Appendix 6 Integrated Water Management Strategies and Benefits This page is deliberately blank

 Table 6-1

 Integrated Water Management Strategies to

 Develop and Maintain a Diverse Mix of Water Resources (Objective D)

Wate Strat	er Management egy ¹	Rationale for Inclusion of Strategy in Integrated Group	Integration Benefits
Prim	ary Strategies tha	t Directly Implement the Objective ²	
3.	Agricultural Water Use Efficiency	Water conservation (urban and agricultural water use efficiency) is a fundamental component of the Region's water diversity plans. This IRWM Plan establishes targets conserving 79,960 AFY of water by year 2010 and 108,400 AFY of water by year 2030.	Demand reduction reduces capacity needs for potable water treatment, reservoir storage, and conveyance, resulting in reduced capacity needs, and capital and operation and maintenance cost savings.
4.	Groundwater Management	Local groundwater supply water is a key source water diversity strategy in the Region's water plans. This IRWM Plan targets 28,580 AFY of groundwater supply by 2010 and 31,1800 AFY of groundwater supply by year 2030.	When integrated into an agency's supply system, groundwater management also provides storage, treatment, and conveyance benefits.
5.	Conveyance	Conveyance facilities are required to transport raw water from such sources as water transfers, imported supply, and local supplies developed through regional surface storage.	Integrating conveyance with this group of strategies allows for optimization of conveyance facilities and capacities, which reduces capital and operation costs.
6.	Seawater Desalination	Seawater desalination is a key source water diversity strategy in the Region's water plans. This IRWM targets 37,400 AFY of seawater desalination supply for Region by year 2015.	Seawater desalination would provide water supply sources along the coast to complement existing treatment capacity and water sources located inland, and would reduce inland reservoir storage needs.
7.	Potable water treatment and distribution	Potable water treatment and distribution is required for several sources of the Region's water supply, including: water transfers, imported supply, and local supplies developed through regional surface storage.	Coordinating treatment needs with supply sources and conveyance can optimize facility reliability, provide for better geographical distribution of treatment capacity, and increase the flexibility of agencies to cope with interruptions in the treated water supply.
11.	Groundwater Aquifer Remediation	Groundwater aquifer remediation can be used to render a wider array of local groundwaters available for extraction and use, and can be integrated into a component of groundwater management.	Groundwater aquifer remediation reduces water quality problems in groundwater resources, increases the usable capacity of the Region's groundwater, resulting in improved yields and reduced costs.
16.	Recycled Water	Recycled water is a key source diversity strategy in the Region's water supply plans. This IRWM Plan targets 33,670 AFY of recycled water supply within the Region by year 2010 and 47,580 AFY of recycled water supply by year 2030.	Recycled water can improve groundwater managemen yields through groundwater recharge. Also, recycled water use can result in reduced needs for other water sources, resulting in improved reliability and potential savings in capital and operation costs for potable water treatment, reservoir storage.
22.	Urban Water Use Efficiency	Water conservation (urban and agricultural water use efficiency) is a fundamental component of the Region's water diversity plans. This IRWM Plan targets conserving 79,960 AFY of water by year 2010 and 108,400 AFY of water by year 2030.	Demand reduction reduces capacity needs for potable water treatment, reservoir storage, and conveyance, resulting in reduced capacity needs, and capital and operation and maintenance cost savings.
23.	Water Transfers	Water transfers are listed as a key source diversity strategy in the Region's water diversification plans. To achieve Objective D, this IRWM Plan targets 277,700 AFY of water transfer supplies by year 2030.	Water transfers increase the number of water sources available within the Region and can share the same storage and conveyance facilities used for the Region's imported supply.
Seco	ndary Related/Lii	nked Strategies	
8.	Economic Incentives	Economic incentives may be used to encourage implementation of agricultural water use efficiency, groundwater management, seawater desalination, matching quality to use, recycled water, and urban water use efficiency strategies.	When combined with the other strategies, economic incentives may render projects that provide Regional benefits economically feasible for proponents that receive only part of the benefit.
12.	Matching Quality to Use	Salinity concentrations (see Section B) may affect the usability of the Region's groundwater, recycled water, and local surface water supplies.	Matching quality to use will allow for more efficient use of existing resources, and will help reach recycled water use targets established in this Plan.
18.	Regional Surface Storage	Regional surface storage is a necessary element of supply diversity. Regional surface storage is required to balance out seasonal differences in demand and the availability of imported water, local surface water, and water transfers.	Integrating regional storage into this group provides such benefits optimizing seasonal demands among diverse water sources, and reducing operational costs by allowing for off-season acquisition of water supplies.
19.	Reoperation and Reservoir Management	Reoperation and reservoir management is directly interlinked with regional surface storage.	Reoperation and reservoir management can be used to enhance storage efficiency, increase the usable yield from local storage reservoirs, and improve the treatability of raw surface waters.
25.	Watershed Management and Planning	Watershed management and planning can be an important element in addressing and protecting the quality and usability of groundwater and surface water resources.	Combined with the above strategies, watershed planning allows watershed-specific supply and quality issues to be addressed and resolved.

