# Watershed Action Plan
# Santa Ana Region
## Riverside County

**January 18, 2017**

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## Acronyms and Abbreviations

| | |
|---|---|
| ABOP | Antifreeze, Batteries, Oil, Paint |
| Basin Plan | Water Quality Control Plan for the Santa Ana River Basin |
| BMP | Best Management Practice |
| Caltrans | California Department of Transportation |
| CAP | Compliance Assistance Program |
| CBRP | Comprehensive Bacteria Reduction Plan |
| CEQA | California Environmental Quality Act |
| CGP | Construction General Stormwater Permit |
| CMP | Consolidated Monitoring Plan |
| CNRP | Comprehensive Nutrient Reduction Plan |
| County | Riverside County |
| CWA | Clean Water Act |
| DAMP | Drainage Area Management Plan |
| District | Riverside County Flood Control and Water Conservation District |
| EEM | Engineered, earthen and maintained |
| EFHM | Engineered, fully hardened and maintained |
| EHM | Engineered, hardened and maintained |
| EIR | Environmental Impact Report |
| EMWD | Eastern Municipal Water District |
| EPHM | Engineered, partially hardened, and maintained |
| FEMA | Federal Emergency Management Agency |
| GIS | Geographic Information System |
| HCOC | Hydrologic Conditions of Concern |

| | |
|---|---|
| HHW | Household hazardous waste |
| HMP | Hydromodification Management Plan |
| IEUA | Inland Empire Utilities Agency |
| IRWMP | Integrated Regional Water Management Plan |
| IS | Initial Study |
| LESJWA | Lake Elsinore and San Jacinto Watersheds Authority |
| LID | Low Impact Development |
| MEP | Maximum Extent Practicable |
| MSAR | Middle Santa Ana River |
| MSHCP | Multiple Species Habitat Conservation Plan |
| MS4 | Municipal Separate Storm Sewer System |
| NAT | Natural |
| NEE | Not engineered and earthen |
| NRCS | National Resource Conservation Services |
| 2010 MS4 Permit | Riverside County MS4 Permit Order No. R8-2010-0033 |
| OWOW | One Water One Watershed |
| Permittees | District, County and Cities within the Santa Ana Region |
| RBF | Robert Bein, William Frost and Associates |
| RCA | Western Riverside County Conservation Authority |
| RCFC&WCD | Riverside County Flood Control and Water Conservation District |
| RCTD | Riverside County Transportation Department |
| RCTC | Riverside County Transportation Commission |
| RDBMS | Relational Database Management System |
| Regional Board | Santa Ana Regional Water Quality Control Board |
| SAR | Santa Ana Region |
| Santa Ana Region | Portion of Riverside County within the Santa Ana River Watershed |
| SAWPA | Santa Ana Watershed Project Authority |
| SCCWRP | Southern California Coastal Watershed Research Project |
| SMC | Southern California Stormwater Monitoring Coalition |
| SWPPP | Stormwater Pollution Prevention Plan |
| SWQSTF | Stormwater Quality Standards Task Force |
| TDS | Total Dissolved Solids |
| TMDL | Total Maximum Daily Load |
| USEP | Urban Source Evaluation Plan |
| USEPA | United States Environmental Protection Agency |
| WAP | Watershed Action Plan |
| WMWD | Western Municipal Water District |
| WLA | Wasteload Allocation |
| WQMP | Water Quality Management Plan |

# Executive Summary

The Watershed Action Plan (WAP) for the Santa Ana Watershed Region of Riverside County (SAR) and its Permittees is a requirement of the Riverside County Municipal Separate Storm Sewer System (MS4), Permit Order No. R8-2010-0033 as adopted by the Santa Ana Regional Water Quality Control Board (Regional Board) in January 29, 2010 (2010 MS4 Permit). The purpose of this requirement is to coordinate existing watershed approaches to address water quality and hydromodification impacts resulting from urbanization within the SAR. This requirement is to be achieved by evaluating existing programs relating to the integration of water quality, stream protection, stormwater management, and re-use strategies with land planning policies, ordinances, and plans within each jurisdiction to the maximum extent practicable (MEP). Throughout implementation of the 2010 MS4 Permit along with the development of this plan, the Regional Board has emphasized that the plans for each jurisdiction should address cumulative impacts of development on vulnerable streams; preserve or restore, consistent with the MEP standard, the structure and function of streams; and protect surface water and groundwater quality.

The WAP and associated Geodatabase was developed through a collaborative process with the Riverside County Flood Control and Water Conservation District (District), the County of Riverside (County) and Cities in the SAR (Co-Permittees) (District and Co-Permittees collectively are the Permittees), and other watershed stakeholders.

The WAP is structured to help the Permittees and stakeholders collaborate with existing programs (MS4 programs and other regional independent efforts) to take a holistic approach toward watershed management within the Santa Ana River Watershed. The WAP was also used to help organize the information included in the Geodatabase. The development process allows the WAP and Geodatabase to be utilized during the development of a WQMP and implemented to the MEP. The Geodatabase also includes many layers that can be used during the Land Use approval process.

A few layers include:

| | |
|---|---|
| Base Maps (Topo, Street, Aerial, USGS) | As-Built Plans |
| City Limits | Groundwater Management Zones |
| Parcels | Plumes |
| Slope | Water District Boundaries (Wholesaler and Retailer) |
| NHD Flow Lines | Groundwater Elevations |
| Permittee Facilities | Soil |
| Hydrologic Unit Codes (HUC) | Geotracker Locations |
| FEMA and Special Studies Flood Plain | Western Riverside MSHCP/Coachella Valley MSHCP |

This WAP, was written to assist in addressing watershed scale water quality impacts of urbanization as described in Section 1. Section 2 provides watershed resources and characteristics such as location, physiography, land use, geology, climate, water resources and groundwater information about the Santa Ana Region Watershed. This will help the permittees understand the type of constraints that may exist when designing a project. Section 3 provides a description of existing MS4 programs such as the Drainage Area Management Plan, Local Implementation Plan and the Water Quality Management Plan. Section 4 includes descriptions of independent Regional Efforts such as One Water One Watershed, MSHCP, the Chino Basin Master Plan and the permittees Water Conservation efforts outside of the MS4 permit. The final section of the WAP, Section 5, describes the watershed priorities and necessary steps for incorporation of WAP measures throughout the development process. The Co-Permittees will use the approved Water Quality Management Plan Guidance Document and Template for direction to the WAP and associated Geodatabase to assist in accomplishing an integrated watershed management approach to project development and ultimately improve water quality.

# 1 WAP Purpose

The purpose of this WAP is to address watershed scale water quality impacts of urbanization in the Permit Area associated with Urban Total Maximum Daily Load (TMDL) Waste Load Allocations (WLAs), stream system vulnerability to hydromodification from Urban Runoff, cumulative impacts of development on vulnerable streams, preservation of Beneficial Uses of waterbodies in the SAR, and protection of water resources, including groundwater recharge areas.

The primary audience and users of the WAP will be Permittee staff. The WAP will help address potential local and regional water quality impacts associated with development and be a resource tool in the development process. In order to address water quality early in the development process, Permittee staff may utilize the WAP to assist development project proponents to comply with the multitude of plans and programs as required by the 2010 MS4 Permit. The Permittee staff may use the WAP and the associated Geodatabase to better understand the development project site and potential constraints from a water quality perspective, as well as the potential water quality issues a project may contribute. The Geodatabase will allow the Permittees to identify stormwater management facilities and improvements, as well as environmental constraints in the vicinity of a project in their jurisdiction.

The WAP is a resource to enable Permittee staff to address watershed scale water quality impacts through the integration of plans developed as part of the MS4 program. This may be accomplished by:

- Implementation of watershed protection principles and policies necessary, for water quality protection, including avoiding disturbance of waterbodies, minimizing changes in hydrology and Pollutant loading, preserving wetlands and other natural areas, by incorporating the appropriate Best Management Practices, employing the Ahwahnee Principles of community design, using the California Environmental Quality Act (CEQA), Low Impact Development (LID), the Water Quality Management Plan and others.
- Reviewing the Hydromodification Management Plan (HMP) for Regional alternative compliance ideas.
- Using the Susceptibility Documentation and Mapping Report that incorporates the delineation of existing unarmored or soft-armored drainages in the SAR that are vulnerable to geomorphology changes due to hydromodification and those channels and streams that are engineered, hardened, and maintained.
- Using the watershed geodatabase as an interactive reference tool to facilitate the use of the WAP as a guidance document.
- Reviewing the specific retrofit studies in the SAR to address TMDLs.
- Performing additional reconnaissance relating to specific sites and geographic areas, as part of the Hydromodification Management Plan Evaluation Program
- Identification of linkages between the independent Efforts such as Stormwater Quality Standards Task Force (SWQSTF), Chino Basin Master Plan, Santa Ana Watershed Project Authority's (SAWPA) Integrated Regional Water Management Plan (IRWMP) and the

MS4 programs such as Drainage Area Management Plan (DAMP), Water Quality Management Plan (WQMP), the implementation of LID, and the TMDL Implementation Plans.

**Ahwahnee Principles**

- Natural resources, such as wetlands, floodplains, recharge zones, riparian areas, and open space, should be identified, preserved, and restored as valuable assets for such uses as flood protection and water quality improvement.
- Water holding areas, including creek beds and recessed athletic fields, should be incorporated into urban landscapes.
- Permeable surfaces should be used for hardscape, with impervious surfaces minimized, so that land is available to absorb stormwater, reduce polluted runoff, recharge groundwater, and reduce flooding.
- Dual plumbing should be used to allow the use of grey water for landscape irrigation in new development.
- Community design should maximize use of recycled water for landscape irrigation, toilet flushing, and commercial/industrial uses, with purple pipe installed in new construction and redevelopment in anticipation of future recycled water use.
- Water conservation technologies for new construction and retrofits should be incorporated into new construction and redevelopment.
- Locally available, drought-proof water supplies (e.g., groundwater treatment and brackish water desalination) should be maximized.

