also proportionate to the level of recommended change that is proposed. This procedure should be applicable to updates that meet the following criteria:

- A substantial update and/or a new policy direction is proposed for this Plan, or the development of a completely new plan is proposed.
- Appropriate coordination and consultation occurs in the stakeholder group, including an informational presentation about the proposed update as needed.
- Stakeholder/public outreach is conducted that is proportional to the level of the proposed update.

A major update or new plan could be prepared using grant funding or other resources that are available. Approval by the watershed stakeholders is recommended. If the appropriate procedure for a particular, proposed update is not apparent, the determination of which of these procedures to use should be made by the stakeholder group.

ALDER CREEK
WATERSHED

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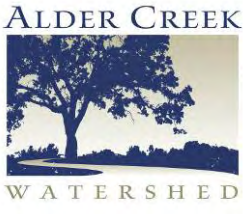

List of Acronyms, Abbreviations, and Glossary

List of Acronyms, Abbreviations, and Glossary

acre-foot (AF):	The quantity of water required to cover 1 acre to a depth of 1 foot. Equal to 1,233.5 cubic meters or 325,851 gallons.
ACT	Adopt a Creek/Trail
active floodplain:	The active floodplain is the level area with alluvial soils, immediately adjacent to streams, which is overbanked by stream water on periodic basis and is at the same elevation as areas showing evidence of: flood channels free of terrestrial vegetation; rafter debris or fluvial sediments newly deposited on the surface of the forest floor or suspended on trees or vegetation; and recent scarring of trees by materials moved by water.
aggradation:	The process of deposition of sediment at a site, typically a stream channel.
aggrade:	To raise the grade or level of (a river valley, a stream bed, etc.) by depositing detritus, sediment, or the like.
anoxic:	Conditions in which there is an absence of oxygen.
alluvial fan:	A fan-shaped deposit formed where a fast flowing stream flattens, slows, and spreads typically at the exit of a canyon onto a flatter plain.
alluvium:	Soil made up of particles and rocks that have been deposited by surface runoff.
aquifer:	Permeable subsurface materials (soil, sediments, and rock) that contain groundwater. Aquifers may be large or small, local or regional, shallow or deep, and confined or unconfined, depending on the subsurface geologic conditions.
ARB IRWMP	American River Basin Integrated Regional Water Management Plan
berm:	A low earthen wall adjacent to a ditch. Used to control erosion and sedimentation by slowing the flow of surface runoff. bifurcation: Divided into two parts.
braided:	A stream that divides into an interlacing or tangled network of several branching and reunited channels separated from each other by branch islands or channel bars. Typically highly changeable with different flows. bypass flow: Water flow that is allowed to pass a diversion in stream or reservoir rather than being diverted out of the stream flow or reservoir.
CALFED	California Bay-Delta Authority
Caltrans	California Department of Transportation

canopy cover:	The vegetation that projects over a stream. Can arbitrarily be divided into two levels: Crown cover is more than three feet (1 m) above the water surface. Overhang cover is less than three feet (1 m) above the water surface.
cascade:	A waterfall or a series of waterfalls.
Cenozoic:	The latest of the four eras into which geologic time is divided; it extends from the close of the Mesozoic Era, about 65 million years ago, to the present.
City:	City of Folsom
coliform:	Coliform bacteria are a commonly-used bacterial indicator of sanitary quality of water. Coliforms are naturally present in the environment; as well as feces; fecal coliforms and E. coli only come from human and animal fecal waste.
colluvium:	A general term applied to loose and incoherent deposits, usually at the foot of a slope or cliff and brought there chiefly by gravity.
confluence:	A juncture where two or more streams or rivers flow together.
conglomerate:	A course-grained, clastic sedimentary rock composed of rounded fragments larger than 2 mm in diameter set in a fine-grained matrix.
Cretaceous age:	The final period of the Mesozoic Era thought to have covered the span of time between 135 and 65 million years ago. Also the system of strata deposited during that period.
cubic feet per second (cfs):	measure of discharge, typically in a stream.
culvert:	A drainage structure under a road or embankment.
CWSRF	Clean Water State Revolving Fund
degradation:	Loss of quality. Process of lowering of channel in elevation (opposite of aggradation).
discharge channel:	A declivity in the ground surface into which waters are directed.
disinfection:	Destruction of microbial pathogens in the water supply.
downgradient:	A location at lower elevation than the reference point.
drainage basin:	The generally large topographic area in which runoff is collected and concentrated into a system of streams.
DSOD:	Division of Safety of Dams
DWR:	California Department of Water Resources

easement: A legal right to cross a land parcel belonging to another party, e.g. a pipeline easement, or a power line easement.

