

4.0 WATER MANAGEMENT STRATEGIES AND INTEGRATION

The Central Orange County IRCWM Plan incorporates a broad range of water management strategies that can be used to achieve the objectives for reduction in impacts to CCAs and ASBSs, water quality improvements, ecosystem restoration, and improved local water supply reliability. The IRCWM Plan fully incorporates the 11 water management strategies that are required to be considered per California Water Code §79562.5 and §79564 and includes all 20 of the water management strategies identified in the IRWM Guidelines.

4.1 Selection of Appropriate Strategies

Strategies were evaluated to determine whether they are appropriate for inclusion in the Plan based on the following criteria:

- Is the strategy already incorporated into adopted plans for land use and water resource management by agencies within the Central Orange County region?
- Does the strategy provide a regionally appropriate means to resolve watershed management issues?
- Can the strategy be implemented through an integrated effort involving more than one agency or more than one project?

The strategies were carefully considered with respect to watershed management challenges and opportunities, agency experience, and a given strategy's appropriateness for the region. Each strategy was further identified as a potential means to achieve each of the objectives.

Based on this evaluation process, each of the 20 strategies identified in the IRWM Guidelines was determined to be appropriate for the Central Orange County region, and no strategies were excluded. Future updates to the IRCWM Plan will expand the list of strategies to address all of the resource management strategies identified in the California Water Plan.

4.2 Integration of Strategies to Achieve Objectives

The IRCWM Plan's approach to integration includes the use of several strategies for implementing the projects in a manner that supports synergistic watershed management. Full integration of strategies is achieved through well-planned implementation of the various projects. Though the projects must incorporate at least one of the strategies, the majority incorporate several complementary strategies, often to achieve multiple objectives. For example, projects that incorporate the water conservation strategy by nature incorporate other strategies, including the following: water quality by reducing wastewater and runoff; water supply reliability and imported water by offsetting imported water supply needs; watershed planning through implementation of conservation measures throughout the watershed to enhance water use

efficiency; environmental and habitat protection and improvement by utilizing recycled water supplies; and land use planning by effectively addressing water issues and ways to incorporate water conservation measures in proposed development. The method for achieving full synergy is through identifying an appropriate mix of projects where the majority incorporate several complementary strategies and are able to achieve multiple objectives. Strategies and projects that address multiple objectives are typically the most cost-effective and resource-efficient and are, for the most part, given higher priority in the IRCWM Plan.

Table 4.1, *Integration of Strategies to Achieve Objectives*, summarizes the integration of strategies to achieve the IRCWM Plan objectives. In many cases, a certain strategy or combination of strategies will be more important than others to achieving an objective given the conditions within the watershed. The table below reflects this by the size of the circle; the larger circles indicate higher importance for that particular objective. The strategies are also identified in Chapter 5, which discusses regional priorities and the proposed projects.

**Table 4.1
Integration of Strategies to Achieve Objectives**

(Note: The size of the circle shows the relative significance within the watershed)

Strategy / Objective	(1) Improve Water Quality to reduce impacts on CCAs, ASBSs	(2) Implement restoration projects, BMPs, & control measures to support beneficial uses, attain TMDL targets, NPDES permit reqmts	(3) Watershed-wide approach to address runoff and related impacts	(4) Protect, restore, enhance & connect wetland and wildlife habitats; support ecosystem processes	(5) Enhance quantity and quality of local water supplies	(6) Provide safe water supply, recreational opportunities to disadvantaged communities	(7) Intra-regional cooperation, planning and implementation
Ecosystem Restoration	●	●	●	●			●
Habitat Protection	●	●	●	●			●
Water Supply Reliability		●			●	●	●
Flood Management	●	●	●	●		●	●
Groundwater Management		●			●	●	●
Recreation/Public Access	●			●		●	●

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Stormwater Management	●	●	●	●			●
Water Conservation	●	●	●		●	●	●
Water Quality Protection	●	●	●	●	●	●	●
Water Recycling					●	●	●
Wetlands Enhancement/Creation	●	●	●	●			●
Conjunctive Use					●	●	●
Desalination					●	●	●
Imported Water					●	●	●
Land Use Planning	●	●	●	●	●	●	●
Non-Point Source Pollution Control	●	●	●				●
Surface Storage					●	●	●
Watershed Planning	●	●	●	●	●	●	●
Water/Wastewater Treatment					●	●	●
Water Transfers					●	●	●

4.3 Strategies to Meet Objectives

Each of the objectives identified in *Chapter 3* is best achieved through the use of multiple complementary strategies. This approach is consistent with integrated resource planning and provides the highest level of benefit from project implementation. The strategies are discussed below as they apply to each objective.