# 2 Watershed Resources and Characteristics

## 2.1 Location

The Santa Ana River Watershed, inclusive of the flood control zones, is located in southern California, south and east of the City of Los Angeles. The Santa Ana River Watershed includes much of Orange County, the northwestern corner of Riverside County, the southwestern corner of San Bernardino County, and a small portion of Los Angeles County. Tributaries of the Santa Ana River within Riverside County include the San Jacinto River Watershed and the Middle Santa Ana River Watershed. The San Jacinto River Basin, a 768-square mile tributary of the Santa Ana River, is regulated by natural storage in Lake Elsinore and contributes flow into the Santa Ana River only as a result of rare high intensity storm events that cause overflow. The Santa Ana River Watershed is bound on the south by the Santa Margarita Watershed, on the east by the Whitewater Watershed, and on the northwest by the San Gabriel River Watersheds. The area of the Santa Ana River Watershed is approximately 2,650 square miles.

## 2.2 Physiography

At just over 7,200 square miles, Riverside County is rectangular shaped and is bordered on the west by Orange County; on the southwest by San Diego County; on the southeast by Imperial County; and on the north by San Bernardino County. Combined, San Bernardino and Riverside Counties are called the Inland Empire. The District encompasses portions of three major river basins in Riverside County: the Santa Ana River, the Santa Margarita River, and the Whitewater River.

Major topographic features within the Santa Ana River Watershed include the Santa Ana, San Jacinto, and San Bernardino Mountains. The Santa Ana Mountain Range trends southeasterly along the western border of Riverside County, with a maximum elevation of 5,687 feet at Santiago Peak. The Santa Ana Mountains create a barrier between the Pacific Ocean and inland valleys of Riverside County. The major topographic barrier in the County is located about 50 miles east. The San Bernardino and San Jacinto Mountain Ranges run southeasterly across Riverside County with maximum elevations at 10,804 feet at the San Jacinto Peak and 11,502 feet at the San Gorgonio Mountain. Near the northern boundary of the County, the San Gorgonio Pass is a major breach of the barrier with elevations dropping approximately 2,600 feet. Between the Santa Ana and San Bernardino-San Jacinto barriers is an area of broken topography that includes valleys, plateaus, and minor mountain ranges.

## 2.3 Major Subwatersheds

### 2.3.1 Santa Ana River Subwatershed

The Santa Ana River Subwatershed includes the Middle Santa Ana River subwatershed, Temescal Wash subwatershed and the San Timoteo Creek subwatershed. The Middle Santa Ana Region is located in the northwest corner of Riverside County. Surface drainage in this area is generally westward from the City of Riverside to the Santa Ana River, Reach 3. The tributary drainage area

to the Santa Ana River is 170 square miles. Tributaries to the Santa Ana River (Reaches 3 and 4) include: Temescal Creek (Reaches 1-6), Tequesquite Arroyo (Sycamore Creek), Day Creek, and San Sevaine Creek. The cities within the Middle Santa Ana River Subwatershed include Corona, Eastvale, Jurupa Valley, Moreno Valley, Norco and Riverside.

The Temescal Wash Subwatershed is also located in the Santa Ana River subwatershed. The 29-mile long Temescal Wash connects Lake Elsinore with the Santa Ana River. The tributary drainage area to Temescal Wash before the confluence with the Santa Ana River in Corona is 250 square miles. Along its watercourse, several tributaries, including Wasson Canyon Wash, Arroyo Del Toro, Stovepipe Canyon Wash, Rice Canyon Wash, and Lee Lake discharge into Temescal Wash. Temescal Wash flows through an arid rain shadow zone of the Santa Ana Mountains and is ephemeral for most of its length. The cities within the Temescal Wash Subwatershed include Corona, Lake Elsinore, Norco, and Riverside.

The San Timoteo Creek Subwatershed is also located in the Santa Ana River subwatershed and encompasses an area of 60 square miles. Upper reaches that account for 59.9 square miles are located within the County of Riverside, whereas lower reaches are located within the County of San Bernardino. Headwaters of San Timoteo Creek within Riverside County are located in the San Bernardino Mountains, which drain to Cherry Valley. Other headwaters located within the County of San Bernardino include Yucaipa Creek and Live Oak Canyon. Upon leaving the San Timoteo Canyon, the creek discharges into the Santa Ana River near the Interstate 10 and Interstate 215 interchange. Agricultural activities and POTW discharges to the creek occur year-around, creating a perennial flow condition. Tributaries to the San Timoteo Creek Basin include: San Timoteo Creek (Reaches 3 and 4) and Little San Gorgonio Creek. The cities within the San Timoteo Wash Subwatershed include Beaumont and Calimesa.

The Beneficial Uses in the Upper Santa Ana River subwatershed include:

| **Watershed Management Areas in Riverside County** | **Hydraulic Unit** | **Beneficial Uses** |
|---|---|---|
| **Upper Santa Ana River** | | |
| Santa Ana River, Reach 3, | 801.21, 801.25, | AGR, GWR, REC1, REC2, WARM, WILD, RARE, |
| Santa Ana River, Reach 4 | 801.27, 801.44 | GWR, REC1, REC2, WARM, WILD, |
| Temescal Creek – Reach 1 | 801.25 | REC1, REC2, WARM, WILD |
| Temescal Creek – Reach 2 | 801.32, 801.25 | INTERMITTENT - AGR, IND, GWR, REC1, REC2, LWARM, WILD |
| Temescal Creek – Reach 3 **See Lee Lake** | | |
| Temescal Creek – Reach 4 | 801.34 | RARE, INTERMITTENT - AGR, GWR, REC1, REC2, WARM, WILD |
| Temescal Creek – Reach 5 | 801.35 | AGR, GWR, REC1, REC2, WARM, WILD, RARE |

| | | |
|---|---|---|
| Temescal Creek – Reach 6 | 801.35 | INTERMITTENT - GWR, REC1, REC2, WARM, WILD |
| Coldwater Canyon Creek | 801.32 | MUN, AGR, GWR, REC1, REC2, WARM, WILD |
| Bedford Canyon Creek | 801.32 | INTERMITTENT - GWR, REC1, REC2, WARM, WILD |
| Dawson Canyon Creek | 801.32 | INTERMITTENT - MUN, GWR, REC1, REC2, WARM, WILD |
| Day Creek | 801.21 | MUN,PROC, GWR, REC1, REC2, COLD, WILD |
| San Sevaine Creek | 801.21 | INTERMITTENT - MUN, GWR, REC1, REC2, COLD, WILD |
| San Timoteo Wash Reach 3 | 801.61 | GWR, REC1, REC2, WARM, WILD |
| Little San Gorgonio Creek | 801.62, 801.63, 801.69 | MUN, GWR, REC1, REC2, COLD, WILD |
| Sunnyslope Channel | 801.27 | MUN, REC1, REC2, WARM, WILD, SPWN |
| Tequesquite Arroyo (Sycamore Creek) | 801.27 | GWR, REC1, REC2, WARM, WILD, SPWN |
| **Chino Basin/ Middle Santa Ana** | | |
| Chino Creek, Reach 1A | 801.21 | REC1, REC2, WARM, WILD, RARE |
| Chino Creek, Reach 1B | 801.21 | REC1, REC2, WARM, WILD, RARE |
| Mill Creek (Prado Area) | 801.25 | REC1, REC2, WARM, WILD, RARE |
| Cucamonga Creek – Reach 1 | 801.21 | GWR, REC1, REC2, LWARM, WILD |

## 2.3.2 San Jacinto River Subwatershed

The Upper San Jacinto subwatershed is located on the northeast portion of the SAR. The headwaters of the San Jacinto River originate in the San Jacinto Mountains of San Bernardino County. The downstream point of the Upper San Jacinto subwatershed is at the confluence of Bautista Creek, Poppet Creek, and the San Jacinto River in the city of San Jacinto. The subwatershed drainage area to this confluence encompasses 190 square miles. The upper portion of the San Jacinto River flows through the San Bernardino National Forest and unincorporated land of Riverside County. The upper portion of the San Jacinto River is about 23 miles long and ranges from the outlet of Lake Hemet and the confluence herein specified.

Lake Hemet is the major water storage facility within this subwatershed. The dam was established in 1895 downstream of the Garner Valley Basin and operates on the principles of water supply. In addition to decreasing the downstream flow rate, the dam acts as a major debris basin.

The Middle and Lower San Jacinto Subwatershed is located within the central part of the SAR. The downstream point of the Lower San Jacinto Subwatershed is the outlet of Lake Elsinore. The

drainage area of the Middle and Lower San Jacinto Subwatershed encompasses 510 square miles. The combined middle and lower sections of the San Jacinto River are 35 miles long. Major tributaries to the Subwatershed include Potrero Creek, Perris Valley Channel, and Salt Creek Channel. The San Jacinto River flows through the cities of San Jacinto, Perris, Menifee, Canyon Lake, and Lake Elsinore. The cities within the Middle and Lower San Jacinto Subwatershed include Beaumont, Canyon Lake, Hemet, Lake Elsinore, Menifee, Moreno Valley, Perris, San Jacinto, and Riverside.

The San Jacinto River drains to Canyon Lake and Lake Elsinore. The Railroad Canyon Dam was built in 1928, creating the 11,600 acre-feet Canyon Lake. The Elsinore Valley Municipal Water District operates the lake based on water supply considerations and maintains a minimum lake elevation of 1,372 feet for the benefits of residents of the Lake Elsinore/Canyon Lake area. In addition, the Canyon Lake Property Owners Association leases surface rights for water recreation and regulates residential development around the edge of the lake.

