Agua Hedionda Watershed Acquisition and Restoration Opportunity Report

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1 Introduction

The Agua Hedionda watershed has experienced an extensive loss of habitat throughout its terrestrial, wetland, and aquatic ecosystems. About 27 percent of the watershed remains in natural, relatively undisturbed areas. Without further habitat protection or restoration, natural area in the watershed is likely to decrease to 13 percent at build out based on the extent of currently protected natural vegetation in the watershed.

The loss of wetland habitat has been particularly significant within the watershed. California has lost more than 90 percent of its historic wetlands and has experienced a much greater loss than the national average of 50 percent (State Coastal Conservancy, 1989). The Agua Hedionda watershed exemplifies this loss. Most of the wetlands are likely to be located in the lower, more coastal portion of the watershed. Much of this land is either highly developed or disturbed by agriculture, leaving little coastal wetland habitat remaining except for the lagoon. Vernal pools were likely to exist historically in the watershed, but neither Tetra Tech's research nor stakeholder knowledge has indicated that any vernal pools remain.[1]

Considering these wetland losses, the Agua Hedionda Lagoon is an important habitat resource for the watershed. The primary wildlife habitat provided by the lagoon is open water. In addition to the open water areas, eelgrass beds provide habitat for fish and crabs, and mudflats provide feeding areas for migrant birds. The marsh areas, although limited, provide additional habitat diversity for a variety of species (State Coastal Conservancy, 1989).

Upstream of the lagoon, watershed impacts have degraded or destroyed aquatic habitat within stream channels. Biological monitoring data indicates that benthic macroinvertebrate biodiversity is relatively poor at select sample locations in the watershed, as reported in Tetra Tech (2007). During October 2007 field reconnaissance, Tetra Tech evaluated aquatic habitat qualitatively throughout the watershed and found a range of aquatic habitat quality, including some potentially high quality sites. Benthic macroinvertebrate sampling at additional locations may reveal higher diversity in locations with higher quality habitat, but these results are difficult to project based on the intermittent nature of the streams and the high sediment load throughout the watershed.

Another major habitat impact has been the loss of connectivity between the upper and lower portions of the watershed. Since this loss is due to development, no feasible opportunity exists to restore this habitat connectivity. Despite this loss, significant tracts of natural wildlife habitat still exist both in the lower and upper portion of the watershed, and a combination of preservation and restoration could be successful at maintaining and enhancing the current habitat connectivity.

Watershed plans typically focus on riparian habitat because this land not only provides wildlife habitat but also protects stream banks and filters pollutants from stormwater runoff. Preservation and restoration of riparian habitat will be important management strategies for the Agua Hedionda watershed. Due to the extensive loss of habitat across all ecosystems, preservation of upland habitat will also be important to maintain existing biodiversity and protect water quality, particularly for highly erodible upland areas.

The Agua Hedionda Watershed Plan provides an opportunity to identify 1) remaining high quality habitat and 2) opportunities to restore lost habitat. The Agua Hedionda Watershed Planning Group (WPG) has developed goals and objectives for the Watershed Management Plan (WMP) relating to preserving existing habitat and restoring habitat losses. The purpose of this report is to propose methods for identifying land acquisition (preservation), riparian buffer restoration, and wetlands restoration

[1] A vernal pool is a shallow, intermittently flooded wetland that is typically dry during the summer and fall (Mitch and Gosselink, 2000).

opportunities that are likely to be most successful at meeting the WPG's goals and objectives. Land acquisition prevents remaining natural areas from being developed or disturbed; this type of management also is meant to maintain the existing quality of the natural areas through stewardship activities, such as invasive species control. Riparian buffer restoration seeks to remove invasive species and revegetate native riparian vegetation along streams and other waterbodies. Wetlands restoration reestablishes wetland hydrology and vegetation on land where historic wetlands have been impacted or destroyed. Some overlap occurs between these practices and stream restoration, but generally stream restoration focuses more on restoring the shape and function of a stream through instream controls, recontouring, and other engineering practices. Tetra Tech will be submitting the Bioengineering Management and Implementation Plan following this report, which will propose opportunities and screening criteria for stream restoration and BMP retrofits.