1. Improve water quality in streams and channels, particularly those that are listed as impaired, and those discharging to Upper and Lower Newport Bay, Newport Beach Marine Life Refuge, and Irvine Coast Marine Life Refuge in order to reduce impacts on these CCAs and ASBSs.

Strategies to be used:

- | | |
|-------------------------|--------------------------------------|
| • Ecosystem Restoration | • Water Quality Protection |
| • Habitat Protection | • Wetlands Enhancement/Creation |
| • Flood Management | • Land Use Planning |
| • Stormwater Management | • Non-point Source Pollution Control |
| • Water Conservation | • Watershed Planning |

Achieving this objective will require the use of a range of interrelated strategies related to land use and water quality programs and projects. Currently, the CCAs and ASBSs are impacted by the quality of the water that is discharging from the upper watershed areas. Watershed planning efforts, coupled with strategic projects that address pollution sources, are essential. Ecosystem restoration that incorporates habitat enhancement, flood protection, and stormwater management will strengthen the ecosystem processes in the watershed so that natural protections occur. Water conservation programs, particularly for landscape, will reduce runoff, complementing non-point source pollution control efforts.

Progress toward achieving this objective will be assessed on a number of levels, including the following:

- Reduction in pollutant loads assessed through water sampling within the CCAs and ASBSs
- Improvements in the health and variety of flora and fauna species in the CCAs and ASBSs over baseline conditions documented in current studies
- Improvements in ecosystem functions determined through visual assessments.

Although any single strategy could provide improvements in support of this objective, the improvement could easily be negated by other actions in the watershed if the planning and implementation effort is not integrated.

2. Provide for implementation of restoration projects, BMPs, and other control measures to support beneficial uses of creeks, streams, bays and estuaries, and to facilitate attainment of TMDL targets, receiving water quality objectives, the Santa Ana RWQCB's Watershed Management Initiative, and NPDES permit requirements.

Strategies to be used:

- | | |
|--------------------------|--------------------------------------|
| • Ecosystem Restoration | • Water Quality Protection |
| • Habitat Protection | • Wetlands Enhancement/Creation |
| • Flood Management | • Land Use Planning |
| • Stormwater Management | • Non-point Source Pollution Control |
| • Water Conservation | • Watershed Planning |
| • Groundwater Management | • Water Supply Reliability |

Similar to Objective No. 1, the most effective means to achieve this objective is through the use of multiple strategies. The majority of the Newport Bay Watershed area is developed, and the remaining developable area, such as Tustin Legacy and the Great Park, will be developed over the next 10 to 15 years. A range of programs and projects can be integrated to achieve this objective, depending on developed conditions and the opportunities that exist. Some source issues have been identified, such as sedimentation occurring through erosion in Serrano Creek and toxics increasing due to boat maintenance in Newport Harbor.

Progress toward achieving this objective will be assessed on a number of levels, including the following:

- Reduction in pollutant loads assessed through water sampling in accordance with the permit requirements and TMDLs
- Completion of projects that address pollutant sources
- Geographic scope and level of participation in public education programs.

Multiple complementary strategies are required to successfully achieve this objective in a cost-effective manner with long-term, sustained results. Although any single strategy could provide improvements in support of this objective, the improvement would likely be negated by other actions in the watershed if the planning and implementation effort for projects and programs is not integrated.

3. Provide a comprehensive, regional, watershed-wide approach to address runoff and its related impacts from existing and future land uses, in accordance with the California Non-point Source Pollution Plan.

Strategies to be used:

- | | |
|-------------------------|--------------------------------------|
| • Ecosystem Restoration | • Water Quality Protection |
| • Habitat Protection | • Wetlands Enhancement/Creation |
| • Flood Management | • Land Use Planning |
| • Stormwater Management | • Non-point Source Pollution Control |
| • Water Conservation | • Watershed Planning |

Similar to the other water quality objectives, efforts to achieve this objective will be most effective if several interrelated strategies are used. This objective specifically addresses current developed conditions and future planned development. Extensive studies have been completed within this region to identify effective strategies to address non-point source pollution. In particular, IRWD's Natural Treatment Systems (NTS) Master Plan identifies 31 areas throughout the watershed where this technology would be appropriate; the benefits of a treatment wetlands is enhanced by related projects and programs to minimize the pollutant load in the water to be treated. An NTS program provides additional benefits for wetlands enhancement, ecosystem restoration, and water quality protection. A watershed-wide approach will only achieve its intended benefits if done as part of an integrated approach.