Lake Elsinore is a 90,000 acre-feet natural lake located downstream of Canyon Lake. The levee is set at a relative elevation of 42 feet; runoff exceeding this elevation discharges into Temescal Wash. Canyon Lake and Lake Elsinore contribute to the decrease in downstream flow rates, and represent a physical barrier to the transport of coarse grained sediments.

Tributaries to the San Jacinto River Basin include: San Jacinto River (Reaches 1-7 and North Fork), Bautista Creek, Fuller Mill Creek, Salt Creek, Strawberry Creek, Stone Creek, Indian, Hurkey Poppet, and Potrero.

The Beneficial Uses in the San Jacinto River subwatershed include:

| **Watershed Management Areas in Riverside County** | **Hydraulic Unit** | **Beneficial Uses** |
|---|---|---|
| **San Jacinto**<br>San Jacinto River reaches 1 and 6 | 802.31, 802.32 & 802.21 | INTERMITTENT - MUN, AGR, GWR, REC1, REC2, WARM, WILD |
| **San Jacinto**<br>San Jacinto River reaches 3-5 | 802.11, 802.14, 802.21 | INTERMITTENT - AGR, GWR, REC1, REC2, WARM, WILD |
| **San Jacinto**<br>San Jacinto River reach 2<br>**See Canyon Lake** | | |
| **San Jacinto**<br>San Jacinto River reach 7 | 802.21 | MUN, AGR, GWR, REC1, REC2,<br>COLD, WILD |
| Bautista Creek | 802.21, 802.23 | MUN, AGR, GWR, REC1, REC2, COLD, WILD |
| Strawberry Creek | 802.21 | MUN, AGR, GWR, REC1, REC2, COLD, WILD |
| Fuller Mill Creek | 802.22 | MUN, AGR, GWR, REC1, REC2, COLD, WILD |
| Stone Creek | 802.21 | MUN, AGR, GWR, REC1, REC2, COLD, W ILD |

| | | |
|---|---|---|
| Salt Creek | 802.12 | INTERMITTENT - REC1, REC2, WARM, WILD |
| Other Tributaries: Logan, Black Mountain, Juaro Canyon, Indian, Hurkey, Poppet and Protrero Creeks, and other Tributaries to these Creeks | 802.21, 802.22 | INTERMITTENT - MUN, AGR, GWR, REC1, REC2, WARM, WILD |
| **Lakes** | | |
| Lake Elsinore | 802.31 | REC1, REC2, WARM, WILD |
| Canyon Lake | 802.11 | MUN, AGR, GWR, REC1, REC2, WARM, WILD |
| Lake Hemet | 802.22 | MUN, AGR, GWR, POW, REC1, REC2, WARM, COLD, WILD, SPWN |
| Lake Fulmor | 802.21 | MUN, AGR, REC1, REC2, WARM, COLD, WILD |
| Lake Perris | 802.11 | MUN, AGR, IND, PROC, GWR, REC1, REC2,, WARM, COLD, WILD |
| Lake Evans | 801.27 | REC1, REC2, WARM, COLD, WILD |
| Lake Mathews | 802.33 | MUN, AGR, IND, PROC, GWR, REC1, REC2, WARM, WILD, RARE |
| Lee Lake | 802.34 | AGR, IND, GWR, REC1, REC2, WARM, WILD |
| Mockingbird Reservoir | 802.26 | AGR, REC1, REC2, WARM, WILD |

## 2.4 Land Use

The land uses in the SAR are primarily undeveloped with approximately 30% in residential, commercial, and industrial. Historically, the SAR has seen significant agricultural development and remains a strong component of the County's economy[1] (2020 General Plan, Riverside County). In 2008, agriculture accounted for 10% of the land uses within the SAR. As of September 2013, the SAR is home to approximately 1.6 million individuals[2], and current projections indicate an increase of the population by 70% at the horizon of 2035[3]. Projections for housing demand are proportional to the projected increase in population, and urbanization has, over the past few decades, been rising rapidly to meet the demand. Over the last approximately 18 years, Permittees have mitigated increases in runoff from New Development during the planning process and have minimized downstream impacts. The Causes of Degradation and Aggradation Technical Memo, included in Appendix F, provides specific land use information for subwatersheds in the Santa Ana Region.

[1] County of Riverside General Plan, Vision Statement for Year 2020. Website: http://planning.rctlma.org/ZoningInformation/GeneralPlan.aspx

[2] State of California, Dept. of Finance, E-1 Population Estimates, and RCIT's Riverside County Progress Report

[3] 2010 Projections of Population. Riverside County Center for Demographic Research.

## 2.5 Geology

Soil depths in the mountainous areas of the Santa Ana Region are shallow. On many of the steepest slopes, the soil cover does not exist, exposing the bedrock. The feasibility for infiltration in these areas is not promising. Alluvial soils are predominant in the valley areas of the County, but vary with respect to depths and types of alluvial deposits. Generally speaking, alluvial cones/fans near canyon mouths are coarse and highly porous. Deposits farther downstream tend to become finer and less porous. Certain areas of the valley have very slow/non-existent infiltration rates due to the high clay content in the alluvium. The Causes of Degradation and Aggradation Technical Memo, included in Appendix F, provides additional geological information for subwatersheds in the Santa Ana Region.

## 2.6 Climate

The climate of the SAR is Mediterranean with hot dry summers and cool wet winters. Average annual precipitation ranges from 10-13 inches per year in the inland alluvial valleys, reaching 36 inches or more in the San Jacinto Mountains. Most of the precipitation in the Santa Ana River Watershed occurs between November and March, with variable amounts of snow at higher elevations.

The SAR's climate cyclicality results in high surface water flows in the spring and early summer followed by low flows during the dry season. Winter and spring floods generated by storms are not uncommon in wet years. There are several types of storms that occur in the Santa Ana River Watershed. General winter storms occur during the period of December to March. They originate over the Pacific Ocean as a result of the interaction between polar Pacific and tropical Pacific air masses and move eastward over the basin. These storms, which often last for several days, reflect aerographic influences and are accompanied by widespread precipitation in the form of snow or rain. General summer storms usually occur during the period from July through September. They are associated with an influx of tropical maritime air originating over the Gulf of Mexico or the South Pacific Ocean and enter the area from a southeast to a southwest direction. Usually, the influx of tropical air is caused by circulation about a high-pressure area centered in the southeastern United States, but occasionally it is caused by the remnants of a tropical hurricane. General summer thunderstorms are accompanied by heavy precipitation over large areas for periods up to 24 hours, but showers may continue for as long as three days.

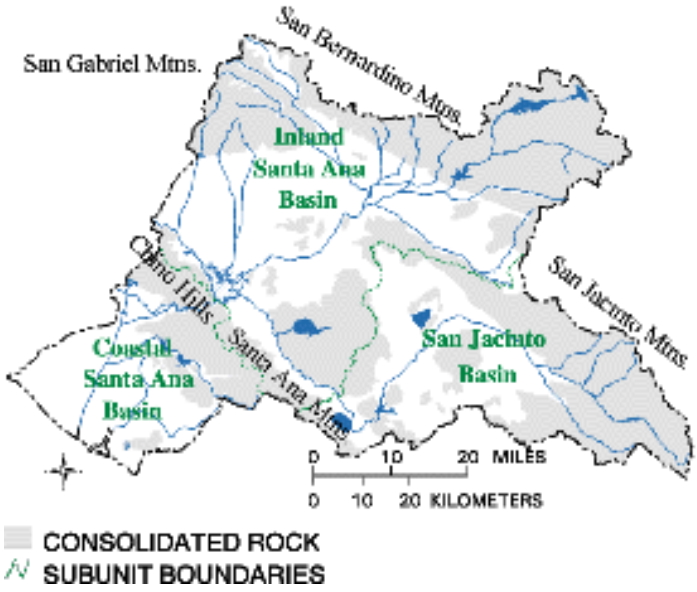
Local thunderstorms can occur at any time of the year, either during general storms or as isolated phenomena. They are most common, however, during the period from July through September, when the Southern California area may be covered by moist unstable air originating over the Gulf of Mexico. These storms cover comparatively small areas and result in high intensity precipitation of short duration.

## 2.7 Groundwater

Groundwater basins within the SAR are used to store local and imported water for later use to meet seasonal and drought-year demands. Groundwater is artificially replenished during wet years or in emergency situations. In some cases, when reclaimed water is recharged into the groundwater basins, the County's ability to meet water demand during years of reduced supply is increased, and

the reliability of the supply is enhanced. There are two groundwater basins located within the SAR: the Inland Santa Ana Basin, and the San Jacinto Basin. The location of each basin is shown in Figure 1 below.

**Figure 1: Groundwater Basin Locations in Santa Ana River Watershed**




The Inland Santa Ana Basin is located in the upper portion of the Santa Ana River Watershed, north of both Prado Dam Basin and the San Jacinto Basin. The Inland Basin is located in portions of Los Angeles, Riverside, and San Bernardino Counties and is comprised of alluvial deposits eroded from the surrounding mountains, varying in depth from less than 200 feet to more than 1,000 feet. The basin is recharged seasonally by infiltration of runoff from the San Gabriel and San Bernardino Mountains and also by water imported from Northern California and the Colorado River. Depths of water range from about hundreds of feet from the bottom of the mountain ranges to near the land cover in close proximity to rivers and wetland areas. The San Andreas Fault and other faults bound the Basin on three sides. The San Jacinto Fault subdivides the Basin. The interior faults are critical because they locally restrict groundwater flow and dictate the location of groundwater discharge. Groundwater management in the area is provided by Western Municipal Water District (WMWD),, Elsinore Valley Municipal Water District (EVMWD), and Eastern Municipal Water District (EMWD). Water District boundaries (wholesaler and retailer) are included in the Geodatabase.

