1.3 Section 303(d) Listings and Total Maximum Daily Load Overview

In 1996 the lowest 3.5 miles of Chollas Creek was placed on the Section 303(d) list by the San Diego Regional Water Quality Control Board for Diazinon, dissolved cadmium, dissolved copper, dissolved lead, and dissolved zinc for toxicity in storm water. The watershed was listed for indicator bacteria in 2002. The 2006 proposed Section 303(d) list removed cadmium based on a re-evaluation of the data used for the original listing.

Federal law requires the Regional Board to develop TMDLs for waters on the Section 303(d) list. The purpose of a TMDL is to attain applicable water quality objectives and to restore the beneficial uses of impaired waters. As shown on Figure 1-12, the receiving waters of Chollas Creek above the tidal prism (shown in purple) are currently under a TMDL for the organophosphate pesticide Diazinon adopted on August 14, 2002 (Resolution No. R9-2002-0123). The implementation of the *Chollas Creek TMDL for Diazinon* (Diazinon TMDL) was initiated with a phase-out and full ban on non-agricultural use of Diazinon-based pesticides and fertilizers. The results to date indicated the ban has been effective, and concentrations are trending downward. TMDLs for dissolved copper, lead, and zinc were adopted for inclusion in the Basin Plan on October 22, 2008, by the OAL and United States Environmental Protection Agency (USEPA). TMDLs are currently being finalized for indicator bacteria in Chollas Creek Watershed. TMDLs are also being developed at the mouth of Chollas Creek (San Diego Bay Shoreline for benthic community effects and sediment toxicity).

Table 1-2 presents the Section 303(d) listing for Chollas Creek above the tidal prism that corresponds to the two branches of the creek highlighted in purple on Figure 1-12. The mouth of Chollas Creek, as shown in red on Figure 1-12, is 303(d) listed for sediment toxicity and benthic effects. The designated beneficial uses, as listed in the Basin Plan for Chollas Creek, include REC-2, WARM, and WILD. The Basin Plan also includes a potential REC-1 beneficial use. These beneficial uses have been defined in the Dissolved Metals TMDL and the Indicator Bacteria TMDL.

Table 1-2. Beneficial Uses and Section 303(d) Listings in the Chollas Creek Watershed

Beneficial Uses (Chollas Creek Watershed, tributary to San Diego Bay)	**Chollas Creek** (3.5 miles)	**Creek Section 303(d) Pollutant**	**San Diego Bay**	**San Diego Bay Section 303(d) Stressor** (a)
Contact water recreation (REC-1)	o	Dissolved copper(1)	•	Sediment toxicity
Non-contact water recreation (REC-2)	•		•	
Warm freshwater habitat (WARM)	•		–	
Wildlife habitat (WILD)	•		•	
Rare, threatened, or endangered species	–	Dissolved lead(1)	•	
Marine habitat	–		•	
Migration of aquatic organisms	–		•	
Preservation of biological habitats of special significance	–	Dissolved zinc(1)	•	Benthic community effects
Estuarine habitat	–		•	
Shellfish harvesting	–	Indicator bacteria	•	
Industrial service supply	–	Diazinon(2)	•	
Commercial and sport fishing	–		•	
Navigation	–		•	

• Existing beneficial use o Potential beneficial use – Not applicable

1. These pollutants are on the 2006 Section 303(d) List of Water Quality Limited Segments for the San Diego Bay. In 1996, Chollas Creek was also listed for cadmium, but this pollutant was delisted in 2006.
2. Diazinon was added to the Section 303(d) List in 1996. The Diazinon TMDL was developed in 2002 to address the contribution of this organophosphate pesticide to storm water toxicity.