The methods in this report are proposed to be used as tools for selecting priorities for the Agua Hedionda Watershed Management Plan. Each section proposes a draft list of top-ranking opportunities based on the prioritization methods. The lists of top-ranking opportunities are provided as draft lists of priorities. These lists are subject to change, and it is expected that additional opportunities will be added to the draft lists during WMP development. Following WMP development, individual resource agencies or conservation organizations can use the methods adaptively to reflect their priorities and identify additional opportunities as they arise. The Agua Hedionda WMP will provide recommendations on how the draft top-ranking opportunities in this report can be integrated with other management opportunities to provide enhanced functional benefit within the watershed.

2 Screening Criteria

2.1 Relevant WMP Goals and Objectives

The opportunities in this report were prioritized based on how well they would meet the objectives outlined under the WPG's Goal #2: Protect, restore and enhance habitat in the watershed. These objectives are:

a) Protect and expand undeveloped natural areas to protect habitat.

b) Protect, enhance, and restore terrestrial habitat, especially existing vegetation in riparian areas.

c) Provide riparian habitat to improve and maintain wildlife habitat.

d) Provide natural area connectivity to improve and maintain wildlife habitat.

e) Maintain stable stream banks and riparian areas to protect instream aquatic habitat and priority tree species.[1]

f) Maintain and protect instream habitat to support native aquatic biology.

g) Maintain and protect lagoon habitat.

The preservation and restoration opportunities in this report were evaluated based on screening criteria that measure how well the opportunities meet the goal and objectives. Tetra Tech selected the screening criteria from the indicators outlined in the January 29, 2008 Revised Work Plan and the February 12, 2008 memorandum titled Final Mission, Goals, Objectives, and Indicators for Watershed Modeling and Detailed Assessment. Most of the indicators were used as screening criteria for the opportunities. More detailed data analysis indicated that some of the indicators need to be defined differently in order to best evaluate priorities in the watershed. Additional data were available following the indicators development, which led to the identification of additional screening criteria. These data included erosion hazard ratings, locations of proposed stream restoration reaches, and data from a wetlands functional assessment.

Selection of screening criteria also considered how management opportunities would support achievement of Goal #3, which is to restore watershed functions, including hydrology, water quality, and habitat, using a balanced approach that minimizes negative impacts. This goal was considered by using screening criteria to prioritize management opportunities with greater water quality benefits.

2.2 Screening Criteria

The methods for developing the screening criteria are described in this section. Table 2-1 shows the screening criteria developed for the purpose of selecting and prioritizing acquisition and restoration opportunities. In the subsequent sections, details are provided on how metrics were calculated, based on the screening criteria and associated data, to evaluate each type of opportunity. Table 2-1 also illustrates which criteria were used for each type of opportunity. Several of the screening criteria are used to prioritize more than one opportunity. A number of terms are defined in this section and used to show how the different priorities are linked.

[1] Priority tree species were defined by the WPG, during goals and objectives development, as mature trees that are threatened by bank undercutting (e.g., 100-year-old trees).

Table 2-1. Screening Criteria Selected to Evaluate Land Acquisition, Buffer Restoration, and Wetlands Restoration Opportunities

Screening Criteria / Data	Land Acquisition	Buffer Restoration	Wetlands Restoration
SC-1 Natural Area	✓		
SC-2 Protected Natural Areas	✓		
SC-3 Unprotected Natural Areas	✓		
SC-4 Existing Terrestrial Habitat	✓		
SC-5 Invasive Species Extent and Status of Treatment	✓		
SC-6 Targeted Buffer Area and Existing Riparian Habitat	✓		
SC-7 Priority Subwatersheds	✓	✓	✓
SC-8 Restoration Reaches	✓	✓	
SC-9 MSCP/MHCP Species	✓		
SC-10 Aquatic Habitat	✓		
SC-11 Wetland Function using CRAM	✓		✓
SC-12 Lagoon Subwatersheds	✓		
SC-13 Erosion Hazard Index	✓		
SC-14 Restoration Opportunity		✓	✓
SC-15 Riparian Restoration Opportunity		✓	
SC-16 Wetlands Restoration Opportunity			✓
SC-17 Mature Riparian Trees		✓	
SC-18 Sewer Constraints		✓	✓
SC-19 Road and Bridge Constraints		✓	✓
SC-20 Priority and Linkage Subwatersheds		✓	✓
SC-21 Coastal Subwatersheds			✓
SC-22 Stakeholder Priority	✓[1]		✓

[1] This criterion was used indirectly to ensure that the priority subwatersheds included land acquisition properties designated as priorities by stakeholders.