Progress toward achieving this objective will be assessed in the following ways:

- Reduction in pollutant loads assessed through water sampling
- Number of treatment wetlands installed and volume of water treated
- Range (geographic and type) and number of projects implemented within the region that specifically address reduction of non-point source pollution
- Public education programs and percent of watershed covered.

Individual water management strategies would provide improvements in support of this objective; however, the improvement could easily be negated by other actions in the watershed if the planning and implementation effort is not integrated.

4. Protect, restore, enhance and connect wetland and wildlife habitats and support ecosystem processes in the coastal zone and upper watershed, while maintaining flood protection.

Strategies to be used:

- Ecosystem Restoration
- Habitat Protection
- Flood Management
- Stormwater Management
- Water Conservation
- Water Quality Protection
- Wetlands Enhancement/Creation
- Land Use Planning
- Recreation/Public Access
- Watershed Planning

An objective that seeks ecosystem restoration and habitat protection, coupled with maintaining adequate flood control capacity, requires an integrated approach. Often times, habitat protection and flood protection are considered mutually exclusive. This region has an extensive drainage system, ranging from natural washes to fully channelized flood control facilities. One of the goals of the watershed studies conducted by the ACOE for this region has been to resolve this conflict and restore ecosystem processes where feasible. Development within the watersheds has resulted in increased area covered by impervious surface with a greater volume of stormwater runoff. The drainages are further impacted by dry weather runoff related to landscape irrigation and other urban activities. Erosion in the soft-bottom drainages causes loss of habitat, impacts water quality, and, in certain areas, threatens life and property. Integrated resource planning and use of multiple management strategies can resolve these conflicts. Watershed planning and land use planning can ensure that drainage areas that have been impacted by development are not further impacted by future development. Flood control can be accomplished through a variety of design approaches, some of which enhance recreational opportunities, such as trails.

Progress toward achieving this objective will be assessed on a number of levels, including the following:

- Length of drainage areas restored from past erosion and type of habitat re-established
- Scale of habitat connectivity created through projects
- Improvements in ecosystem functions determined through visual assessments
- Range of drainage solutions used with new development to avoid impacts to existing soft-bottom drainages.

In order to achieve the benefits of this objective, the use of multiple strategies is required. Projects will require the integration of two perspectives: flood control and habitat protection

and/or restoration. Any single strategy would not yield the level of benefit expected for projects implemented under this objective.

5. Enhance quantity and quality of local water supplies, including groundwater, to reduce reliance on imported water.

Strategies to be used:

- | | |
|------------------------------|----------------------|
| • Water Supply Reliability | • Desalination |
| • Groundwater Management | • Imported Water |
| • Water Conservation | • Land Use Planning |
| • Water Quality Protection | • Surface Storage |
| • Water Recycling | • Watershed Planning |
| • Water/Wastewater Treatment | • Water Transfers |
| • Conjunctive Use | |

The Central Orange County region benefits from a diverse mix of water supplies due to the foresight and major commitment of the water agencies early on to develop local supplies. Today, the region has a reliable source of supply from groundwater, recycled water, and imported water. A broad array of effective demand management measures are in place, including water use efficiency programs and tiered rate structures that send a direct price signal for overuse. The water system infrastructure is in place, and future capital needs are incorporated into the agencies' respective capital and financial plans.

However, given the water supply conditions across the western United States, there is still a critical need to further enhance local water supplies and decrease dependence on imported water. To be cost-effective and sustainable over the long-term, multiple strategies must be used. IRWD is at the forefront of water resource planning, using progressive water conservation programs, water banking, and water transfers to maximize resources. Conjunctive use has been employed for a number of years to recharge the Orange County Groundwater Basin. Agencies have adopted new technologies to treat significant groundwater issues to ensure that this remains a reliable source of supply.

Progress toward achieving this objective will be assessed on a number of levels, including the following:

- Reduction in deliveries of imported water for potable and non-potable uses due to reduced demand and reliability of local supplies
- Increased production of recycled water and areas of availability
- Volume of impaired groundwater treated and used for beneficial purposes.

Water supply development is expensive, and single-purpose projects will not achieve the level of benefit available through an integrated resource management approach. Success in achieving this objective requires cooperation between agencies with land use and water resource management authority to ensure that groundwater resources are protected and recycled water is used to the maximum extent feasible.

6. Provide a safe, reliable drinking water supply and recreational opportunities for disadvantaged communities within the region, consistent with other areas of the region.