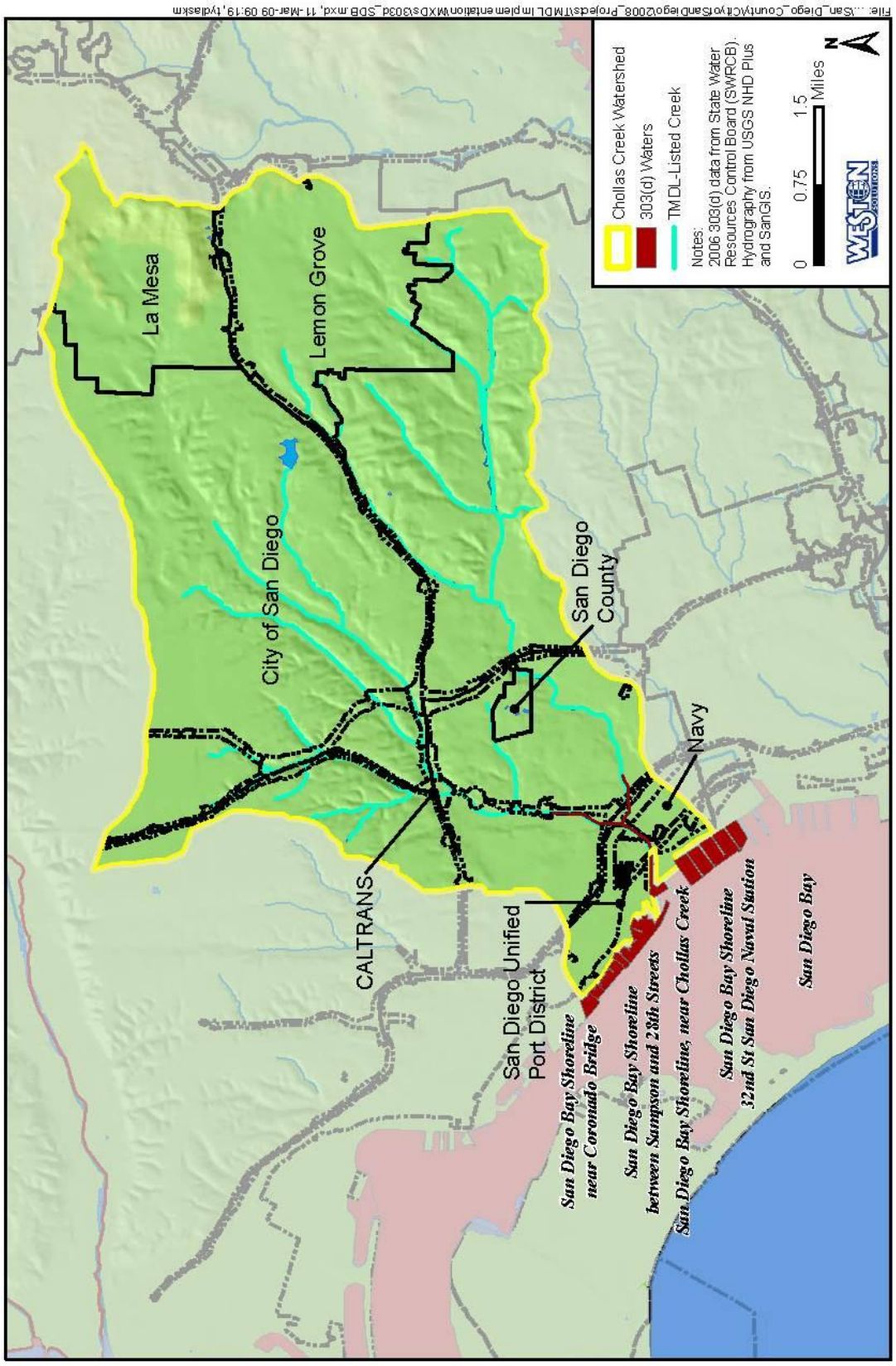

Figure 1-12. Extent of Section 303(d) Listings Overlain with Extent of Total Maximum Daily Loads in the Chollas Creek Watershed (data from the 2006 State Water Resources Control Board 303(d) GIS layer)

