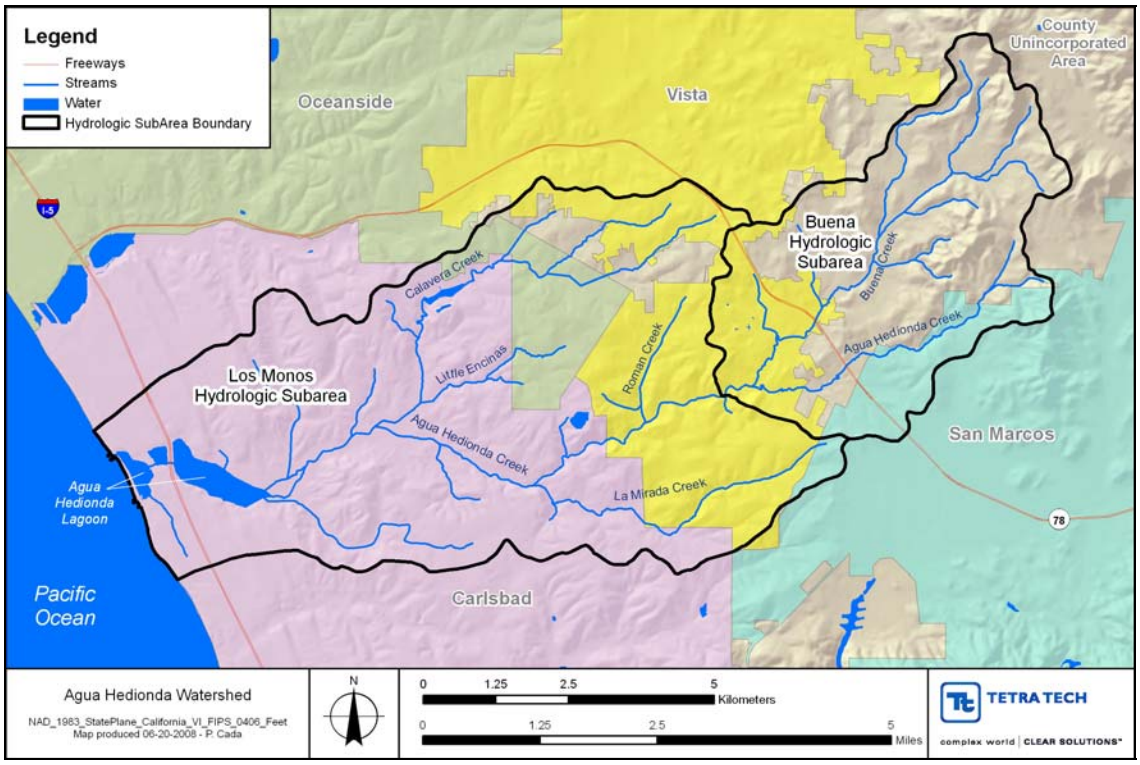
Agua Hedionda WMP Executive Summary

Where is the Agua Hedionda watershed?

The Agua Hedionda watershed is located in southern California, about 35 miles north of downtown San Diego. The watershed drains 31 square miles of land and includes portions of the cities of Carlsbad, Vista, Oceanside, and San Marcos, and the unincorporated County of San Diego. The watershed contains approximately 37 linear miles of streams most of which are still natural or earthen bottomed channels. The watershed terminates at the Agua Hedionda Lagoon, an important cultural, economic and environmental resource that provides critical habitat for migratory and resident birds and fish. The lagoon serves as nursery habitat for commercially and recreationally significant coastal and resident species.



Why does the Agua Hedionda watershed need a management plan?

Signs of degradation are evident throughout the watershed, and significant loss of natural habitat across all ecosystems has occurred. In addition, large areas with high quality habitat in the upper watershed are planned for development. To address these and other concerns, the local stakeholders have prepared this Watershed Management Plan (WMP) to "Preserve, restore and enhance the watershed's natural functions and features." They recognize that a healthy watershed is one that provides wildlife habitat, clean water, scenic beauty, and other benefits.

What are the priority issues in the watershed?

