10 CONCLUSIONS AND RECOMMENDATIONS

10.1 Surface Water Hydrology

The results of the assessment indicated that a number of areas in the lower watershed are subject to flooding from the breakout of 100-year storm flows from the San Diego River. The extent and severity of flooding could dramatically increase as a result of the 2003 Cedar Fire, particularly in the Lakeside, Santee, and San Diego areas. The current flood control measures may not be adequate in providing flood protection to the highly urbanized, densely populated areas in the lower watershed under burned conditions. The necessary levels of flood protection in the watershed should be determined based on detailed hydrologic, hydraulic, and sedimentation studies that include the effects of stream sedimentation from mud flows and debris flows. Potential measures that could be considered for implementation to improve the short-term level of flood protection are listed below:

- Restore, improve, and maintain drainage system capacities through vegetation clearing and sediment removal
- Improve flood early warning systems
- Install, restore, improve, and maintain erosion control and water retention structures, particularly in areas determined to be at high risk to flooding
- Provide public information (e.g., signage and mailings) on flood hazards, particularly in areas determined to be at high risk to flooding
- Adopt guidelines to encourage the "daylighting" of underground culverts as well as the removal of concrete/riprap channel lining as appropriate to improve water quality while maintaining and/or improving the existing level of flood protection

A review of existing data indicated that although most hydromodification, with the exception of the reservoirs, has been limited primarily to the San Diego Management Area, hydromodification is occurring in the other two management areas as documented by recent permit activity processed by the SDRWQCB. This indicates that future hydromodification of the watershed may continue unless guidelines or policy changes are adopted to give the SDRWQCB the ability to prohibit or restrict these activities in the future (e.g., channelization). Written guidelines, if not from policies, established by the RWQCBs, prohibiting channelization and other similar activities would facilitate the 401 WQC application process for SDRWQCB staff and applicants, and would most likely result in the implementation of effective measures to improve water quality (Porter 2002).

10.2 Surface Water Quality

Past water quality monitoring efforts have shown that turbidity, nutrients (nitrate and phosphorus), TDS, and bacterial indicators are persistent, watershed-wide COCs (City of San Diego 2003). In addition, stream bioassessment data have indicated degraded benthic communities in the lower watershed. Other, less persistent water quality concerns on both spatial and time scales include pesticides (diazinon primarily), oil and grease, low DO, and ammonia.

The upper watershed is generally undeveloped and the surface water quality is very good (Porter 2003). The lower watershed is generally developed and surface water quality is generally poor (Porter 2003), due to anthropogenic contamination sources. Typical contaminants include elevated levels of biological indicators, TDS, pH, pesticides, metals, petroleum, and trash. These often result from direct discharges (pesticides, fertilizers, leaking sewage collection systems, cars, farms, industries, gold courses, etc.) and from hydromodification. BMPs are necessary to protect the existing water quality, and will be fully explored in the WMP. SDRWQCB recommended management measures include the following.

- Increased oversight of section 401 WQC applications by the SDRWQCB to minimize hydromodification of the streams that lead to decreased water quality and the loss of beneficial uses
- Removal of existing hydromodifications where feasible
- The SDRWQCB should encourage continued improved compliance with all stormwater permits
- Development of alternative site use designs and construction techniques
- Increase the number of stationary, permanent monitoring stations in the San Diego Management Area
- Pursue acquisition of technology that provides real-time data collection

The San Diego River WURMP proposes the following activities:

- Determine the extent of each water quality problem (spatial, temporal, and magnitude) and identify unknowns
- Determine the need for additional data or studies when data or information gaps are identified
- Identify existing activities in the watershed related to water quality issue and assess extent and efficacy of current efforts

- Identify potential mechanisms to reduce pollutant load and its concentration (structural and non-structural BMPs, including education and outreach)
- Assess, as appropriate, the efficacy, economical impact, benefit to cost ratios, and technically feasibility of potential corrective actions
- Identify funding sources for actions under consideration

10.3 Groundwater and Water Supply

El Capitan Management Area. Outside of the community of Alpine, groundwater serves as the exclusive source of water supply to homes and businesses within the El Capitan Management Area. Groundwater resources within the El Capitan Management Area are developed from fractured rock and shallow alluvium. Yields from individual wells are limited by the amount of storage in contiguous fractures and the amount of local groundwater recharge. Historic data indicate that groundwater quality tends to vary with location, well depth, and sources or recharge. In general, however, historic data indicate low concentrations of TDS and nitrate within groundwaters of the El Capitan Management Area. Only limited recent data, however, are available to characterize groundwater quality. The Julian aquifer, contaminated by gasoline, still requires cleanup. Because of the fractured rock nature of the aquifer, hydrogeologic responses to groundwater pumping can be highly variable from location to location. In zones where groundwater pumping approaches or exceeds the available local recharge, declining water table elevations can occur that can potentially result in impacts to well owners, impacts to groundwater-dependent vegetation, and reductions in surface stream base flows.