1.3.1 Wasteload Allocations

The USEPA has a policy for establishing WLAs for storm water discharges in TMDLs approved or established by USEPA (Wayland, Pers. Communication, 2002). The policy also established the water quality-based effluent limits and conditions in NPDES permits based on the WLAs for storm water discharges in TMDLs. The policy states that USEPA recommends that for NPDES-regulated municipal and small construction storm water discharges, effluent limits should be expressed as BMPs or other similar requirements under specified circumstances, rather than as numeric effluent limits (USEPA, 1996). The Interim Permitting Approach Policy recognizes the need for an iterative approach to control pollutants in storm water discharges. Specifically, the policy anticipates that a suite of BMPs will be used in the initial rounds of permits and that these BMPs will be tailored in subsequent rounds. The USEPA policy has been incorporated into this Implementation Plan through the iterative and phased Integrated TMDL Watershed Approach.

1.3.1.1 Dissolved Metals Wasteload Allocations

The USEPA established numeric criteria for toxic pollutants, which through promulgation of the California Toxics Rule, form applicable water quality objectives for dissolved copper, lead, and zinc. These water quality objectives are the basis for the Chollas Creek Dissolved Metals TMDL (Table 1-3). The WLAs of the Dissolved Metals TMDL are concentration-based and include an explicit 10% margin of safety that takes into account any uncertainties in the TMDL calculation. The WLAs for dissolved copper, lead, and zinc are equal to 90% of the California Toxics Rule chronic and acute criteria. The TMDL also includes an implicit margin of safety due to the conservative assumptions used in developing the criteria for the California Toxics Rule (Stephan et al., 1985). As a concentration-based TMDL, compliance is not driven by total loads (i.e., flow based), but rather by a measured concentration in the waterbody for which the TMDL applies. Unlike loads, which typically apply in the downstream portions of the watershed, these concentration-based WLAs apply to the entire receiving waters of the Chollas Creek Watershed.

Table 1-3. Water Quality Objectives for Specified Metals in the Chollas Creek Watershed

Metal	Numeric Target for Acute Conditions	Numeric Target for Chronic Conditions
Copper (dissolved)	(0.96) * {e^ [0.9422 * ln (hardness) - 1.700]	(0.96) * {e^[0.8545 * ln (hardness) - 1.702]
Lead (dissolved)	{1.46203 – [0.145712 * ln (hardness)]} * {e^ [1.273 * ln (hardness) - 1.460]}	{1.46203 – [0.145712 * ln (hardness)]} * {e^[1.273 * ln (hardness) - 4.705]}
Zinc (dissolved)	(0.978) * {e^ [0.8473 * ln (hardness) + 0.884]}	(0.986) * {e^[0.8473 * ln (hardness) + 0.884]}

Hardness is expressed as milligrams per liter.
The natural log and exponential functions are represented as "ln" and "e," respectively.

The California Toxics Rule equations are based on hardness, a measure of the mineral content of water. As shown on Figure 1-13, there is an inverse relationship between hardness and toxicity. The water toxicity threshold (and WLA) increases with increased hardness. As hardness increases, charged constituents (e.g., dissolved metals) bind with a greater concentration of minerals making them less bioavailable to aquatic organisms. Therefore, increased hardness results in a decrease in bioavailability and thus a higher WLA. Natural buffering mechanisms that would increase hardness are not present in many segments of the creek due to the urbanized nature of the Chollas Creek Watershed and the channelization of a large portion of the creek. The

lower hardness generally observed in wet weather storm flows increases the WLA. Therefore, the required reductions in dissolved copper, lead, and zinc concentrations in receiving waters are greater during wet weather events. The design constraints are discussed further in Section 3.0. The observations for dry weather flows have indicated that hardness is generally higher in these flows. The hardness may be the result of the higher mineral content of piped potable water used for irrigation and other activities that result in urban runoff.