Strategies to be used:

- | | |
|--------------------------------|----------------------|
| • Water Supply Reliability | • Desalination |
| • Groundwater Management | • Imported Water |
| • Water Conservation | • Land Use Planning |
| • Water Quality Protection | • Surface Storage |
| • Water Recycling | • Watershed Planning |
| • Water/Wastewater Treatment | • Water Transfers |
| • Conjunctive Use | • Flood Management |
| • Recreation and Public Access | |

The strategies used to achieve this objective are similar to those discussed above with respect to enhancing local water supplies. Integrated resource planning is an effective tool to ensure environmental justice issues are avoided to the greatest extent possible and the benefits of projects and programs are shared equally throughout the region. The disadvantaged communities receive services from the same systems as adjacent areas within the region; no projects have been included that would result in environmental justice issues.

Recreational facilities with free public access provide important social value to this region. The type and location of these facilities can be expanded through the use of multiple strategies, such as incorporating trails into habitat restoration and flood control projects or using synthetic turf on a sports field as a water conservation project, thereby expanding the capacity of the field for use.

Progress toward achieving this objective will be assessed on a number of levels, including the following:

- Reduction in deliveries of imported water for potable and non-potable uses due to reduced demand and reliability of local supplies
- Increased production of recycled water and areas of availability

- Volume of impaired groundwater treated and used for beneficial purposes
- Range (geographic and type) of recreational facilities added with open public access
- Reduction in number of days (over current year baseline) in which existing recreational facilities/areas are closed due to water quality issues.

Providing equal benefit to disadvantaged communities is an essential component of the IRCWM Plan. The cost-effectiveness of project implementation is an important consideration to avoid increases in water rates and other public service charges that would negatively impact those in lower income brackets. The most effective way to accomplish this is through the use of complementary strategies with a specific focus on achieving multiple benefits through projects and programs and leveraging agency resources. With competing demands for public funds, the greatest gain in improved public services and facilities, including recreation, is through broad project integration rather than single-purpose projects.

7. Provide a framework for efficient intra-regional cooperation, planning, and implementation of this and other plans that have been developed for the region, which encourages integrated implementation of watershed improvement projects with multiple benefits.

Strategies to be used:

- | | |
|------------------------------|--------------------------------------|
| • Ecosystem Restoration | • Water Quality Protection |
| • Habitat Protection | • Wetlands Enhancement/Creation |
| • Flood Management | • Land Use Planning |
| • Stormwater Management | • Non-point Source Pollution Control |
| • Water Conservation | • Watershed Planning |
| • Water Supply Reliability | • Desalination |
| • Groundwater Management | • Imported Water |
| • Water Recycling | • Surface Storage |
| • Water/Wastewater Treatment | • Conjunctive Use |
| • Water Transfers | • Recreation and Public Access |

This last objective will be achieved through the broad integration of multiple water management strategies. The strategy mix will change according to the scope of the planning effort, project, or program being considered. The long-term commitment of the stakeholders within this region, including public agencies, environmental groups, and private entities, is to work collaboratively toward achieving regional goals for improved water quality, ecosystem restoration, and a reliable local water supply. A number of studies have been conducted for the Newport Bay and Newport Coast Watershed, such that the stakeholders have determined shared goals and objectives. Moving into specific implementation measures, whether capital projects or programs, requires

continued collaboration and cooperation to re-affirm priorities, resolve conflicts, and garner broad public support.

Progress toward achieving this objective will be assessed through the following:

- Number of stakeholders cooperating on individual projects and programs
- Adherence to implementation schedules
- Funding and other support for projects and programs received from other agencies and groups.

This objective is fundamental to the long-term success of the IRCWM Plan. Individual strategies will not accomplish the level of benefit expected from a regional integrated planning effort. The stakeholders are committed to the integrated planning approach, and the IRCWM Plan is structured to leverage the financial and physical resources within the region to achieve the regional goals as cost-effectively and efficiently as possible.

4.4 Benefits of Integration to Meet Objectives

The value of integrated regional planning is a direct result of the extent to which water management strategies are determined to be complementary within a given region and then further identified as a means to achieve regional objectives. The objectives of this IRCWM Plan for water quality, habitat and ecosystem restoration, and enhanced local water supplies present a number of opportunities to combine strategies for greater benefits and improved cost-efficiency. *Table 4.2, Water Management Strategy Integration*, presents a matrix of strategy combinations appropriate for the Central Orange County region and the specific objectives of this plan. The areas marked with a “●” indicate a nexus between the two strategies for accomplishing objectives within this region. Those areas that are shaded indicate that the combination of strategies has been incorporated into the priority projects identified in *Chapter 5*. As reflected in the table, there are a multitude of strategy combinations that could be used; this Plan incorporates a number of them and there are still a wide range of possibilities to be used as projects evolve or conditions change in the watershed.