San Vicente Management Area. Groundwater resources within the San Vicente Management Area are principally developed from fractured rock or shallow alluvium/residuum that exists along major tributary streams. Recharge to the shallow alluvium/residuum and fractured rock is from streamflow infiltration, percolation of precipitation, and percolation from applied waters. No comprehensive surveys of groundwater wells have been performed in the San Vicente Management Area, but water agency supply records and population data indicate that hundreds of private groundwater wells exist within the management area. Well yields from the fractured rock and shallow alluvial aquifers are limited by local recharge. As a result, aquifers within the San Vicente Management Area are likely to be sufficient to provide water supply to sparsely developed rural areas. Such aquifers, however, are unlikely to be sufficient to supply denser developments or large-scale commercial or agricultural projects. Groundwater production difficulties within the Barona Valley upon completion of the Barona Valley hotel/golf course complex appear to confirm this conclusion. Imported water use, increased development, and other salt and nitrate loads within the northern portion of the San Vicente Management Area indicate the potential for increased groundwater concentrations of TDS and nitrate.

San Diego Basin Management Area. Aside from isolated pockets of contamination, groundwater quality is good. The San Diego Basin Management Area is dominated by large alluvial aquifers, including the Santee/El Monte Basin, El Cajon Basin, and Mission Valley Basin. The 70,000 AF Santee/El Monte Basin is the most important from both groundwater quality and groundwater production standpoints. The Santee/El Monte Basin serves as a source of municipal supply to HWD, Lakeside Water District, and Riverview Water District. Additionally, a significant number of private wells exist within the Santee/El Monte basin. Groundwater TDS and nitrate concentrations within the Santee/El Monte basin are highly variable, and depend on well location, local hydrologic conditions, and local nitrate sources. TDS concentrations typically increase with distance downstream within the Santee/El Monte Basin. Groundwater within the upstream portion of the basin is usable as a source of potable supply without the need for treatment. No public water supplies are currently being developed within the Mission Valley Basin and El Cajon Basin, and current water quality monitoring data for the basins are not available. Historic data, however, indicate high TDS concentrations in both Mission Valley and the El Cajon Basin.

SDRWQCB recommended management measures include (Porter 2003):

- Continued oversight of regulated septic tank waste and small wastewater facilities (campgrounds, parks, RV parks, etc.) by the SDRWQCB.
- Reduce the potential for contamination of groundwater that results from uncontrolled or poorly-controlled urban runoff practices.
- Improving pesticide and fertilizer storage and handling
- Minimize use of pesticides and fertilizer and use as appropriate to the soils
- Increase private well monitoring and coordinate data

10.4 Biological Resources

It is recognized that fire is a natural and important ecological disturbance in Southern California. However, the impacts of the Cedar Fire on habitat and wildlife vary spatially and temporally. The effects on the biological resources may be temporary or permanently destroyed depending on the severity of the fire. The recovery of the native habitats are influenced by several factors including the isolation of habitat patches, by urbanization and roads, which may prevent some species from re-establishing in isolated patches after fire, and the invasion of non-native species following fire, which can result in permanent type-conversion of habitat (Bond and Bradley 2003). Individuals that depend on a specific habitat type and are dispersal-limited or depend upon late-successional habitats may be adversely affected by the fire due to the extensive loss of habitat. Additionally, habitat lost in fire no longer serves as a protective corridor for avifauna or mammal species to larger tracts of habitat. Critical habitat for threatened and endangered species has been altered by the October 2003 fires; therefore, it is imperative that local and region-wide impacts of the wildfires be investigated, and that baseline conditions are updated to reflect any impacts to these species.

Currently, the October 2003 fires have changed baseline status of plant and animal species and/or the underlying environmental circumstances such that supplemental environmental review will be needed and legally required under ESA and CEQA. Supplemental environmental review taking into account potential local and landscape-level effects of the wildfires should be conducted for previously approved projects occurring within the range of critical habitat of threatened and endangered species.