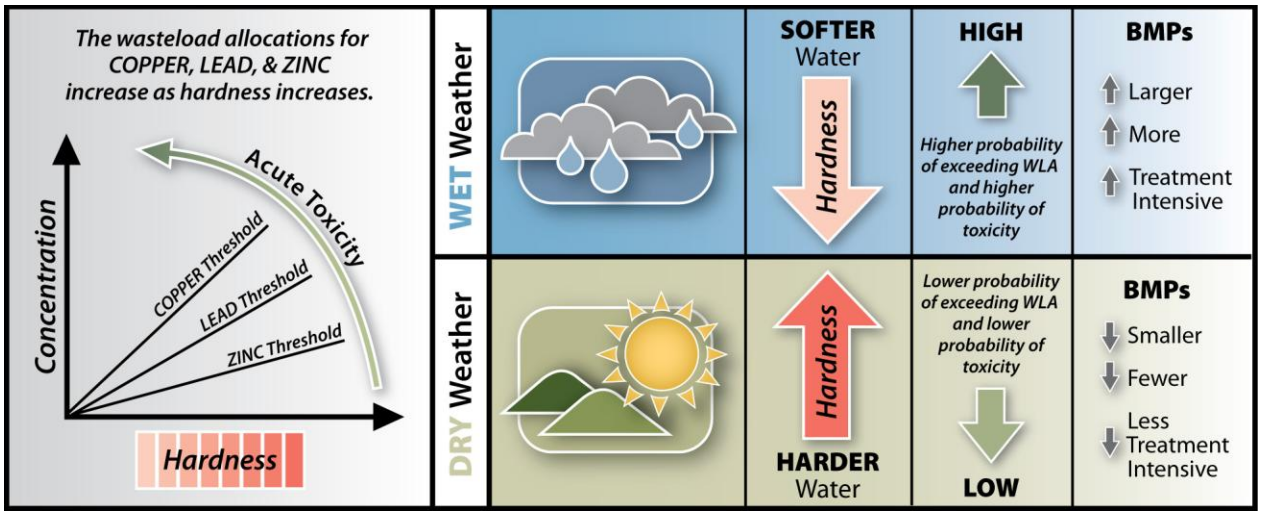

Figure 1-13. Impact of Hardness as a Dominant Variable in the Dissolved Metals Total Maximum Daily Load

1.3.1.2 Diazinon Wasteload Allocation

The WLA for Diazinon are concentration-based numeric targets that were derived from the California Department of Fish and Game Freshwater Water Quality Criteria. The acute Water Quality Criterion of 0.08 µg/L protects aquatic life from short-term exposure to Diazinon, whereas the chronic criterion of 0.05 µg/L protects aquatic life from long-term Diazinon exposure. All allocations were set at 90% of the numeric targets, based on an explicit 10% margin of safety to account for uncertainties in the TMDL analysis. The resulting Diazinon WLA is set at 0.072 µg/L for acute exposure conditions and 0.045 µg/L under chronic exposure conditions. The Implementation Plan for addressing the Diazinon TMDL is based on a nationwide ban on the retail sale of the pesticide effective on January 1, 2005. Diazinon concentrations have been steadily declining at the Chollas Creek Mass Loading Station SD8(1) since 2002. There have been no exceedances of the acute or chronic water quality objective for Diazinon over the past two wet weather monitoring seasons (Figure 1-14).