Table 4.2
Water Management Strategy Integration

	Ecosystem Restoration	Habitat Protection	Water Supply Reliability	Flood Management	Groundwater Management	Recreation/Public Access	Stormwater Management	Water Conservation	Water Quality Protection	Water Recycling	Wetlands Enhancement/	Conjunctive Use	Desalination	Imported Water	Land Use Planning	Non-point Source Pollution Control	Surface Storage	Watershed Planning	Water/Wastewater Tmt	Water Transfers
Ecosystem Restoration		•	•	•	•	•	•	•	•	•	•				•	•	•	•		
Habitat Protection	•		•	•	•	•	•	•	•		•				•	•	•	•		
Water Supply Reliability	•	•		•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•
Flood Management	•	•	•		•	•	•		•		•	•			•	•		•		
Groundwater Management	•	•	•	•			•	•	•	•		•	•	•	•	•	•	•	•	•
Recreation/ Public Access	•	•	•	•			•	•	•		•				•	•	•	•		
Stormwater Management	•	•	•	•	•	•		•	•	•	•	•			•	•	•	•		
Water Conservation	•	•	•		•	•	•		•	•		•	•	•	•	•		•	•	•
Water Quality Protection	•	•	•	•	•	•	•	•		•	•	•	•		•	•		•		
Water Recycling	•		•		•		•	•	•			•	•	•	•	•	•	•	•	•
Wetlands Enhancement	•	•		•		•	•	•	•						•	•		•		
Conjunctive Use	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•
Desalination			•		•			•	•	•		•		•	•	•		•	•	•
Imported Water			•		•			•	•	•		•		•	•	•		•	•	•
Land Use Planning	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•
Non-point Source Pollution Control	•	•	•	•	•	•	•	•	•	•	•	•			•			•		
Surface Storage	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	
Watershed Planning	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•
Water/ Wastewater Treatment			•		•		•	•	•	•	•		•	•	•			•	•	
Water Transfers			•		•		•					•		•				•		
Total – Priority Projects	3	7	8	2	4	6	8	4	10	4	4					8		2		

The use of multiple complementary strategies is necessary to achieve the objectives of the Plan, as outlined below.

Water Quality Objectives: One of the major watershed management issues in the Central Orange County region is that land use and other urban activities in the upper watershed areas impact water quality in the coastal ecosystem, particularly the CCAs and ASBSs. Projects and programs to address this issue must be implemented both in the upper watershed areas as well as the coastal areas. Sustained water quality improvements can be obtained through land use planning, flood control, non-point source pollution control, strategically placed treatment wetlands, and water conservation. Any single strategy will not result in the same level of benefit due to limited scope and other activities in the watershed. Given the level of urbanization in the region and magnitude of the issue, single strategies would not result in sustained water quality improvements to the extent possible if multiple strategies were used.

Habitat and Ecosystem Restoration with Flood Control Objective: The level of urbanization within the Central Orange County region makes habitat and ecosystem restoration particularly challenging, due to competing needs for flood control, recreation, and other urban land uses. This region has important ecosystems in the coastal area as well as the upper watershed. Measurable progress toward achieving regional goals for habitat and ecosystem restoration is dependent on the use of multiple strategies. Some drainages within the region can serve dual purposes for flood control and habitat when designed and managed with that purpose in mind. Achieving this balance further requires water quality strategies so that erosion and sedimentation do not impact receiving waters. To be effective, these dual-purpose drainage systems often require greater levels of stormwater management within developments to minimize the impact on the natural drainages during storm events. These strategies are integrally linked, and any stand-alone alternative would not fully achieve the objective or provide long-term regional benefit.

Enhanced Local Water Supply Objectives: Developing local water supplies to a level that results in a long-term reduction in imported water demands is costly. Use of single strategies may ultimately increase the cost of water supply as the projects may not leverage other resources to maximize the range of potential benefits. For example, expanding the capacity of a recycled water system may not achieve its full level of benefit unless it integrates land use planning, wastewater treatment, water conservation, and a variety of other strategies. When the project is planned with full regional integration, conflicts are minimized and benefits extend beyond the planning area. An increased supply of recycled water, available in areas where it can be fully used, reduces demand for imported water, reduces wastewater discharge into the ocean, and conserves water resources in the Bay-Delta and Colorado River.

References Cited

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