A number of priority issues emerged from the assessment of watershed conditions and trends, including:

- Urban land use has increased over time in the watershed, replacing agriculture and natural open space. Future development is expected to cause additional impacts to water quality and stream stability.
- The San Diego Regional Water Quality Board (RWQCB) has listed Agua Hedionda Creek, Buena Creek, and Agua Hedionda Lagoon as impaired and not supporting designated beneficial uses under the Clean Water Act Section 303(d).
- Stream channel modification, from a natural to impacted state, has been observed throughout the watershed. Typical impacts include habitat degradation and channel and bank erosion (see photo to the right).
- The majority of wetland and riparian habitat in the watershed has either been cleared or developed. The largest expanses of unprotected habitat, both riparian and upland, exist in the upper watershed, while the largest protected areas occur in the lower watershed.
- Predicted climate change may present a challenge to planning long-term management in the Agua Hedionda watershed. Shifts in weather patterns may increase sediment loading, channel erosion, and other stressors that already have an impact on watershed functions. Climate change may also endanger existing habitat and could present increased hazards to both human and animal life in the watershed.

Fallen Trees Due to Bank Erosion in the Creeks

What is the Agua Hedionda Watershed Management Plan?

The Agua Hedionda WMP provides a comprehensive, scientifically-based plan for preserving, restoring, and enhancing watershed functions and minimizing future degradation. The WMP assesses past, present, and future watershed conditions and identifies management needs throughout the watershed, considering the complex relationships among different watershed processes. As the watershed faces additional stress from development, the WMP provides a foundation for successfully addressing both past degradation and future stresses, and as further watershed-related regulations are adopted, the WMP guides decision makers towards the most beneficial management practices for a healthy watershed.

The stakeholders developed the following goals that formed the basis for the plan:

1. Design land use and infrastructure so as to minimize impacts on the watershed.
2. Protect, restore and enhance habitat in the watershed.
3. Restore watershed functions, including hydrology, water quality, and habitat, using a balanced approach that minimizes negative impacts.
4. Support compliance with regional, state, and federal regulatory requirements.
5. Increase awareness and stewardship within the watershed, including encouraging policymakers to develop policies that support a healthy watershed.

What does the plan recommend?

The WMP recommends management actions to address priority issues, build upon current management efforts, and resolve existing management gaps. These actions are prioritized based on how well each opportunity will contribute to the WMP goals and objectives. Watershed model results, Geographic Information Systems (GIS) analysis, and field observation were among the tools used to prioritize the most promising opportunities. The types of management actions are summarized below.

- **New Development Site Management:** New development has a significant potential to exacerbate existing watershed impacts, or even create new ones in relatively unimpacted streams. Development can increase pollutant loading rates in runoff, and can also increase the frequency and duration of erosive flows in stream channels. Appropriate site management can partially or even fully mitigate development impacts, depending to a large degree on how aggressively they are implemented. The WMP recommends implementing watershed-specific low impact development (LID) techniques for stormwater management, including reduction of impervious surface, stream buffer policies, and the use of structural stormwater management practices (extended detention facilities, grass swales, and permeable pavement).

- **Preservation and Riparian Buffer and Wetlands Restoration:** Land acquisition and preservation prevents remaining natural areas from being developed or disturbed; this type of management also maintains the existing quality of the natural areas through stewardship activities, such as invasive species control. Riparian buffer restoration creates native riparian vegetation along streams. Wetlands restoration reestablishes wetland hydrology and vegetation where historic wetlands have been impacted or destroyed. Specifically, the WMP recommends the following high priority actions:

Unprotected Natural Habitat in Upper Watershed

    - Land acquisition and preservation opportunities including 387 acres in total.
    - 27 buffer restoration opportunities ranging from about 0.2 to 29 acres and including 129 acres in total.
    - 12 top ranking wetland restoration opportunities ranging from about 0.2 to 21 acres and including 47 acres in total.

  These opportunities include stakeholder recommended opportunities that provide a strong link to the WPG's goals and objectives. These and many additional recommended opportunities are provided to decision makers as part of the Management Opportunity Database, a spreadsheet tool detailing the characteristics of all opportunities considered.

- **Stream Restoration:** Stream restoration involves restoring the shape and function of a stream. The WMP recommendations, in particular, focus on installing grade control structures within a stream channel to achieve equilibrium between sediment inflow and transport capacity. The WMP recommends 11 stream restoration reaches covering nearly 30,000 feet of stream.

- **Stormwater BMP Retrofit Projects:** The WMP recommends portions of the watershed where retrofits of stormwater best management practices (BMPs) can reduce impacts from development.