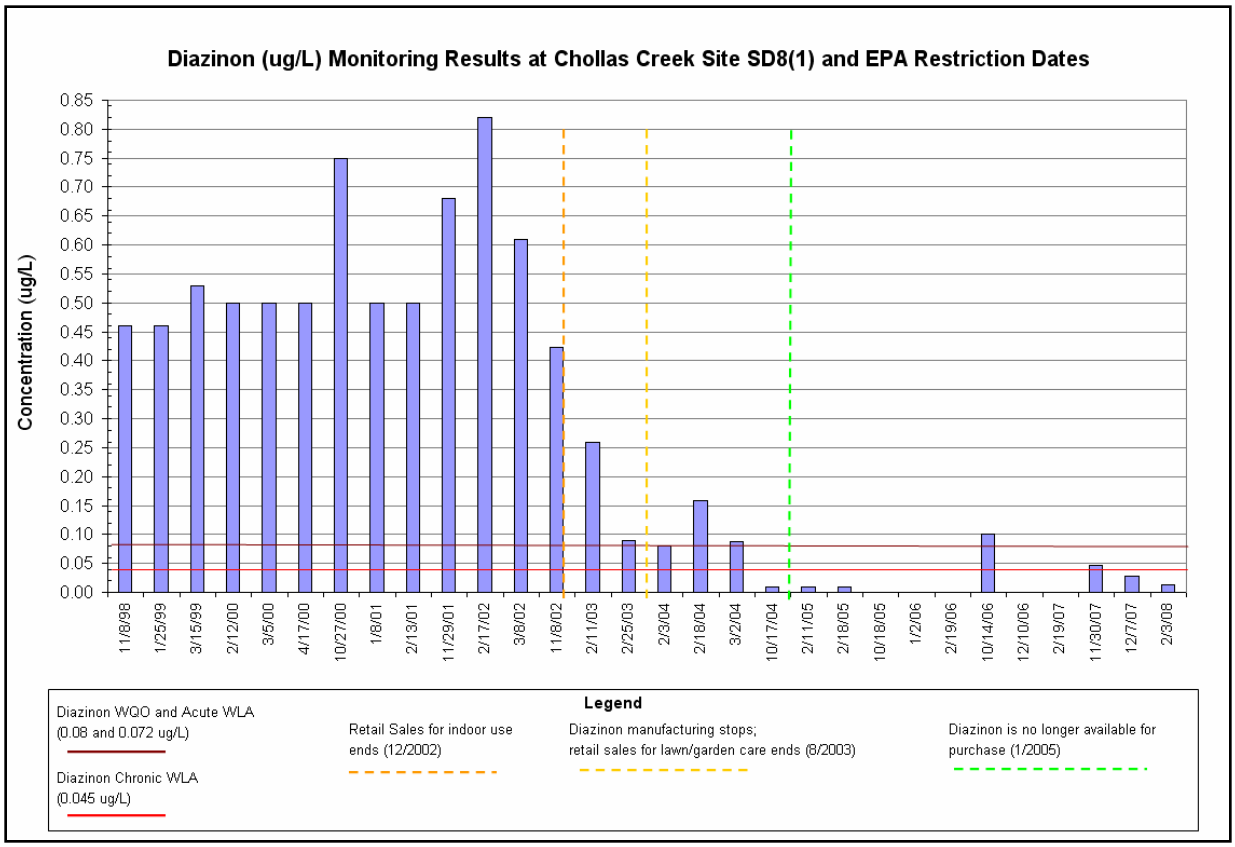

Figure 1-14. Diazinon Concentrations at Chollas Creek Mass Loading Site SD8(1)

1.3.1.3 Pending Indicator Bacteria Total Maximum Daily Load

The Chollas Creek Watershed has also been listed in the Indicator Bacteria TMDL (San Diego Regional Board, 2005). The Regional Board is proposing a Basin Plan amendment to add the TMDL for bacteria, but at present, the Indicator Bacteria TMDL is still in process. The draft Indicator Bacteria TMDL was reviewed by the State Water Resources Control Board and returned to the Regional Board for revision. A revised draft TMDL is anticipated in 2009.

1.4 Integrated Total Maximum Daily Load Watershed Approach

As stated above, the Integrated TMDL Watershed Approach developed for this Implementation Plan is a holistic planning strategy that considers multi-pollutant water quality issues at both the local and watershed levels to achieve the following:

- Meet the WLAs for dissolved copper, lead, and zinc and integrate these efforts to address additional Section 303(d) listed impairments such as indicator bacteria and Diazinon as well as other priority water quality problems.
- Minimize the adverse environmental effects in the Chollas Creek Watershed.
- Integrate the Dissolved Metals TMDL Implementation Plan with watershed and jurisdictional storm water programs and other TMDL programs, as appropriate and feasible.
- Have a long-term, cost-savings benefit by reducing the need to retrofit existing BMPs to address future TMDLs.