1 The above-integrated group of primary and secondary strategies is presented for purposes of identifying water management strategies that work together to achieve Plan objectives. The above list of linked primary and secondary water management strategies is not exclusive. Additional water management strategies exist (see Table D-5 on page D-17) that can provide further synergistic benefits.

2 Primary water management strategy directly linked to objective. See Table D-5 on page D-17.

Water Managem Strategy ¹	Rationale for Inclusion of Strategy in Integrated Group	Integration Benefits
Primary Strategi	es that Directly Implement the Objective ²	
5. Conveyanc	The Region is dependent on the reliability of its imported water conveyance system. Several key upgrades to this system are being addressed as part of the Water Authority'seEmergency Storage Program. Significant differences in supply and conveyance flexibility exist among the Region's 	Conveyance needs are dependent on the geographic location and capacities of raw water sources, potable water treatment, and storage facilities. Integrating conveyance with these strategies (as set forth in the Region's local water supply plans) allows for optimization of facility locations and capacities, reducing capital and operation costs.
7. Potable wa treatment a distribution	nd Region's potable water treatment and distribution facilities.	Coordinating treatment needs with supply sources and conveyance can optimize facility reliability, provide for better geographical distribution of treatment capacity, and increase the flexibility of agencies to cope with interruptions in the treated water supply.
18. Regional Surface Storage	Seasonal storage is needed to balance out differences in seasonal demand and water availability. Carryover, and emergency storage represent key needs addressed in the Region's water supply plans and the Water Authority's ESP.	Regional surface storage needs are dependent on the type, quantity and timing of available water sources, and the timing and magnitude of demands. Integrating regional storage with these strategies (as set forth in th Region's local water supply plans) is required to optimize storage facilities and reduce capital and operational costs.
 Reoperatio and Reserv Management 	bir Reoperation and reservoir management is directly interrelated	Reoperation and reservoir management can be used to enhance storage efficiency, increase the usable yield from local storage reservoirs, and improve the treatability of raw surface waters.
Secondary Relate	ed/Linked Strategies	
 Agricultura Water Use Efficiency 	The ability to reliably meet water demands is, in part, dependent on the amount of the demand. Demand reduction (e.g. agricultural water use efficiency) reduces the potential for water shortages, rationing, or inability to reliably meet demands. Demand reduction also reduces capital facilities needs for conveyance, potable water treatment, and storage.	Demand reduction reduces capacity needs for potable water treatment, reservoir storage, and conveyance, resulting in reduced capacity needs, and capital and operation and maintenance cost savings.
4. Groundwat Managemet		When integrated into an agency's supply system, groundwater management also provides storage, treatment, and conveyance benefits.
 Seawater Desalinatio 	Note: The set of the s	Seawater desalination would provide treatment capacity along the coast to complement existing treatment capacity and water sources located inland.
8. Economic Incentives	Economic incentives may be used to encourage implementation of agricultural water use efficiency, groundwater management, seawater desalination, recycled water, and urban water use efficiency strategies.	When combined with the other strategies, economic incentives may render projects that provide Regional benefits economically feasible for proponents that receive only part of the benefit.
16. Recycled Water	Recycled water offers a reliable means of water supply for irrigation and other uses. Recycled water supply is not affected by drought, aqueduct shutdowns, or other imported water supply interruptions. Recycled water can be used as a source of groundwater recharge.	Recycled water can improve groundwater managemen yields through groundwater recharge. Also, recycled water use can result in reduced needs for other water sources, resulting in improved reliability and potential savings in capital and operation costs for potable wate treatment, reservoir storage.
22. Urban Wat Use Efficie		Demand reduction reduces capacity needs for potable water treatment, reservoir storage, and conveyance, resulting in reduced capacity needs, and capital and operation and maintenance cost savings.