The San Jacinto Basin is a series of interconnected, alluvium-filled valleys surrounded by steep sides of bedrock mountains and hills. The deposits range in thickness from approximately 200 to 1,000 feet. Collectively, alluvium covers about one-half of the total area in the subunit. Before the development of the area, groundwater recharge to the flow system was provided by infiltration of mountain streams, most notably the San Jacinto River. Today, groundwater recharge is largely from irrigation return flows and from percolation ponds filled with reclaimed water. Groundwater discharge occurs primarily by groundwater pumpage. Water levels in the alluvium-filled sub-basins are greatly affected by local management practices, including augmentation of groundwater pumpage by use of imported water and recharge with reclaimed water. Along with groundwater

management, EMWD also provides monitoring and water supply to various cities, including Moreno Valley, Perris, Sun City, Menifee, Winchester, Nuevo, Homeland, Hemet, San Jacinto, and Valle Vista.

# 3 MS4 Programs

The 2010 MS4 Permit requires Urban Runoff programs that are being implemented in the SAR by each of the Permittees. DAMP programs, LIPs, CMP, comprehensive reduction plans, WQMPs, Hydromodification Management Plans and the Geodatabase are summarized in this section to cover the existing approaches taken by the Permittees. The following programs are related to such efforts within the SAR and can be found online through the Regional Board website:

- Drainage Area Management Plan (DAMP);
- Local Implementation Plan (LIP);
- Consolidated Monitoring Plan (CMP);
- Comprehensive Nutrient Reduction Plan (CNRP);
- Comprehensive Bacteria Reduction Plan (CBRP);
- Water Quality Management Plan (WQMP);
- Hydromodification Management Plan (HMP);
- Geodatabase

Implementation of these programs collectively addresses Urban Runoff in the SAR and water quality levels are maintained and improved. Watershed drainage area specific programs vary depending on jurisdiction as some jurisdictions have MDPs, water agencies, encroachment permit processes in addition to the MS4 programs.

## 3.1 Drainage Area Management Plan

The DAMP identifies programs and policies, including BMPs, to achieve Water Quality Standards in the Receiving Waters. These BMPs can be organized into two categories: BMPs for existing facilities and BMPs for New Development and Significant Redevelopment. Both categories include regulatory activities, public education programs, waste management, and operations and maintenance activities. The Co-Permittees are currently implementing the 2014 DAMP which defines appropriate implementation strategies and standards for development activities. The DAMP is a dynamic document which is constantly undergoing revisions to incorporate the latest technologies and practices associated with water quality and stormwater management. The DAMP also documents all of the specific stormwater-related activities carried out by the Permittees during the term of the 2010 MS4 Permit. This acts as an important organizational tool enabling all of the Permittees to stay informed and updated on completed tasks and planned goals. Integrating DAMP principles into the WAP and incorporating it into the Geodatabase will be a beneficial tool to help keep everyone informed on the latest activities in the SAR. Ultimately, the WAP is required to be incorporated into the latest DAMP. The Permittees are required to incorporate applicable provisions from the revised DAMP into the LIPs.

### 3.1.1 Regional Treatment Control BMPs

Regional Treatment Control BMPs are an important tool in the water quality improvement toolbox. The factors that should be considered for implementation and approval of Regional Treatment Control BMPs include location, type, effectiveness for the target Pollutants of Concern, tributary drainage area, site constraints and constructability, engineering feasibility, operation and maintenance requirements, monitoring protocol, adjacent land uses, and funding sources. The Permittees continue to evaluate Regional BMP implementation plans and strategies within the SAR.

## 3.2 Local Implementation Plan

As summarized in the 2010 MS4 Permit, the LIP template was created to facilitate a description of the Permittees' individual programs to implement the DAMP. This includes the organizational units responsible for implementation and identification of positions responsible for Urban Runoff program implementation. The description for each Permittee addresses the overall program management, including internal reporting requirements and procedures for communication and accountability, including:

- Interagency/interdepartmental agreements necessary to implement the Permittees' Urban Runoff program;
- A summary of fiscal resources available to implement the Urban Runoff program;
- The ordinances, agreements, plans, policies, procedures, and tools used to execute the DAMP, including legal authorities and enforcement tools;
- A summary of procedures for maintaining databases required by the 2010 MS4 Permit; and
- A description of internal procedures to promote accountability.

The LIP also covers TMDL requirements, if required, logistics regarding legal authority/enforcement procedures and compliance tracking, Illicit Connections/Illegal Discharges programs and responsibilities, litter, debris and trash control, sewer spills/leaks/failure inspection, maintenance and response coordination, construction site Construction General Permit (CGP) permitting and BMP implementation procedures, implementation of the Residential Program, New Development and Significant Redevelopment, WQMP and HMP implementation, descriptions of the credit programs, public education and outreach, a description of the Permittees' MS4 facilities and activities (see 2010 MS4 Permit for complete list), and training programs for Stormwater Managers, Planners, Inspectors and Permittee contractors.

Permittees are required to annually review and evaluate the effectiveness of their Urban Runoff programs to determine the need for revisions to their LIPs as necessary in compliance with the 2010 MS4 Permit and document revisions in the Annual Report. Ultimately, the WAP is required to be incorporated into the latest DAMP. The Permittees are required to incorporate applicable provisions from the revised DAMP into the LIPs.

## 3.3 Consolidated Management Plan

In order to have an effective monitoring program to accurately characterize Urban Runoff, the District administers the CMP in the SAR for the Permittees. The CMP includes both Storm Event and Dry Weather event monitoring of MS4 outfalls and Receiving Waters. It also includes monitoring for Illicit Connection/Illegal Discharge (IC/ID) and various special studies throughout Riverside County. The 2010 MS4 Permit requires the Permittees to develop a Monitoring Plan for the SAR that is included in the CMP in order to meet requirements of the Monitoring and Reporting Program.

## 3.4 Total Maximum Daily Load Plans

The goal for the programs discussed within the WAP is to protect and improve water quality through an integrated watershed management approach.

Section 303(d) of the CWA requires that, every two years, the State must update the list of waterbodies for which Water Quality Standards (Beneficial Uses and Water Quality Objectives) are not attained, or are not expected to be attained, with the implementation of technology-based controls. TMDLs incorporate WLAs in order to meet these Water Quality Standards. TMDLs are an important tool for the Permittees to achieve water quality goals and are major priorities for the Permittees.

As previously discussed, Section 303(d) of the CWA requires the State to update the list of waterbodies for which water quality standards (beneficial uses and water quality objectives) are not attained, or are not expected to be attained. The list includes a description of the pollutants causing impairment and a schedule for developing a TMDL for each pollutant. The TMDL is the maximum load of a Pollutant that can be discharged from Point and Nonpoint Sources without Impairing Water Quality Standards. A TMDL must include WLAs for Point Source discharges, load allocations for Nonpoint Source discharges, and a margin of safety. TMDLs are implemented by those entities who are assigned WLAs and Load Allocations. Multiple TMDLs exist within the SAR and will be incorporated into the Geodatabase in order to track the progress of each. Table 1 identifies the current approved TMDLs in the SAR.

**Table 1: Current Approved TMDLs in the SAR**

| WATER BODY NAME | POLLUTANT |
|---|---|
| Canyon Lake | Nutrients |
| Lake Elsinore | Nutrients |
| Santa Ana River, Reach 3 | Bacterial Indicators |

Point Source discharges are controlled effectively through implementation of the Regional Board's core regulatory program. Nonpoint Source discharges remain the most significant source of Pollutants in many of the waters in the SAR. TMDLs are an important part of the Regional Board's regulatory program for assessing and controlling Nonpoint Source contributions to Pollutant loads.

Measures developed for the Plan for California's Nonpoint Source Pollution Control Program and the Nonpoint Source Management Plan's three tier approach (voluntary compliance, regulatory encouragement, issuance of waste discharge requirements) are and will be utilized to develop effective TMDL implementation programs for Nonpoint Source discharges. Modification of MS4 Permits, permits for individual industrial and construction facilities/activities, watershed planning, and the involvement of stakeholders are also important parts of effective TMDL development and implementation. TMDLs are incorporated into the Basin Plan as a Basin Plan Amendment (BPA). Once a TMDL has been incorporated into the Basin Plan, the Regional Board is responsible for ensuring TMDL implementation and effectiveness. The implementation and monitoring phase requires just as many staff resources (if not more) as were used to develop the TMDL itself. Even if local agencies or private interests are responsible for implementing components of the TMDL, Regional Board resources are required for reviewing and negotiating specific implementation strategies, providing oversight of the implementation program (which could include enforcement), monitoring and assessment of the TMDL effectiveness, and revision of the TMDL, if necessary.

The Permittees are participating in several studies in conjunction with the Stormwater Monitoring Coalition (SMC), SWQSTF, the Lake Elsinore and Canyon Lake TMDL Task Force, the Middle Santa Ana River (MSAR) TMDL Task Force, and Southern California Coastal Water Research Project (SCCWRP) to address the elevated Pollutant levels. TMDL Implementation Plans have been set forth for the MSAR and the San Jacinto River Watershed. These plans consist of collecting outfall monitoring data, site identification, and site prioritization yearly for further evaluation in the next phases of the Urban Source Evaluation Plan (USEP) Resolution No. R8-2008-0044. The monitoring requirements set forth in the 2010 MS4 Permit require the Permittees to implement a "Consolidated Program for Water Quality Monitoring", (CMP), to evaluate BMP effectiveness in the SAR. Effectiveness is evaluated based on the WLAs and a specified compliance date for the specific TMDL. The Permittees are also required to revise the DAMP to incorporate the results of the USEP and/or other studies. The DAMP revisions include implementing schedules for meeting WLAs, recording results of the USEP and/or other studies, BMP effectiveness evaluations, and evaluating compliance with the WLAs for Urban Runoff by initiating a WLA pre-compliance evaluation monitoring program. WQMP revisions to incorporate BMPs per the USEP as well as development of a CBRP to achieve compliance with the WLAs by the compliance dates are also required. Specific information regarding WLAs, task force members, and other TMDL-related information can be found in the Order and the Basin Plan.