This section provides an overview of the Integrated TMDL Watershed Approach. This approach is an integrated, tiered, and phased strategy for the planning, implementation, and assessment of watershed activities in the Chollas Creek Watershed. An in-depth description of the Integrated TMDL Watershed Approach and the associated implementation tools is presented in Appendix D.

1.4.1 Initial Assessment

The Initial Assessment component of the Integrated TMDL Watershed Approach consisted of collecting, compiling, and assessing existing water quality data and then identifying and prioritizing priority water quality problems. The two key planning documents developed from this process were the Priority Sources of Priority Pollutants Table(s) and the Priority Sector Map. These documents helped Dischargers prioritize watershed activities for Phase I implementation (Tool A of Appendix D).

1.4.2 Planning

The Planning component consists of identifying, prioritizing, and planning the implementation of watershed activities to meet the dissolved metals WLAs and to address Diazinon, bacteria, trash, and other priority water quality problems identified during the Initial Assessment process. Dischargers used planning tools B, C, and D (Appendix D) to complete Planning for the first five years of the 20-year TMDL Compliance Schedule (Phase I). In keeping with the adaptive management approach presented in this Implementation Plan, only the first phase of the Planning process has been presented at this time because Dischargers are evaluating the quality of the runoff coming off their jurisdictions to the Chollas Creek Watershed and the efficiency and effectiveness of different watershed activities that would be implemented in the first five years. By developing large suites of different types of watershed activities during early phases of the Implementation Plan, Dischargers will be able to assess the effectiveness of the activities to determine a smaller subset of the "best" programs which may be implemented on a larger scale during subsequent phases. Although the basic framework of the Implementation Plan is not anticipated to change, the schedule is tentatively structured to have three phases of watershed activity implementation. Dischargers will use the Integrated TMDL Watershed Approach for the planning, implementation, and assessment of subsequent phases of watershed activities.

Watershed activities are operationally defined as BMPs that prevent, control, or treat constituents in urban runoff to lessen overall environmental impacts. They are classified into three tiers of BMPs. Tiers are defined according to the relative efficiency of pollutant removal from the system (based on a literature review), level of infrastructure required for implementation, and cost, as follows:

- **Tier I Non-Structural BMPs—**Tier I BMPs focus on non-structural source control and pollution prevention measures. Pollution prevention activities include behavior changing activities such as public outreach and education and increased inspection of identified sources. Source control activities include erosion controls. These activities are typically targeted at specific pollutant sources and/or land uses. Tier I activities also include source and design studies that will aid in the further identification of pollutant sources and provide design parameters for construction of effective inline treatment systems (Tier III BMPs).

- **Tier II Structural BMPs—**Tier II includes structural BMPs such as infiltration basins, bioretention, and LID techniques to reduce wet weather and dry weather runoff volumes and further reduce pollutant entry into the Chollas Creek Watershed.
- **Tier III Restoration and Treatment BMPs—**Tier III BMPs are infrastructure-intensive structural pollution reduction treatment measures that typically require significant capital investment and/or have impacts on surrounding communities. These activities can also include integrated restoration projects that restore stream habitat and improve water quality or include natural treatment systems.

The tiered aspect of the Integrated TMDL Watershed Approach stems from these three BMP classifications. Dischargers typically selected and developed Tier I and Tier II BMPs early in the TMDL Compliance Schedule. Tier III activities will be piloted during Phase I, but typically after the other Types of BMPs had reached a point of diminishing returns. Figure 1-15 depicts a potential watershed activity implementation program over the 20-year TMDL Compliance Schedule.