Table 6-2 Integrated Water Management Strategies Construct, Operate, and Maintain a Reliable Water Infrastructure System (Objective E)

 The above integrated group of primary and secondary strategies is presented for purposes of identifying water management strategies that work together to achieve Plan objectives. The above list of linked primary and secondary water management strategies is not exclusive. Additional water management strategies exist (see Table D-5 on page D-17) that can provide further synergistic benefits.

2 Primary water management strategy directly linked to objective. See Table D-5 on page D-17.

Table 6-3 Integrated Water Management Strategies to Reduce Negative Effects on Waterways and Watershed Health Caused by Hydromodification and Flooding (Objective F)

	er Management tegy ¹	Rationale for Inclusion of Strategy in Integrated Group	Integration Benefits	
Prin	nary Strategies tha	t Directly Implement the Objective ²		
2.	Agricultural Land Stewardship	Unless properly managed, agricultural lands within the Region may have a significant effect on runoff, sedimentation, and erosion. Agricultural land stewardship represents an important strategy in reducing the potential for irrigation runoff, erosion, stream sediment loads, and hydromodification with the Region.	Agricultural land stewardship practices can reduce the potential for hydromodification and flooding, potentially reducing the degree of required flood control infrastructure and hydromodification controls.	
10.	Floodplain Management	Floodplain management and the Region's flood management plans directly target hydromodification, flood-related sediment transport, and flood-related erosion.	Integrating Watershed management, flood management, agricultural land stewardship, urban land use management, and watershed planning	
20.	Urban Land Use Management	Almost the entire western portion of the Region is urbanized. Urban land use management represents a means for reducing erosion, stream sediment loads, and hydromodification through land zoning, requiring appropriate best management practices, and addressing flood management issues.	Integrating urban land use management into this group allows for the implementation of land use controls or incentives as a means of implementing agricultural land stewardship, flood management, and urban runoff control strategies and projects.	
21.	Urban Runoff Management	Urban runoff management can be used to reduce sediment loads, reduce urban runoff flows, and reduce the potential for erosion or hydromodification effects that result from urban flows.	Urban runoff management controls may affect flood management, and need to be addressed as one. Urban runoff management also affects water quality issues and ecosystem restoration, while ecosystem restoration can be used incorporated into urban runoff management.	
25.	Watershed Management and Planning	Watershed management and planning can be an important tool to identify and address local or watershed-specific hydromodification issues.	Combined with the above strategies, watershed planning allows watershed-specific sedimentation, erosion, and hydromodification issues to be addressed and resolved.	
Seco	Secondary Related/Linked Strategies			
8.	Economic Incentives	Economic incentives may be used to encourage implementation of agricultural land stewardship, land conservation, ecosystem restoration, and urban runoff management.	When combined with the other strategies, economic incentives may render projects that provide Regional benefits economically feasible for proponents that receive only part of the benefit	
9.	Ecosystem Restoration ³	Only a small portion of the Region's waterways are concrete lined. Ecosystem restoration can be used as a means of reducing the potential for erosion and hydromodification through revegetation, invasive species control, natural drainage controls, and wetlands creation.	When incorporated into flood management, ecosystem restoration may reduce the need for flood control infrastructure, resulting in capital and operation cost savings. Synergistic effects may also occur with urban runoff management, as urban runoff management can improve sustainability of restored ecosystems, and restored ecosystems can act as a means of reducing effects of urban runoff.	