BMP retrofits recommended include extended detention facilities, grass swales, and other structural BMPs that are appropriate for the watershed. Six demonstration BMP retrofits are identified that can support the above stream restoration opportunities.

- **Monitoring:** Once WMP implementation has begun, a coordinated monitoring program is recommended for water quality, land use change and treatment, restoration, and retrofits. Specific tracking indicators identified by the WPG can be integrated with existing monitoring requirements under programs such as the MS4 permit and the MHCP and MSCP programs.
- **Citizen Stewardship/Public Outreach:** The WMP recommends a comprehensive watershed implementation and stewardship effort led by a collaborative watershed council. Recommended outreach efforts include education for local boards, educational materials, technical and policy-oriented workshops and programs, and management partnerships.
- **Funding and Sustained Support:** Securing and maintaining stable and diverse funding for the WMP will be an important, ongoing effort. The WMP discusses options for funding and sustained support that are most applicable to the watershed.
- **Focus Areas:** Three areas in the watershed are highlighted in the plan where management opportunities can be implemented together to achieve cumulative and potentially greater watershed benefits.

How will the plan be implemented?

Implementation of the WMP will depend on all stakeholders taking an active role, though the roles will vary greatly by action. The WMP outlines the primary roles and responsibilities of stakeholders in carrying out the recommended actions. Implementation timelines and milestones are designated, potential funding sources are listed, and costs are estimated. Detailed lists of implementation actions are provided to facilitate leadership and coordination among stakeholders. It is highly recommended that one of the first steps toward implementation is the development of a formal Watershed Council consisting of members of the local jurisdictions with land use authority. One key aspect of implementation will be collaboration with regional management efforts and agencies. Many local and regional plans are identified in the WMP that relate closely to the Agua Hedionda WMP.

Watershed management is ongoing work that must respond and adapt to changing conditions. The WMP recommends several procedures or actions that enable this adaptive approach: long-term monitoring, management indicators for plan performance evaluation, and a Watershed Council that can make plan updates.

What are the benefits of plan implementation?

The recommended management opportunities will provide a number of benefits to the watershed. By addressing the goals and objectives of the plan, these opportunities will work toward preserving, restoring, and enhancing the Agua Hedionda watershed's natural functions and features. The WMP describes the specific benefits of all management types and provides quantitative estimates of benefits for low impact development, preservation, and BMP retrofits.

New development and redevelopment site management will provide reductions in future pollutant loading and hydrology impacts. Watershed modeling indicates that if certain land conversion (e.g., from agricultural to LID development) is realized, basic low impact development (LID) techniques and certain BMPs are implemented for future development and redevelopment, and land preservation is achieved, communities in the watershed should be able to "hold the line" on pollutant loading and peak discharge. Implementing enhanced LID techniques would achieve even greater cumulative benefits in the watershed.

Land acquisition and preservation can have a significant impact on localized stream water quality, streambank stability, and habitat diversity. In tandem with the other WMP actions, preservation can also help restore water quality and hydrology functions on a watershed scale.

Riparian buffer restoration is an important tool in the protection and restoration of watershed functions. A stable, vegetated streambank is a crucial component of stream channel protection and sediment reduction. Without vegetation along a stream, streambanks can slough off and may become more susceptible to failure during high flow events. Riparian buffers also serve as filters for sediment and other pollutants such as nutrients in runoff from adjacent land.

The benefits of wetland restoration include flow control, nutrient cycling, and habitat diversity. Wetland restoration actions can also strengthen other WMP actions, such as buffer restoration, stream restoration, and land preservation.

The retrofit BMPs will provide pollutant load and runoff reductions for their receiving watersheds. Furthermore, the BMPs will reduce storm event peak flow and runoff volume, an important component of mitigating risk of geomorphic change in streams receiving the runoff.

It is important to note that the recommended actions work together to achieve greater functional uplift for the watershed. In fact, the recommendations are designed to leverage actions and maximize overall preservation and restoration benefits for the Agua Hedionda watershed. Citizen outreach and education will support the above benefits, and funding, sustained support, and monitoring will be essential for realizing the multiple benefits and creating a healthy watershed that provides habitat, water cleansing and aesthetic benefits that can be managed to promote quality local communities.

(Photo courtesy of William Kloetzer)

Implementation of the Agua Hedionda WMP is critical to creating a healthy watershed that provides habitat, water cleansing and aesthetic benefits for local communities.

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