### 3.4.1 Middle Santa Ana River Bacterial Indicator TMDL

In February 2005, the Regional Board amended the Santa Ana River Basin Plan to incorporate the MSAR Waterbodies Bacterial Indicator TMDLs. The Amendment was adopted by the Regional Board in August 2005, and approved by the State Water Resources Control Board, Office of Administrative Law on September 1, 2006. The TMDLs were approved by the USEPA on May 16, 2007.

#### 3.4.1.1 Comprehensive Bacteria Reduction Plan

In response to the TMDL and MS4 Permit requirements, the CBRP was developed for the SAR. The CBRP is a long-term plan designed to achieve compliance with Dry Weather condition (April

1st – October 31st) WLAs for Bacterial Indicators established by the MSAR Bacterial Indicator TMDL. The CBRP was developed collaboratively by the Permittees participating in the MSAR TMDL and the MSAR TMDL Task Force. The Permittees that participate in the MSAR TMDL Task Force include RCFC&WCD, County of Riverside, Cities of Riverside, Corona, Norco, Eastvale and Jurupa Valley. The need for the development of the CBRP, and ways in which the compliance with the WLAs can be measured is discussed in Appendix C.

Currently the Permittees have been implementing water conservation programs which directly reduce the amount of dry weather runoff in the SAR. Municipalities have existing stormwater/urban runoff management and discharge control ordinances prohibiting the discharge of domestic waste from sewer line overflows, septic tanks, portable toilets, boats, and animal feces. Typical ordinances make unlawful the failure to exercise due care or control over an animal such that solid waste is to allowed to be deposited on any public sidewalks, parks or other public property, or private property.

As part of CBRP implementation, the Permittees have re-visited the existing ordinances that address any type of animal waste and looked at ways to enhance waste management requirements, compliance, and enforcement. Penalties or fines are included as part of their existing ordinance. Along with the non-structural source control BMPs currently being implemented and planned throughout the SAR, the Permittees are enforcing structural BMPs for New and Redevelopment Projects through the use of WQMPs.

#### 3.4.1.2 Santa Ana Watershed BMP Retrofit Assessment- Technical Memorandum

The Santa Ana Watershed BMP Retrofit Assessment- Technical Memorandum was to identify a list of parcels and flood control facilities that are possible candidates for future BMP retrofits in the event that structural solutions are required to address pollutant issues. Each opportunity was identified, evaluated, and ranked based on a suite of important characteristics, such as location in the watershed, soil types, and engineering feasibility. The BMP Retrofit Assessment- Technical Memorandum is located in Appendix B of this document.

### 3.4.2 Lake Elsinore and Canyon Lake Nutrient TMDL

In 1994, the Regional Board declared that Lake Elsinore was not meeting Water Quality Standards because of nitrogen and phosphorus exceedances. Lake Elsinore was then placed on the 303(d) list because of the Impairment of the following Beneficial Uses: warm water aquatic habitat (WARM), and water contact and non-water contact recreation (REC1 and REC2).

In addition to Lake Elsinore, the Regional Board also deduced that excessive nutrients were causing impairment of Beneficial Uses in Canyon Lake. Canyon Lake was included on the 303(d) list in 1998. The following Beneficial Uses were identified as Impaired by nutrients: municipal water supply (MUN), warm water aquatic habitat (WARM), and water contact and non-water contact recreation (REC1 and REC2).

Regional Board staff prepared the Lake Elsinore Nutrient TMDL Problem Statement and the Canyon Lake Nutrient TMDL Problem Statement in October 2000 and October 2001, respectively. The reports summarized the Impairments caused by excessive nutrients and provided preliminary

recommendations for numeric levels to ensure protection of the Beneficial Uses. After the Problem Statements were completed, numerous studies were conducted by the University of California at Riverside, Regional Board staff, and the Lake Elsinore San Jacinto Watershed Authority to create the Nutrient TMDLs. The Final Nutrient TMDLs were adopted on December 20, 2004.

#### 3.4.2.1 Comprehensive Nutrient Reduction Plan

In response to the TMDL and MS4 Permit requirements, the CNRP was developed for the SAR. The CNRP includes watershed based BMPs such as street sweeping, debris removal, septic system management, LID, land use conversion, and public education and outreach that are currently being implemented throughout the region. Projects for in-lake remediation within Canyon Lake and Lake Elsinore have also been implemented and documented by the Lake Elsinore/Canyon Lake TMDL Task Force. Lake Elsinore/Canyon Lake TMDL Permittees in the Task Force include, RCFC&WCD, the County of Riverside, Cities of Beaumont, Canyon Lake, Hemet, Lake Elsinore, Menifee, Moreno Valley, Perris, and San Jacinto. Watershed BMPs that are being implemented which provide a quantifiable nutrient reduction include street sweeping and MS4 debris removal, structural BMPs implemented through the requirements of WQMPs, septic system management, and LID in urban areas. Results have been documented and are provided in the CNRP, Appendix D, along with anticipated reduction projections within the region.

Compliance with the Urban WLAs will require implementation of nutrient mitigation activities in both the San Jacinto Watershed and the lakes. Accordingly, the CNRP is built around a framework that includes both watershed-based BMPs and in-lake remediation activities. Coupled with this framework is a monitoring program to evaluate progress toward compliance with Urban WLAs and an adaptive implementation program to provide the opportunity to make adjustments to the CNRP, where deemed necessary to achieve the Urban WLAs. The Permittees submitted the CNRP to the Santa Ana Regional Board on January 3, 2012. The Permittees received comments from the Santa Ana Regional Board on the CNRP on April 2, 2012. The Permittees addressed the Santa Ana Regional Board comments and submitted a revised CNRP on July 2, 2012, and a follow up addendum in January 2013. The Regional Board approved the CNRP on July 19, 2013 and it is now a narrative effluent limit for the LE/CL TMDL.

## 3.5 Water Quality Management Plan

According to the National Resource Council, there is a direct relationship between impervious cover and the biological condition of downstream Receiving Waters. HCOCs and Pollutant concentrations are two immediate concerns related to Urban Runoff. Therefore, the Regional Board has set forth requirements to address specific concerns for different types of land development activities. WQMPs have been implemented throughout the SAR in order to address requirements of the 2010 MS4 Permit.

The WQMP is a document required for New Development and Significant Redevelopment projects in order to ensure compliance with the requirements of the 2010 MS4 Permit. The 2010

MS4 Permit requires preparation of a WQMP for all projects within the SAR that meet the "Priority Development Project" categories and thresholds; if not, a Project-Specific WQMP is generally not required. Threshold guidelines used to determine if a project falls under a category that requires a WQMP are summarized in the WQMP Manual as well as the 2010 MS4 Permit. Co-Permittee staff will determine in each case when and how the WQMP requirements and guidelines are applied. A summary of the WQMP requirements for New Development and Significant Redevelopment projects as well as procedures for WQMP compliance and approval can be found in the SAR WQMP.

Typically, infiltration BMPs are prioritized as the preferable BMP choice when trying to meet WQMP and HCOC requirements. Because infiltration can be used toward HCOCs and Pollutant reduction, it is important to note that the Geodatabase should be used as a tool that would help identify areas where Urban Runoff infiltration is an appropriate action, as well as locations where it may be infeasible given soil, geologic, or groundwater conditions. Those locations that cannot be clearly designated would require a more detailed level of assessment, consistent with the 2010 MS4 Permit requirements, in order to determine the feasibility/appropriateness of Urban Runoff infiltration.

The benefits of this approach include cost savings, comprehensive and consistent technical analyses, and simplicity, resulting in straight-forward guidance that will assist the Permittees and property owners to easily identify locations where infiltration or other technical solutions should occur.

## 3.6 Hydromodification

This section will describe the different plans and programs developed by the Permittees to manage Hydromodification caused by Urban Runoff. The following plans and programs include:

- Hydromodification Management Plan
- Hydromodification Management Plan-Evaluation Program
- Causes of Degradation and Aggradation-Technical Memorandum
- Hydromodification Susceptibility Documentation Report and Mapping
- Risk Assessment and Project Prioritization

### 3.6.1 Hydromodification Management Plan

The objective of the HMP is to manage increases in runoff volumes and decreases in times of concentration that may result from New Development and Significant Redevelopment projects over one acre. The Permit contains specific requirements that strongly influence the hydromodification management methodology chosen in the development of the HMP, including the prioritization of actions based on drainage feature/susceptibility/risk assessments and opportunity for restoration.

The HMP will help the user identify whether the project is subject to Hydrologic Conditions of Concern (HCOC) requirements and when required, meet the HCOC requirements. The HMP also provides answers to the following questions:

- How do I identify if a project is subject to the requirements of this HMP?
- What are the HCOC MEP standards that applicable projects must meet?
- How does the user meet the HCOC MEP standards?
- What are the alternative compliance options available to the user?
- How does the user initiate compliance with the requirements of this HMP?

The HMP will be used by all Permittees and will serve as the guidance document for addressing HCOC. The 2011 Design Handbook for LID BMPs and the 2012 WQMP Guidance will be updated to incorporate the approved HMP. If a project has been granted approval of the preliminary WQMP before the implementation date as identified by the SARWQCB of the HMP, compliance with HCOC, if any, will be grandfathered under the approved 2012 WQMP Guidance. The HMP is located in Appendix E of this document.

### 3.6.2 Hydromodification Management Plan-Evaluation Program

This HMP Evaluation Program defines a protocol as required by Provision XII.B.5.b. of the 2010 SAR MS4 Permit that will be implemented by the Permittees to evaluate potential impacts to those channel segments deemed most susceptible to hydromodification.