ecosystem: The complex of organisms and their environment in a given geographic area with a distinctive structure and functional systems.

electrical conductivity: Electrical conductivity is a measure of the amount of salts in the water. See also micro-mhos as a measure of electrical conductivity.

emergent vegetation: Vegetation in or along the edge of a water body in which the root system is underwater and the plant body (stems, leaves, etc.) are above water.

embankment: A natural or artificial slope comprised of earth, concrete or other material.

endemic: Referring to local or natural conditions in the environment.

entrainment: The process by which solid material and chemicals are picked up by flowing water and transported from the site of origin.

Eocene: An epoch of the Tertiary period (see Tertiary) thought to span 45 to 38 million years before present.

EPA U.S. Environmental Protection Agency

ephemeral: Refers to streams that flow only for short duration during and following a rain storm.

epilimnion: The top-most layer in a thermally stratified reservoir, occurring above the deeper hypolimnion. It is warmer and typically has a higher pH and dissolved oxygen concentration than the hypolimnion.

estuarine: Referring to environments with shared characteristics of both fresh water and salt water conditions, typically in a bay.

eutrophic: Having waters rich in mineral and organic nutrients that promote a proliferation of plant life, especially algae, which reduces the dissolved oxygen content.

FACT Financing Alternatives Comparison Tool

Farmland of Local Importance: Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee, as mapped by the CA Department of Conservation's Farmland Mapping and Monitoring Program.

Farmland of State Importance: Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture, as mapped by the CA Department of Conservation's Farmland Mapping and Monitoring Program.

fault zone:	A zone in which there are a number of more or less closely spaced faults.
fish passage:	Referring to stream conditions that allow fish to move freely, as in a migration.
fisheries:	A term used to refer to protection and enhancement of fishery habitat, including augmentation of stream flows during certain times of the year.
floodplain:	The area periodically inundated by flood waters and lying above the normal channel of a river or stream.
geomorphology:	The study of landforms and the processes that create them, e.g., erosion, sediment transport, sediment deposition, slope processes and others.
glide:	A slow-moving shallow run.
groundwater:	Water in the ground held within soil material, fractures and other spaces in the rock.
igneous rock:	Rocks created by solidification of hot fluid material, e.g., volcanic material flowing and cooling on the earth surface (such as basalt) or magma material cooling within the crust of the earth (such as granite).
inflow:	Water flowing into a water body, such as a lake, reservoir or stream or through subsurface groundwater movement.
Holocene time:	Approximately the last 11,000 years.
hydrograph:	A chart that depicts certain water conditions over a given period of time.
hydrology:	The study of water, water movement, and water use.
hydromodificaton	As watersheds urbanize, soil is compacted and covered with hardscape such as buildings and roads, known as impervious cover. This can cause an alteration of flow (hydromodification) that increases the volume of runoff and decreases the infiltration of rainwater, an important source of groundwater recharge.
hydrophytic vegetation:	Plants that are adapted to living in wet conditions, e.g., wetland plants.
hypolimnion:	The cool, dense bottom water layer in a reservoir that lies below the warmer, lighter epilimnion on the surface.
channel incision:	process of lowering of the channel bed elevation.

intermittent stream: A watercourse that flows only for part of the year and dries up part of the year.

invasive species: nonnative species (e.g. plants or animals) that adversely affect the habitats they invade economically, environmentally or ecologically.

limnology: Scientific study of the physical and biological characteristics of inland bodies of water such as lakes and ponds.

linear feet: A total length measured in feet along a straight or curved line.

loam: Soil comprised of an approximately even distribution of clay, silt, sand, and organic material.

macroinvertebrate: An invertebrate animal (without backbone) larger than 0.5 millimeters or large enough to be seen without magnification.

Maximum Contaminant Level (MCL): The maximum concentration of a contaminant that is allowed in drinking water. The MCL is established by the U.S. Environmental Protection Agency (EPA).

micro-mhos per centimeter (umhos/cm): Units used when measuring electrical conductivity. umhos/cm is a rate at which a small electrical current flows through a solution.

neotropical migrants Birds that spend their summers in North America and their winters in the New World tropics of Central and South America, Mexico or the Caribbean.

nephelometric turbidity units (NTUs): Units used to measure turbidity (or clarity) in water. The term Nephelometric refers to the way the instrument estimates how light is scattered by suspended particulate material in the water. This measurement generally provides a very good correlation with the concentration of particles in the water that affect clarity.

nonnative species: Plants and animals that have not evolved naturally in a subject habitat.

outflow: Water discharging from a water body.

outlet conduit: A pipe or other conveyance structure that removes water from a reservoir, lake, stream or other water body.

peak flow: The maximum instantaneous discharge for a stream at a specific location. Corresponds to the highest stage of a flood.

perennial: Lasting all year long, generally in reference to stream flow.

pH: pH is a measure of the acidity or alkalinity of the water or soil.

photosynthesis: The process by which plants absorb solar energy and grow.