The above integrated group of primary and secondary strategies is presented for purposes of identifying water management strategies that work together to achieve Plan objectives. The above list of linked primary and secondary water management strategies is not exclusive. Additional water management strategies exist (see Table D-5 on page D-17) that can provide further synergistic benefits.
 Primary water management strategy directly linked to objective. See Table D-5 on page D-17.

Wat Stra	ter Management ategy ¹	Rationale for Inclusion of Strategy in Integrated Group	Integration Benefits
Prir	mary Strategies tha	t Directly Implement the Objective ²	
2.	Agricultural Land Stewardship	Agricultural land stewardship can reduce the potential for runoff of irrigation waters, pesticides/herbicides, erosion, and stream sediment loads.	Agricultural land stewardship can reduce pollutant loads in rural areas, potentially lessening the degree of pollution prevention and urban runoff infrastructure required to achieve water quality standards.
13.	Pollution Prevention	Pollution prevention directly targets reduction in sources of pollution and environmental stressors. Identifying and preventing pollutant sources and controlling urban runoff are directly interrelated.	Integrating pollution prevention, urban runoff management, agricultural land stewardship effort is required to address and resolve the Region's complex pollution reduction needs to attain compliance with water quality standards.
21.	Urban Runoff Management	Urban runoff management can reduce urban flows and improve water quality during both dry weather and storm events. Identifying and preventing pollutant sources and controlling urban runoff are directly interrelated.	Integrating pollution prevention, urban runoff management, agricultural land stewardship efforts is required to address and resolve the Region's complex pollution reduction needs to attain compliance with water quality standards.
25.	Watershed Management and Planning	Watershed management and planning target watershed- specific water quality improvement and attainment of beneficial uses. Watershed management and planning can coordinate urban runoff management, pollution prevention, and other pollution reduction strategies.	Combined with the above strategies, watershed planning allows pollution source and control issues to be addressed and resolved on a watershed basis.
Sec	ondary Related/Lir	nked Strategies	
3.	Agricultural Water Use Efficiency	Improvements in irrigation efficiency (reduction in irrigation demands) can result in reduced irrigation runoff and improved water quality.	Improved water use efficiency can reduce irrigation runoff, potentially lessening the degree of pollution prevention and urban runoff infrastructure required to achieve water quality standards.
8.	Economic Incentives	Economic incentives may be used to encourage agricultural land stewardship, pollution prevention, ecosystem restoration, urban runoff management, agricultural water use efficiency, and urban water use efficiency.	When combined with the other strategies, economic incentives may render projects that provide Regional benefits economically feasible for proponents that receive only part of the benefit
9.	Ecosystem Restoration ³	Ecosystem restoration can be used as a means of reducing the potential for water quality impacts through revegetation, invasive species control, natural drainage controls, and wetlands creation.	Combined with the above strategies, watershed planning allows pollution source and control issues to be addressed and resolved on a watershed basis.
20.	Land Use Management	Urban land use management represents a means for reducing pollutant loads through land zoning, requiring appropriate best management practices, and addressing stormwater control.	Integrating urban land use management into this group allows for the implementation of land use controls or incentives as a means of implementing agricultural land stewardship, pollution prevention, and urban runoff control strategies and projects.
22.	Urban Water Use Efficiency	Improvements in irrigation efficiency (reduction in irrigation demands) can result in reduced irrigation runoff and improved water quality.	Improved water use efficiency can reduce irrigation runoff, potentially lessening the degree of pollution prevention and urban runoff infrastructure required to achieve water quality standards.
24.	Water- Dependent Recreation and Public Access	Contact and non-contact recreation represent important surface water beneficial uses within the Region. Water quality improvement results in increased recreational opportunities. Conversely, recreation uses can result in water quality degradation.	Integrating water-dependent recreation into this group allows for the identification and resolution of recreational impacts on water quality, and water quality impacts on recreation.

 Table 6-4

 Integrated Water Management Strategies to

 Effectively Reduce Sources of Pollutants and Environmental Stressors (Objective G)

1 The above integrated group of primary and secondary strategies is presented for purposes of identifying water management strategies that work together to achieve Plan objectives. The above list of linked primary and secondary water management strategies is not exclusive. Additional water management strategies exist (see Table D-5 on page D-17) that can provide further synergistic benefits.