> *"The HMP will identify sites to be monitored, include an assessment methodology, and required follow-up actions based on monitoring results. Where applicable, monitoring sites may be used to evaluate the effectiveness of BMPs in preventing or reducing impacts from Hydromodification."*

One key consideration of the HMP Evaluation Program is to attempt to distinguish hydromodification impacts, if any, that are caused by new development or significant redevelopment. A series of upstream dams, flood mitigation basins, agricultural developments, significant storm events or other stressors within the SAR are major elements that need to be considered when determining an impact.

The term of the Evaluation Program will extend through fiscal year 2021. Data will be gathered from the two monitored sites (described in Section 4.5 below) which will be submitted to the SARWQCB, tentatively in Fall 2022. However, as data is collected and new programs developed, this plan may be modified by the Permittees and the SARWQCB. The final report will contain:

- An explanation of field monitoring and GIS methods utilized;
- A summary of the monitored sites;
- A characterization of the physical conditions of monitored surface waters to hydromodification;

- An assessment of whether any of the monitored sites exhibited impacts due to hydromodification, and any sources which may be suspected; and
- A description of how the data gathered under this Evaluation Program will be used in future monitoring and/or implementation efforts.

The HMP Evaluation Program is located in Appendix G of this document.

### 3.6.3 Causes of Degradation and Aggradation-Technical Memorandum

The purpose of the Causes of Degradation and Aggradation technical memorandum is to identify potential causes of stream degradation and aggradation in the SAR. Subwatersheds analyzed include the Upper San Jacinto River, Middle and Lower San Jacinto River, Temescal Wash, and San Timoteo Wash. The Middle Santa Ana River (MSAR) subwatershed is not investigated in the report.

The causes of channel degradation and aggradation were determined using two methods: examination of historical and current aerial photographs, and a Geographic Information System (GIS)-based desktop study.

Current aerial photographs were provided by Microsoft Bing. These aerials were examined to get a general idea of the existing condition of the subwatersheds. Specifically, the aerials were used to locate drainage basins, areas of significant degradation, aggradation and regions of dense urban development. Historical aerials were obtained from the USGS Earth Explorer online database, available for download at http://earthexplorer.usgs.gov/. The aerial photographs were selected based on the engineer's best professional judgment to exhibit the channel conditions that are representative of the evolution of the subwatershed and, if any, examine the timing and the extent of degradation and aggradation of selected channels. Based on availability, aerial photographs ranged from 1948 to 2013.

A GIS-based methodology for identifying potential causes of degradation and aggradation was developed by the Southern California Coastal Water Research Project (SCCWRP) entitled "Hydromodification Screening Tools: GIS-Based Catchment Analyses of Potential Changes in Runoff and Sediment Discharge" dated March 2010.

The Causes of Degradation and Aggradation technical memorandum is located in Appendix F of this document.

### 3.6.4 Hydromodification Susceptibility Documentation Report and Mapping

The Hydromodification Susceptibility Report and Mapping is another useful tool for the Permittees to use to meet Water Quality Standards as well as recharge groundwater and help restore the Beneficial Uses of Receiving Waters in the SAR. The report includes the expansion of existing SAR maps to include lined and unlined channels and streams within the SAR Permit area with the goal of identifying those segments of existing stream channels that may be vulnerable to development impacts. The channels and streams were categorized into five classifications:

- Engineered, Fully Hardened, and Maintained (EFHM);
- Engineered, Partially Hardened, and Maintained (EPHM);

- Engineered, Earthen, and Maintained (EEM);
- Not Engineered and Earthen (NEE); and
- Natural (NAT).

A desktop study was conducted categorizing each individual stream channel segment into one of the above groups. The desktop study included an examination of as-built plans and aerial photography. The segments that were in question based on limited desktop information were field verified to confirm the classification identified. Field verification included visiting an accessible location along the segment of stream channel. Photographs and notes were taken in regards to the stream channel segment condition and armoring. Any stream channel facilities that could not be accessed and/or were still in question were discussed and verified with the Permittees of facility jurisdictional responsibility. A Rapid Geomorphic Assessment (RGA) to identify a potential susceptibility to adverse impacts from Hydromodification was not performed as part of the field visits as these visits were performed to only verify a channel classification, and only for sites where the classification needed to be verified based on limited desktop information.

As part of the WAP, the Hydromodification Susceptibility Report and Mapping must be incorporated into the Geodatabase. The Hydromodification Susceptibility Report and Mapping is located in Appendix A of this document.

### 3.6.5 Risk Assessment and Project Prioritization

The HMP Evaluation Program, the Causes of Degradation and Aggradation technical memorandum and the Hydromodification Susceptibility Documentation Report are useful tools to observe a specific watercourse, perform a desktop analysis of potential causes and classify flood control infrastructure. However, in order to commit resources to a specific study, project, or retrofit, a potential risk needs to be established or observed. It is important that any potential projects be evaluated based on risk, public need and prioritized through the existing flood risk reduction process.

The RCFC&WCD, as part of its annual budget process, holds public budget hearings for the purpose of receiving flood control project requests. At this time the public can also request projects for beneficial use preservation and restoration and mitigation of environment impacts of hydromodification.

These public hearings are held in a centrally located public place in each of the District's seven tax Zones. Each Zone has three Flood Control Commissioners (or Zone Commissioners) who are zone residents. These Commissioners are appointed by the Board of Supervisors and serve without compensation.

Any individual, or representative of any business, organization, or government entity, may make a request for a flood control project by appearing at the budget hearing for the appropriate Zone, or by submitting a written request to the Flood Control District, preferably before the hearing. Support for currently budgeted projects may also be offered. Written project requests should include the location and nature of the problem and the degree of damage (i.e., are residences or businesses actually flooded, etc.).

After the public hearing, the District staff prepares cost estimates of all newly requested projects, as well as ongoing projects, and then prioritizes them on the basis of public need, necessity and available funds. A draft budget is then prepared by District staff and is presented to the Commissioners at a second public meeting (Work Session). At the Work Session, the Commissioners review the draft budget in detail with District staff and make adjustments, as they deem appropriate before making a recommendation for approval. The Work Session is a public meeting and there is opportunity for public comment, however, the Commissioners do not accept or consider requests for additional new projects at this session.

In June, a final draft proposed budget, approved by the Zone Commissioners, is forwarded to the District's Board of Supervisors for final approval concurrently with the County of Riverside's budget.

## 3.7 Geodatabase

The WAP includes development and implementation of the Geodatabase. This web-based interactive planning tool will assist applicants and agencies in planning development that meets the requirements of the 2010 MS4 Permit through the integrated use of both LID strategies and regional planning. The Geodatabase will be useful not only for New Development, but for identifying opportunities for infill development and retrofit of existing hardscapes that will provide Urban Runoff capture and related water quality, flood control, and environmental benefits. The integration of the WAP and the Geodatabase will be developed in coordination with groundwater managers, Permittees, and the Chino Basin Water Master, so that the water supply and associated environmental and public benefits are recognized and incorporated into region-wide planning efforts.

The principles the integration of the Geodatabase into the WAP will build upon and leverage are: a) data and online platforms compiled as part of mapping efforts related to HCOC (stream erosion and hydromodification), b) studies conducted by the Chino Basin Watermaster that highlight benefits and opportunities associated with infiltration of stormwater (water quality and water resources), c) GIS-based tools and technologies developed by stormwater agencies, consulting professionals, and environmental special interest organizations, d) land use data developed by planning agencies and f) other potential data sources.

The Geodatabase currently incorporates stormwater and groundwater related information, topography, parcel and right-of-way information, soils, Federal Emergency Management Agency (FEMA) flood hazard areas, as well as habitat and species information for the entire County. The Geodatabase locates the Permittee facilities including basins, levees, spreading grounds, dams, and other related facilities. The Geodatabase also identifies the project site's Hydrologic Unit, pollutants of concern, environmental constraints, and groundwater depth if available. The online map will eventually be accessible by the public with limited access depending on the role the person has in the project. The online Geodatabase provides template functionality for WQMPs, as well as important requirements regarding the DAMP, LID, and TMDLs. Additionally, regional BMP retrofit studies, plans, and improvements along with other planning tools, such as RCA protection plans, Prado Basin activities, and groundwater related information will also be incorporated into the Geodatabase. The Geodatabase will be updated regularly to provide current information.

# 4 Independent Regional Efforts

## 4.1 Regional Watershed Efforts

In addition to the Programs required by the 2010 MS4 Permit, there are separate independent regional organizations and planning efforts in the SAR that have, or could have, overlapping objectives with MS4 Permit compliance programs. Regional efforts evaluated for cooperative opportunities are summarized below. Independent efforts include Stormwater Quality Standards Task Force (SWQSTF), SAWPA, IRWMP, Chino Basin Master Plan, Western Riverside County Conservation Authority (RCA), groundwater protection procedures and Water Conservation.

### 4.1.1 Stormwater Quality Standards Task Force

SWQSTF is an example of one stakeholder group that participates in watershed planning. SWQSTF includes representatives from the Regional Board, Orange, Riverside and San Bernardino Counties, Cities, environmental special interest groups, and others interested in water quality issues within the Santa Ana River Watershed. The SWQSTF was formed in 2003 to assist the Regional Board in providing the scientific and technical basis for modifications to existing bacterial indicator quality objectives for recreational uses. They have led recommendations for changes in recreational use designations and implementation strategies, specifically related to the standards regarding body contact with water during recreational activities where ingestion of water is reasonably possible. These uses include, but are not limited to swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and uses of natural hot springs inclusive of the entire Santa Ana River Watershed and coastal waters. Water contact implies a risk of waterborne disease transmission and involves human health. Accordingly, criteria that are more stringent are required to protect this use than criteria for more casual water-oriented recreation. The SWQSTF has also led a basin-wide assessment of the current conditions of Receiving Waters, the nature of recreational uses, and areas where additional data or information is needed. Santa Ana Watershed Project Authority (SAWPA) is a member of the SWQSTF and serves as the group administrator. The SWQSTF is working toward integration of water quality standards in the entire Santa Ana River Watershed.