Management measures for the protection of habitat and wildlife include:

- Maintain existing large patches where possible
- Build to preserve natural stream and vegetated corridors
- During construction, efforts should be made to preserve useful and attractive vegetation, and to protect it from damage by machinery. Vegetation also provides natural erosion control during construction
- Use of native vegetation/minimal threat due to spread of exotic species
- Roads bisecting riparian corridors should cross at the narrowest width
- New roads/trails should conform to existing ecological patterns. Roads should not bisect patches, rather they should run along edges preserving the integrity of the larger pattern
- Culverts and bridges should be designed to accommodate wildlife, encourage flora, to allow unimpeded water circulation and to blend into the natural setting

- Grazing should not be permitted in riparian corridors which should be fenced to prevent access by cattle, but allow passage by native fauna
- Natural drainage patterns should be maintained to avoid channelization and diversion of streams which can alter seasonal patterns critical to wildlife

10.5 Land Use Planning

The results of the Assessment indicate that while the various jurisdictions are coordinating with each other to develop ordinances intended to protect and enhance water quality, and to a lesser degree water quantity, implementation and enforcement of these ordinances are, for the most part, conducted independently. These same jurisdictions are also participating in NCCP/HCP planning efforts that have identified key habitats and sensitive species requiring protection and enhancement activities. Currently, these two efforts are only loosely coordinated and no comprehensive watershed-wide land protection and management goals have been set. The use of a metric like imperviousness could provide these jurisdictions with a mechanism by which they can coordinate and guide land development within their respective jurisdictions to occur within appropriate locations and at appropriate densities required to maintain and enhance the health of the SDRW into the future.

Land Use Management Measures. Some recommended management measures for land use and planning include:

- Establish a process for ongoing, multi-jurisdictional decision-making
- Expand use of site design and source control BMPs, such as use of native vegetation, avoidance of impervious surfaces, lot design, etc.
- The NPS Program Five-Year Implementation Plan (2003 to 2008) recommends the following measurement measures:
    - Coordination between the SWRCB and RWQCB TMDL staff and managers to include NPS management measures in the TMDL Implementation Plans, as appropriate.
    - Promote coordination of interagency programs that protect water quality from urban runoff pollution.
    - Reduce the potential for contamination of surface and groundwater that results from uncontrolled or poorly-controlled urban runoff practices through the implementation of BMPs.
    - Develop tools to assess the effectiveness of urban water pollution programs.

- o Increase the availability of regulatory and guidance documents and/or instructional workshops to demonstrate effective urban pollution control programs and policies.
- o Support the development and implementation of watershed-based plans, including TMDLs and SWPPPs, in order to identify and address impacts from urban land use.

10.6 Beneficial Uses

Beneficial uses are defined as the uses of water necessary for the survival and well-being of man, plants, and wildlife. Once the human-induced influences most likely to affect beneficial uses and water quality are identified, basin management strategies for reducing or eliminating these influences can be evaluated and prioritized. Therefore, management strategies that offer the highest potential for the greatest benefit for the management areas should represent a high priority for implementation. Lowest basin management priorities should be given to water quality influences that are determined to be associated natural causes, since basin management actions or controls on human-induced discharges are unlikely to affect such natural influences.

In general, in the SDRW, the human-induced water quality influences most likely to affect beneficial uses and water quality are eutrophic conditions from fertilizers and sedimentation, nitrates from septic tanks and agricultural irrigation, and turbidity from new construction. Management strategies that offer the highest potential for the greatest benefit are education of homeowners about the construction, use, and maintenance of septic tanks, the construction of sewer lines for new developments, and wide-spread use and enforcement of BMPs for new development, and the development of alternative BMPs to reduce the agricultural use of pesticides and fertilizers.

Management strategies for reducing or eliminating these influences will be evaluated and prioritized in the WMP.

10.6.1 Impacts of 2003 Cedar Fire on Future Water Quality Monitoring Results

In addition to the physical impacts, an ancillary impact of the Cedar Fire to reporting agencies, such as cities and water districts, is the challenge of interpreting future water quality monitoring data. These agencies will likely find that, while other indications show that the SDRW is recovering from the fire, water quality monitoring data will continue to indicate degraded conditions. It is likely that the data does not easily or accurately relate to the overall watershed conditions during the reporting period; the data may show such high levels of contaminants that under other conditions the regulating agencies would call for corrective action. The challenge is determining when the data accurately reflect the overall watershed condition and where, if at all, corrective action needs to be taken. In the short term, turbidity, sedimentation, and increased nutrients will influence water quality monitoring results.

Other indicators of watershed condition include looking at the type of vegetation recovering, level of impervious surface, and reconstruction design standards. Over 75 percent of the burn area is within chamise and mixed chaparral habitats that are adapted to fire with excellent vegetation recovery potential. Because the Cedar Fire occurred during the winter season and precipitation had been limited within the area over the last several months, vegetation conditions were within a dormant cycle which should help minimize long-term damage and vegetation loss. Based on information provided by the BAER Team, the probability that the vegetation will recover rapidly, without any treatment, is high (Wells et al. 2003).

After this period of adjustment, however, fire-related releases will continue to impact the SDRW in the long-term. For example, in the El Capitan Management Area, pre-fire COC include nutrients (phosphorus and nitrogen) and turbidity. The El Capitan Reservoir will act as a “sink” for the ash and other organic matter that has flowed from the management area during storm events. The decomposition of this organic material will continue to supply phosphorus and nitrogen into the system.