2 Primary water management strategy directly linked to objective. See Table D-5 on page D-17.

	ter Management ategy ¹	Rationale for Inclusion of Strategy in Integrated Group	Integration Benefits
Prir	nary Strategies that	t Directly Implement the Objective ²	
2.	Agricultural Land Stewardship	Agricultural land stewardship represents an important and potentially cost-effective strategy for preserving open space, restoring and maintaining habitat, and improving water quality.	Agricultural land stewardship can be integrated with ecosystem restoration, flood management, and pollution prevention to attain multiple Plan goals (oper space, habitat preservation, and pollution prevention).
9.	Ecosystem Restoration ³	Ecosystem restoration strategies represent the key means of restoring habitat. Ecosystem restoration can be coordinated land conservation measures such as agricultural land stewardship and recharge area protection to protect and maintain open space.	Ecosystem restoration can be integrated with agricultural land stewardship, flood management, and pollution prevention to attain multiple Plan goals (oper space, habitat preservation, and pollution prevention).
20.	Urban Land Use Management	Habitat protection needs and land use are addressed in land use plans and multiple species conservation program plans.	Integrating urban land use management into this group allows for the implementation of land use controls or incentives as a means of implementing agricultural land stewardship, pollution prevention, and urban runoff control strategies and projects.
25.	Watershed Management and Planning	Watershed planning and management addresses open space needs, land use issues that affect habitat, and water quality issues that may affect habitat.	Combined with the above strategies, watershed planning allows for open space and habitat protection issues to be addressed and resolved on a watershed basis.
Sec	ondary Related/Li	nked Strategies	
4.	Groundwater Management	Groundwater management represents an important tool for ensuring the sustainability of groundwater-dependent habitat. Groundwater management can also be coordinated with ecosystem restoration, recharge area protection, and floodplain management to provide water quality benefits, flood protection benefits, enhance recreation, and reduced surface water pollutant loads.	Groundwater management needs to be integrated into ecosystem restoration to insure that groundwater development is consistent with supporting groundwater-dependent vegetation.
8.	Economic Incentives	Economic incentives can be used to encourage implementation of agricultural land stewardship, ecosystem restoration, pollution prevention, recharge area protection, and urban runoff management strategies.	When combined with the other strategies, economic incentives may render projects that provide Regional benefits economically feasible for proponents that receive only part of the benefit
10.	Floodplain Management	Floodplain management can result in set-aside open spaces and catchment basins that preserve open spaces and restore/maintain habitat.	Floodplain management can be integrated with agricultural land stewardship, ecosystem restoration, and pollution prevention to attain multiple Plan goals.
13.	Pollution Prevention	Pollution prevention can reduce water quality-related impacts on ecosystems. Habitat restoration, conversely, can be a means of natural pollution control.	Pollution prevention can be integrated with agricultural land stewardship, ecosystem restoration, and flood management to attain multiple Plan goals (open space, habitat preservation, and pollution prevention).
15.	Recharge Area Protection	Land conservation or land use controls to protect recharge areas can include acquiring lands for preservation and maintaining habitat.	Integrating open space and habitat protection with recharge area protection can improve land use efficiency, improve water quality, and prove for enhanced water supply.
21.	Urban Runoff Management	Urban runoff management can reduce stormwater flows and water quality-related impacts to ecosystems.	Urban runoff management controls can be integrated into land use planning and open space preservation to more provide for achievement of multiple Plan objectives.
24.	Water- Dependent Rec. and Public Access	Open space preservation and habitat preservation can result in improved recreational opportunities.	Integrating water-based recreation into the above open space and habitat protection strategies allows recreational needs to be incorporated into urban land use management, ecosystem restoration, and floodplain management.

 Table 6-5

 Integrated Water Management Strategies to

 Protect, Restore and Maintain Habitat and Open Space (Objective H)

1 The above integrated group of primary and secondary strategies is presented for purposes of identifying water management strategies that work together to achieve Plan objectives. The above list of linked primary and secondary water management strategies is not exclusive. Additional water management strategies exist (see Table D-5 on page D-17) that can provide further synergistic benefits.