### 4.1.2 Integrated Regional Water Management Plan– "One Water One Watershed"

SAWPA, a member and administrator of the SWQSTF, plays an integral role in protecting and restoring the water resources of the Santa Ana River Watershed. SAWPA has implemented an Integrated Regional Water Management Plan (IRWMP) to help restore and create a sustainable Santa Ana River. IRWMP is a fundamental plan which integrates a comprehensive planning tool to educate everyone involved in the 2010 MS4 Permit on the logistics of water supply and demand. An understanding of where water originates and how it is used helps resolve the water supply issue by increasing awareness and responsibility with the public. The method for resolving the water supply issue is through water quality permits and use of effective tools such as the Geodatabase. The main goal of this plan is to have a drought-proofed, salt-balanced watershed that supports economic and environmental vitality in the year 2030. The IRWMP unites the watershed and

coordinates expertise, efforts, and resources to accomplish a sustainable environment. The plan addresses all water-related problems and capitalizes on SAWPA Member Agencies' successful reputation in watershed-wide planning and problem solving. It envisions a single unified submittal to the State, engenders a collaborative approach to solving problems, allows influence on projects over which the Permittees have no authority, and addresses systematic and long-term needs.

Due to the dwindling natural potable water supply and increased water demand from population growth and urban development, the need for a sustainable water balance solution becomes more evident every day. Regional partnerships have expanded throughout the Santa Ana River Watershed to develop a solution for this problem. The Integrated Regional Water Management Plan also known as One Water One Watershed (OWOW), has identified the four major threats as reduction in water supplies from climate change combined with increased water needs; continuing drought in the Colorado River Region resulting in reductions of imported supply due to upper Santa Ana River Basin entitlements and continued long-term drought; reduction or loss of supply due to levee failure or changing management practices in the Delta Sacramento/San Joaquin Delta; and, interruptions in hydrology and groundwater recharge caused by population growth and development. To attain the long term Year 2030 vision for the Santa Ana River Watershed that is drought-proofed, salt-balanced, and supports economic and environmental viability, the next generation of IRWMP must be implemented. The IRWMP or OWOW Plan, is located at the following link: www.sawpa.org/owow/the-plan/. Updates and planned activities will be included in the online Geodatabase so the Permittees can monitor and include the ongoing activities of the IRWMP.

### 4.1.3 Chino Basin Master Plan

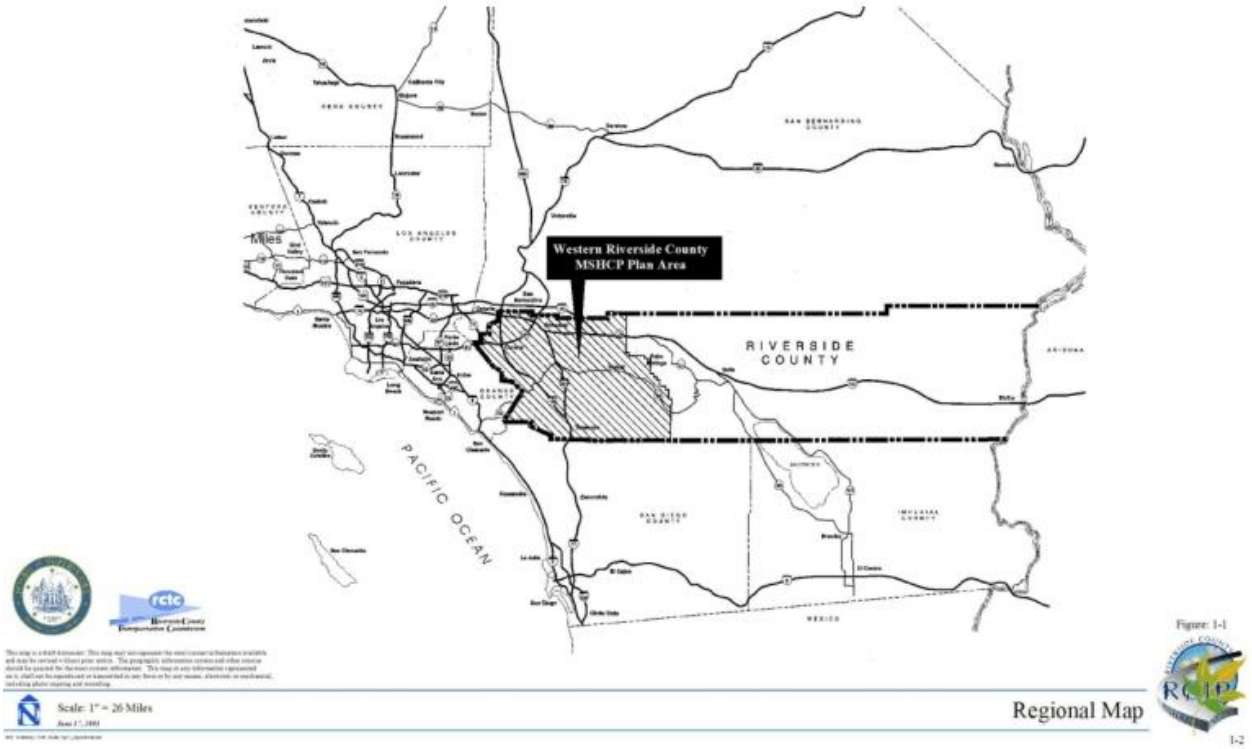
The Chino Basin Master Plan evolved from an integrated renewable energy plan, including organics management, biosolids, and regional co-composters, into a regional plan to also include managing water use and protecting and improving open space and wildlife habitat in this quickly urbanizing area. Improvements to the water treatment and delivery systems, Prado Basin activities, stormwater BMPs, natural treatment systems for water quality improvement, LID concepts, local development proposals, and recreation and trail systems are now being incorporated into the master plan. Dairy waste runoff, increased soil erosion, and increased stormwater flows with their resultant pollutants, have not only degraded water quality, but have also caused channel incision, loss of habitat, decreased infiltration and increased flooding within the Chino Basin. Continuation and expansion of these practices necessitates implementing sustainable approaches to LID and implementing barriers to control the entrance of contaminants and high flows into Receiving Waters. The inclusion of natural treatment approaches to water quality improvement and flood flow reduction will provide opportunities for important habitat improvements and valuable passive and active recreation opportunities. The Chino Basin Master Plan also contains a Salt Management Program to eliminate water quality problems in the Chino Basin associated with nitrogen salt. The Salt Management Program includes an ad-hoc committee to review cooperative strategies set forth by the Regional Board. The goal of the Chino Basin Master Plan is to evaluate and refine opportunities for multiuse and multiple purpose projects that improve water quality, flood protection, habitat and recreation and to identify the steps to implementation of these projects. Updates and planned activities will be included in the online

Geodatabase so the Permittees can monitor and include the ongoing activities of the Chino Basin Master Plan.

### 4.1.4 Western Riverside County Regional Conservation Authority

Rapid population growth throughout Riverside County in the 1980s and 1990s led to traffic congestion, increasing endangered species, and a variety of other environmental degradation concerns. In order to address these rising impacts, the Western Riverside County Regional Conservation Authority (RCA) was created in 2004 to implement "one of America's most ambitious environmental efforts", known as the Multiple Species Habitat Conservation Plan (MSHCP). This plan aims to protect hundreds of native species of plants and animals and preserves a half million acres of their habitat. In conjunction with protecting the environment, the MSHCP allows the development and transportation infrastructure necessary for a healthy economy to move ahead without sacrificing the Santa Ana Region and Santa Margarita Region's environment and quality of life. The MSHCP is a unified plan to guide local development and provide for economic growth while protecting the environment. The Watershed Action Plan goal to preserve wetlands, riparian corridors, and buffer zones is met with the implementation of the MSHCP. A map of the area covered by the MSHCP is identified in Figure 2 below.

**Figure 2: MSHCP Map**




Source: MSHCP Website: http://www.rctlma.org/mshcp/volume1/sec1.html#1.1

The MSHCP was adopted by Riverside County and the Cities of Banning, Beaumont, Calimesa, Canyon Lake, Corona, Hemet, Lake Elsinore, Menifee, Moreno Valley, Murrieta, Norco, Perris,

Riverside, San Jacinto, Temecula, and Wildomar. In addition, the District, Riverside County Parks and Open Space District, Riverside County Waste Management Department, Riverside County Transportation Commission (RCTC), California Department of Transportation (Caltrans), and the California Department of Parks and Recreation also participated.

According to the RCA, the MSHCP covers 1.26 million acres of western Riverside County, 40% of which is designated for preservation. Of that half million acres, 69% is already conserved as public or quasi-public land. The acquisition of the remaining land is one of the most important activities of RCA. To date, more than 27% of the remaining goal of 153,000 acres has been acquired. Altogether, Riverside County has reached 77% of the goal in the MSHCP.

While reserve acquisition is RCA's core activity, RCA must also monitor development or "habitat-loss" within the MSHCP, review applications for infrastructure or development projects by public agencies and other regional entities like electric and gas utilities, monitor the species being protected, and manage the lands it acquires. RCA generates revenue to facilitate these operations, as well as acquire additional land through fees from project proponents involved in construction or land development within any area specified as a "Criteria Area." According to RCA's website, "Any individual, business, or public agency wishing to construct a project within the Criteria Area covered by the MSHCP must obtain an approval from RCA and a permit for the project from the local agency responsible. Approved projects pay fees both for the review of the project, called Joint Project Review and for constructing the project itself." This is the nexus between the Permittees responsibility under the MSHCP, and measures implemented as part of the land use approval process as the Permittee reviews land use development applications in the MSHCP and comments on the measures appropriate for protection and mitigation in the MSHCP.

The MSHCP has identified habitat adjoining the core areas and linkages by which species could be expected to move from one area of conserved habitat to another. These areas of adjoining land and linkages are at the heart of the MSHCP. They comprise the area to which the MSHCP "criteria" are applied to and from which the 153,000 acres are being acquired. This Criteria Area has been divided into cells or cell groupings for organizational and evaluation purposes.