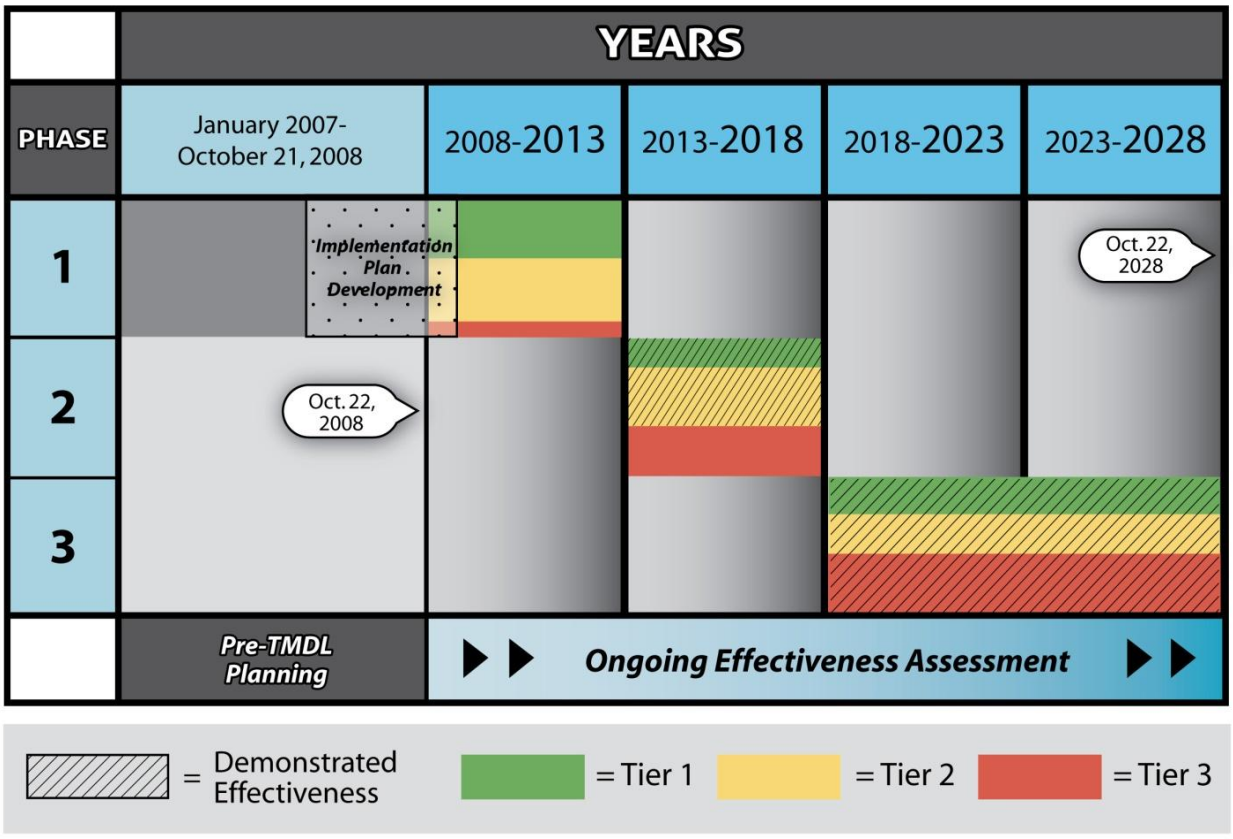

Figure 1-15. Phased Watershed Activity Implementation over the 20-Year Total Maximum Daily Load Compliance Schedule

1.4.3 Implementation and Effectiveness Assessment/Re-Evaluation

Dischargers planned and designed watershed activities so that the goals and objectives of the watershed activity can be assessed during implementation in Phase I. The framework for

watershed activity implementation is presented in Tool E, and the assessment framework is presented in Tool F of Appendix D.

1.4.4 Phases of the Implementation Plan

All Implementation Plan phases subsequent to Phase I will be based on the iterative nature of the Integrated TMDL Watershed Approach where priority management actions concurrently address identified activity goals, priority water quality problems, and identify emergent issues. This process occurs in parallel with ongoing effectiveness assessment projects. Based on the results of monitoring, Phase II watershed activities will be selected and implemented following the Integrated TMDL Watershed Approach. Therefore, Phase II BMPs are not well defined at this point, but will be selected from the General List(s) of Watershed Activities (Tool C of Appendix D) based on the assessment results. The Type of BMPs and overall approach to Phase I implementation in the following sections.