2 Primary water management strategy directly linked to objective. See Table D-5 on page D-17.

 Table 6-6

 Integrated Water Management Strategies to

 Optimize Water-Based Recreational Opportunities (Objective I)

		Optimize Water-Daseu Recreational Oppor	()
	er Management tegy ¹	Rationale for Inclusion of Strategy in Integrated Group	Integration Benefits
Prin	nary Strategies that	t Directly Implement the Objective ²	
9.	Ecosystem Restoration ³	Ecosystem restoration can enhance aesthetics and nature/habitat-related recreational opportunities. Ecosystem restoration can also result improved water quality, reduction in bacterial loads, erosion, and sediment impacts to downstream waters. Recreational opportunities and public access must be balanced against potential impacts to ecosystems.	Integration of ecosystem restoration, flood control, and pollution prevention can help attain multiple plan objectives, avoid cost duplication, and allow for cost sharing.
13.	Pollution Prevention	As documented in Sections B.5 and B.8, bacteria loads within the Region significantly affect recreational opportunities. Pollution prevention measures that target bacteria sources, trash, and other non-point sources, can improve water quality and decrease recreational impacts.	Integration of appropriate pollution prevention and urban runoff management controls is essential to complying with recreation-based water quality standards, and can help attain multiple plan objectives.
21.	Urban Runoff Management	Urban runoff management represents an important strategy for reducing non-point source runoff and bacteria loading to the Region's surface waters.	Integration of appropriate pollution prevention and urban runoff management controls is essential to complying with recreation-based water quality standards.
24.	Water- Dependent Rec. and Public Access	As discussed in Section B.8, the Region features a significant array of water-based recreational opportunities. Water- Dependent Recreation and Public Access represents a central water management strategy toward optimizing water-based recreational opportunities in the Region.	Integrating other strategies within water-based recreation can provide for cost sharing and can help attain pollution prevention benefits along with achieving recreation goals.
Seco	ondary Related/Lir	iked Strategies	
8.	Economic Incentives	Economic incentives can be used to encourage effective pollution prevention and urban runoff management measures. Economic incentives can also help implement or improve recreational opportunities and public access.	When combined with the other strategies, economic incentives may render projects that provide Regional benefits economically feasible for proponents that receive only part of the benefit
10.	Floodplain Management	The Region features several existing and planned river parks. Floodplain management must be integrated with recreational opportunities to addressed may provide recreational opportunities as part of natural flood protection systems and overflow basins.	Integration of flood control, recreation, pollution prevention, and ecosystem restoration strategies can help attain multiple plan objectives.
18.	Regional Surface Storage	Regional surface reservoirs represent an important recreational resource within the Region. Recreational opportunities and water supply needs must be balanced with water quality impacts resulting from recreation.	Integrating recreation and reservoir strategies allows for the identification and resolution of potential conflicts between recreation and water quality.
19.	Reoperation and Reservoir Management	Reservoir management operations (e.g. reservoir volumes) may limit recreational opportunities, and recreation may affect water quality and treatability needs.	Integrating recreation and reservoir management strategies allows for the identification and resolution of potential conflicts between recreation and water quality.
20.	Urban Land Use Management	Urban land use plans incorporate and implement recreational elements. Land use plans can also target water quality improvement through zoning and requiring appropriate best management practices.	Integrating urban land use management into this group allows recreational needs to be better addressed through appropriate land use designations, controls, and incentives.
25.	Watershed Management and Planning	Watershed management and planning can be used to identify and optimize water-based recreational opportunities and to address means of reducing water quality-related impacts to recreation.	Combined with the above strategies, watershed planning allows recreation and water quality needs to be addressed and resolved on a watershed basis.
1	The above integrated group of primary and secondary strategies is presented for purposes of identifying water management strategies the		

1 The above integrated group of primary and secondary strategies is presented for purposes of identifying water management strategies that work together to achieve Plan objectives. The above list of linked primary and secondary water management strategies is not exclusive. Additional water management strategies exist (see Table D-5 on page D-17) that can provide further synergistic benefits.

2 Primary water management strategy directly linked to objective. See Table D-5 on page D-17.