Every year, RCA issues an Annual Report to update its members and the public on its progress. RCA plays an integral role in the SAR. Additionally the Geodatabase WQMP Report links to the MSHCP website and identifies the parcel number, criteria cell, Area Plan and the sensitive habitats for the specific project site. The Geodatabase and WQMP Report can be used by both developers and plan checkers to either avoid the sensitive habitats or identify what areas would require habitat mitigation for development.

### 4.1.5 Groundwater Protection Procedures

The significantly increasing population in the SAR is putting a high demand on limited groundwater supplies. Much of the groundwater in the SAR is experiencing a buildup of salts, and many of the groundwater basins exceed water quality objectives or are projected to exceed water quality objectives in the future. This is primarily a result of salts added by historic irrigated agriculture, historic municipal and industrial discharges, historic and current dairy operations, and the increase in salt concentrations resulting from reuse and recycling of groundwater. The Regional Board initiated a total watershed approach for salt control beginning with the 1975 Basin Plan. The Total Dissolved Solids (TDS) Management Plan, developed through extensive ground

and surface water modeling of the Middle, Upper Santa Ana River, and Elsinore/San Jacinto River Basins, contains specific water supply, wastewater, and groundwater management plans for the Region in order to control salt loadings from residential, commercial, industrial, and agricultural sources. Groundwater issues, protection plans, and recharge locations will be included in the Geodatabase to allow the Permittees to access and track this vital information. The District is coordinating with water agencies in the permit area to ensure the protection of groundwater resources. As this information is obtained, it will be integrated into the Geodatabase so that plan checkers can use the Geodatabase in review of WQMPs in the land use approval process to ensure groundwater resources are not impacted by development.

Additionally, SAWPA has developed an interactive water quality map allowing users to review areas which contain water quality objectives within specific groundwater management zones throughout the watershed. With a valid login, users may view groundwater management zones containing TDS concentrations which exceed Beneficial Use Objectives and well concentrations for TDS throughout the different groundwater management zones. The online map can be found by visiting SAWPA at the following site www.sawpa.net/ .

### 4.1.6 Regional Water Conservation

The significantly increasing population and decreasing water supply in the SAR is putting a high demand for improving our ability to capture and reuse stormwater. The Permittees are working together to determine locations, type of projects, and funding for water conservation projects. Water Conservation Projects include wetland projects, floodplain acquisition, restoration and recharge projects. Water conservation projects will be incorporated into the Geodatabase upon approval by the Permittees.

# 5 WAP Coordination and Priorities

The WAP is structured to help the Permittees and stakeholders collaborate with existing programs to take a holistic approach toward watershed management within the Santa Ana River Watershed. Some of the plans such as the DAMP, LIPs, CMP, WQMP, and the Geodatabase required by the 2010 MS4 Permit provide guidance for the entire Santa Ana Region. The CNRP, CBRP and Hydromodification Management Plans are subwatershed specific and provide guidance for major priorities in the Santa Ana Region. In addition to the Programs required by the 2010 MS4 Permit, there are separate independent efforts in the SAR that are efficient and effective. It is important to be aware of these independent efforts so that regional coordination can be considered during the development process.

The development process below addresses the necessary steps for incorporation of WAP measures throughout the development process by a Co-Permittee.

Understanding the watershed benefits of any implementation strategy is critical before decisions are made about prioritizing projects. Pollutant removal may be evaluated through the guidance in the CNRP and CBRP to provide a better understanding of the benefits that different BMP placement strategies will have upon Receiving Waters. Understanding what the Pollutants of Concern are and where high pollutant concentrations are located will assist in establishing priorities. In addition to the CNRP and CBRP, becoming familiar with the hydromodification documents will help identify potential causes of degradation and aggradation and assist in protecting susceptible reaches from potential hydromodification impacts resulting from urbanization in the SAR.

## 5.1 Development Process Overview

**Initial Development Project Meeting with Co-Permittee Staff**

The first presentation of a New Development project typically takes place in an initial meeting with the Co-Permittee staff. In the meeting, the development project proponent presents the scope and location of the project proposed. Preliminary plans for the project are presented, and Co-Permittee provides initial input about the project as well as makes a determination of whether or not the proposed project is appropriate.

At this stage, the necessity for a Water Quality Management Plan may be referenced. The Co-Permittees will use the Water Quality Management Plan Guidance Document and Template for direction to the WAP and associated Geodatabase to assist in accomplishing an integrated watershed management approach to project development and ultimately improve water quality.

The Geodatabase aids staff in identifying the physical characteristics of the project site, as well as identifying the associated existing regional studies.

Once the Project-Specific impacts have been explored, the Co-Permittee staff may make Project-Specific recommendations to the proponent.

**Project Submittal (Pre-Approval)**

Once Co-Permittee staff has completed initial project evaluation/consultation with the developer, a preliminary WQMP (if applicable) is submitted. Preliminary WQMPs identify the potential water quality measures that will be incorporated into the project design.

The project proponent should utilize the Geodatabase to provide guidance in development of project features which demonstrate consistency with coordinated development and management of water and land resources. .

The preliminary WQMP for the project will be evaluated by appropriate Co-Permittee staff. If the preliminary WQMP is deemed to be adequate, the water quality design of the project will then be deemed a complete filing (assuming all other submittal requirements have been met) and would move forward into the entitlement process.

**CEQA Analysis**

Discretionary development projects are subject to review under CEQA. CEQA analysis covers environmental effects of a project, including potential impacts to water quality. The primary vehicle for CEQA analysis is the CEQA initial environmental study checklist [Initial Study (IS) or CEQA checklist]. An IS is performed and if substantial impacts are identified, an Environmental Impact Report (EIR) is then prepared. If identified impacts are non-significant or non-significant once mitigation is applied, a Negative Declaration is prepared.

The preliminary WQMP should be considered during the CEQA analysis to assist in assessing the level of project impact and the formulation of effective mitigation measures. Evaluation guidelines pertaining to water quality impacts should be prepared by the local agencies to standardize the analysis of this part of the IS or EIR.

**Project Approval**

In addition to the CEQA analysis, the project will be reviewed by all affected agencies and departments for their specific project approval requirements. At the end of this review, the Permittee staff will assemble all necessary conditions of approval, required mitigation measures and design considerations, and assist the project proponent in developing the final project design that can be approved by the lead agency subject to these conditions and mitigation measures. The project recommendations should be coupled with the specific water quality requirements the project will need to implement at the project site. The recommendations and identification of water quality requirements will be documented in the WQMP noted in the conditions of approval and included in the approved final project design.

**Final WQMP**

Once the final design of the project has been issued entitlement approval subject to conditions, the Final WQMP is developed in collaboration with the final designs of the project and is usually submitted to the Co-Permittee with the grading plan prior to issuance of a grading permit. The Final WQMP should substantially conform to the preliminary WQMP.

The Final WQMP should consider any design changes required from the time of the preliminary WQMP and also address any new impacts that were identified in the CEQA process. The Final WQMP must obtain approval from appropriate agency staff prior to the construction phase of the project.

**Grading Plan**

Once a final design of the project is developed, a grading plan is submitted to the Co-Permittee for review and approval. The grading plan components include:

- Detailed Grading Plan;
- Elevations, dimensions, location, extent, and slope of proposed grading;
- Approved Tentative Map or Site Plan;
- Preliminary Title Report;
- Soils Report;
- Hydrology and Hydraulics Study; and
- Grading and Erosion Control Plan.

The Grading Plan must receive review and approval from Co-Permittee staff prior to the construction phase of the project.

## 5.2 Watershed Priorities

As discussed in the WAP, programs which address groundwater recharge, water quality, flood risk and hydromodification typically work independently but achieve similar goals. The WAP has evaluated the MS4 programs and other regional independent efforts to identify all collaboration opportunities through the Geodatabase. The development process allows the WAP and Geodatabase to be utilized during the development of a WQMP and implemented to the MEP. The Geodatabase provides an opportunity for the Permittees to evaluate each program and look for areas of collaboration and integration that could achieve multiple goals and address regional water quality issues.

Integrated solutions, such as the CNRP and CBRP, are always considered. When major opportunities are presented to address multiple issues, major resources are established. Such resources come in the form of stakeholders, permits, real estate, funding, grants and time. The CNRP and CBRP are important tools to achieve water quality and are major priorities for the Permittees. Major resources are currently allocated to these efforts.

The WAP also mentions many hydromodification documents that have been developed to aid in identifying potential causes of degradation and aggradation and will assist in protecting Beneficial Uses from potential hydromodification impacts resulting from urbanization in the SAR.

In addition to the existing plans and programs mentioned throughout the WAP, the Permittees will continue to assess water quality and hydromodification risks to public health and safety in order to properly prioritize watershed projects. The goal for the plans and programs discussed within the WAP is to protect and improve water quality through an integrated watershed management approach.

Lastly, the Permittees will continue to participate in several studies in conjunction with the Stormwater Monitoring Coalition (SMC), SWQSTF, the Lake Elsinore and Canyon Lake TMDL

Task Force, the Middle Santa Ana River (MSAR) TMDL Task Force, and Southern California Coastal Water Research Project (SCCWRP) to address the elevated Pollutant levels.

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# Appendix A: Hydromodification Susceptibility Documentation and Mapping Report

# Appendix B: Santa Ana Watershed BMP Retrofit Assessment

# Appendix C: Comprehensive Bacteria Reduction Plan (CBRP)

# Appendix D: Comprehensive Nutrient Reduction Plan (CNRP)

# Appendix E: Hydromodification Management Plan

# Appendix F: Causes of Degradation and Aggradation Technical Memorandum

# Appendix G: Hydromodification Management Plan Program Evaluation

# Appendix H: Subwatershed Fact Sheets