Plan	Alder Creek Watershed Management Action Plan
pool:	Deeper areas of a stream with slow-moving water, often used by larger fish for cover.
Prime Farmland:	Farmland with the best combination of physical and chemical features able to sustain long term agricultural production, as mapped by the CA Department of Conservation's Farmland Mapping and Monitoring Program.
Quaternary:	The second period of the Cenozoic era (following the Tertiary); is the geologic time period from the end of the Pliocene Epoch roughly 1.806 million years ago to the present. The Quaternary includes two geologic subdivisions: the Pleistocene and the Holocene Epochs.
reach:	A linear segment of a stream or river.
Reclamation	U.S. Bureau of Reclamation
redd:	A nest of fish eggs covered with gravel.
REI	Recreational Equipment, Inc.
reservoir:	An artificially impounded body of water.
riffle:	A shallow section in a stream where water is breaking over rocks or other partially submerged organic debris and producing surface agitation.
riparian:	Habitat along a water body.
riprap:	A layer of large pieces of rock placed on top of a surface to protect the surface from erosion.
run:	The straight fast-moving section of a stream between riffles.
RWA	Regional Water Authority
SARA	Save the American River Association
scour:	The clearing and digging action of flowing water, especially the downward erosion caused by stream water in removing material (e.g., soil, rocks) from a channel bed or bank or around in-channel structures.
SEP	Supplemental Environmental Project
SOI	Sphere of Influence
SPA	Specific Plan Area
State Parks	California Department of Parks and Recreation

streambed: The bottom of a stream comprised of natural materials (sand, silt, clay, cobbles, boulders or artificial constructed materials.

substrate: Soil or the materials at the bottom of a lake or stream in which plants grow.

Tertiary age: One of the major divisions of the geologic timescale, lasting from the end of the Cretaceous (about 65 million years ago) to the start of the Quaternary (about 2 million years ago). Also the system of strata deposited during that period.

top-of-bank: The location or point of the first significant grade break from the upland to the active floodplain immediately adjacent to the creek channel.

total dissolved solids (TDS): TDS is that portion of solids in water that can pass through a 2 micron filter. The more minerals dissolved into the water the higher the total dissolved solids. TDS is used as an indication of aesthetic characteristics of drinking water and as an aggregate indicator of presence of a broad array of chemical contaminants.

trophic: Referring to specified kinds of nutrition or feeding requirements of organisms.

turbidity: Turbidity is a measure of the cloudiness or clarity of the water. Turbidity is the condition resulting from suspended solids in the water, including silts, clays, industrial wastes, sewage and plankton. Such particles absorb heat in the sunlight, thus raising water temperature, which in turn lowers dissolved oxygen levels. (See also NTUs as a measure of turbidity.)

undercuts: Natural, inadvertent or intentional excavation of a slope or embankment in which underlying material is removed more deeply than the overlying material, creating an unstable slope.

Unique Farmland: Farmland of lesser quality soils used for the production of the state's leading agricultural crops, as mapped by the CA Department of Conservation's Farmland Mapping and Monitoring Program.

U.S. 50 U.S. Highway 50

watershed: A region or area bounded peripherally by a water parting and draining ultimately to a particular watercourse or body of water

ALDER CREEK

WATERSHED

Appendices

Appendices

All Alder Creek Watershed Management Action Plan appendices can be found online at:

http://creeks.folsom.ca.us

A. Alder Creek Watershed Project Assessment and Evaluation Plan (AECOM 2007a)

B. Alder Creek Watershed Assessment and Monitoring Plan (includes QAPP in Appendix) (AECOM 2007b)

C. Alder Creek Watershed Assessment Technical Report - Hydrologic and Geomorphic Component (NHC 2009)

D. Alder Creek Watershed Assessment Technical Report – Biological and Ecological Component (AECOM 2010)

E. Technical Memorandum – Recommendations for Future Hydromodification Analysis Methods and Tools, and Potential Mitigation Actions (cbec 2010)