Phase I – Years 1–5
October 22, 2008–October 22, 2013
Overall, Phase I aims to implement a range of BMP projects designed to address identified priority water quality problems from a range of community, structural, and watershed-level activities. This will be achieved as Dischargers implement a range of Tier I, Tier II, and pilot Tier III BMPs to address the priority water quality problems and loading areas identified in the Initial Assessment component (Section 2.0). Dischargers have included specific Tier I and Tier II BMPs in their Watershed Activity Lists to achieve source control and pollution prevention. During Phase I, Tier III BMPs will be implemented on a pilot basis, typically in small isolated drainage areas where a specific pollutant source and type of treatment system has been identified. The planned Tier III BMP pilot projects are located in areas where the storage volume required is limited and the effectiveness of the BMP can be readily assessed. Therefore, implementation will provide a clear benefit to overall pollutant reduction.

Phase I also includes effectiveness assessments to measure the performance of specific BMPs, to assess the long-term performance of the program, and to identify existing pollutant source or BMP design data gaps. The goal is to maximize the effectiveness of Tier I and Tier II activities in Phase I to address pollutant reduction goals and guide the BMP priority rankings and implementation strategies in subsequent phases.

Phase II – Years 5–10
TMDL Milestone: 80% Reduction of Dissolved Metals WLA by October 22, 2018
Information gathered over the first five years of this program will be used to prioritize watershed activities for Phase II implementation. During Phase II, a range of Tier I and Tier II BMPs will continue to be implemented, but emphasis will be placed on the watershed activities that demonstrated to be both efficient and effective during Phase I. In order for Dischargers to meet the expected 80% reduction of Dissolved Metals TMDL milestone, the number of Tier III BMPs implemented during Phase II may potentially increase compared to the earlier years. These activities will address the high-priority pollutant and loading areas originally identified in the Initial Assessment component of this Implementation Plan and will reflect modifications recommended as a result of the effectiveness assessment and compliance monitoring conducted during Phase I.

Phase III – Years 10–20
TMDL Milestone: Attainment of Dissolved Metals WLA by October 22, 2028
Information gathered during Phase I and Phase II will then be used to prioritize watershed activities in Phase III. Phase III will also incorporate data and knowledge acquired during previous phases to prioritize specific Tier I and Tier II BMPs, characterize design parameters for structural BMPs, and identify data gaps. Although Phase III will continue the implementation of Tier I and Tier II BMPs, it is anticipated that Phase III will prioritize a larger proportion of specific Tier III BMPs.

As a result of the iterative and phased structure of the Integrated TMDL Watershed Approach, specific watershed activities for Phase II and Phase III implementation are not well defined. As described above, watershed activity planning for subsequent phases will be driven by an integrated information analysis of identified priority water quality problems, ongoing activity effectiveness assessments and compliance monitoring, and Discharger management decisions.

1.5 Total Maximum Daily Load Compliance Schedule

The current TMDLs for the Chollas Creek Watershed include specific compliance schedules. Table 1-4 presents the compliance schedule for the Chollas Creek Dissolved Metals TMDL. Table 1-5 presents the compliance schedule and actions for the Diazinon TMDL.

Table 1-4. Chollas Creek Dissolved Metals Total Maximum Daily Load Compliance Schedule

Action	Compliance Date
Submittal of TMDL Implementation Plan	October 22, 2009(1)
Initiate TMDL Monitoring Program	October 1, 2009
Reach 80% reduction of dissolved metals	October 22, 2018
Attain 100% compliance with Dissolved Metals TMDL	October 22, 2028

(1) October 22, 2008 is the date the OAL adopted the Dissolved Metals TMDL.

Table 1-5. Chollas Creek Diazinon Total Maximum Daily Load Compliance Schedule

Action	Compliance Date
Integrated Pesticide Management workshops	Annual
Monitoring Plan	December 2003
Diazinon Toxicity Control Plan	December 2003
Implement authorities	May 2003
Compliance with Permit	Ongoing
Submit reports	Annual

These TMDL Compliance Schedules can be integrated with the Compliance Schedule of the anticipated Indicator Bacteria TMDL.