2.2.1 Screening Criteria for Land Acquisition and Overall Habitat Priorities

The following screening criteria and associated data were selected to evaluate land acquisition opportunities. Buffer restoration and wetland restoration opportunities screening criteria are discussed in Section 2.2.2. The data relevant to habitat quality and connectivity were also used to prioritize buffer and wetlands restoration opportunities based on habitat benefits.

SC-1 Natural Area

For the purposes of achieving Goal #2 and the associated objectives, natural area was defined as any naturally occurring vegetation that is likely to support native species, provide high quality wildlife habitat, and protect downstream water quality. To approximate the location of natural area within the watershed, appropriate land cover classes were selected from the SANDAG 1995 Vegetation GIS data (SANDAG, 1995). Tetra Tech considered using more recent land cover data to update the 1995 vegetation coverage, however, after reviewing more recent data (including the 2007 SANDAG data and the 2001 National Land Cover Dataset) and comparing select areas to aerial photographs, Tetra Tech found that the more recent data was not always accurate at the site scale and that using the data may cause the prioritization to overlook natural areas that still exist. Tetra Tech also reviewed the California Gap Analysis Program (GAP) vegetation data and found that these data provided significantly less geographic information than the 1995 SANDAG Vegetation data. It was decided that the 1995 data would be used for the GIS analysis; then, once the top ranking parcels were selected, the extent of natural areas within each parcel would be verified using high-resolution aerial photographs. The City of Vista is in the process of developing an updated vegetation coverage for its jurisdiction; these data were provided to Tetra Tech after the GIS analysis was completed and, therefore, were used to verify vegetation types within the draft top ranking parcels. The City of Carlsbad did not have an updated vegetation coverage available at the time of this assessment.

The following SANDAG vegetation classes were defined as natural area:

- Chamise Chaparral
- Chaparral
- Cismontane Alkali Marsh
- Coast Live Oak Woodland
- Coastal and Valley Freshwater Marsh
- Coastal Sage-Chaparral Scrub
- Diegan Coastal Sage Scrub
- Eucalyptus Woodland
- Freshwater Marsh
- Maritime Succulent Scrub
- Mule Fat Scrub
- Native Grassland
- Riparian Forests
- Riparian Scrubs
- Riparian Woodlands
- Scrub Oak Chaparral
- Southern Coast Live Oak Riparian Forest
- Southern Coastal Salt Marsh
- Southern Cottonwood-willow Riparian Forest
- Southern Maritime Chaparral
- Southern Mixed Chaparral
- Southern Riparian Scrub
- Southern Riparian Forest
- Southern Sycamore-alder Riparian Woodland (Pauma and Pala areas)
- Southern Willow Scrub
- Torrey Pine Forest
- Southern Riparian Forest
- Valley and Foothill Grassland

The Natural Areas data were used to measure the quality of habitat within both protected and unprotected land in the watershed. These data are also recommended for use as a tracking indicator during plan implementation; a useful tracking metric would be the percent change in natural area over time.

SC-2 Protected Natural Areas

A watershed plan seeking to preserve high quality natural habitat should prioritize the largest, most contiguous areas with existing habitat. One way to measure how one tract will provide greater benefits than another tract of equal natural area is to prioritize those tracts that are near or adjacent to habitat that is already preserved. Tetra Tech developed a GIS coverage of protected natural area based on GIS data of protected areas from the City of Carlsbad, publically owned properties outside of Carlsbad according to SANDAG (2004), and the natural areas coverage described above. The protected areas coverage represents the land that is protected from clearing or development in the future, and protection has been accomplished on these properties through either fee simple acquisition, conservation easement, or by regulation through local habitat management plans. The City of Vista provided an updated protected areas coverage for its jurisdiction; these data were not available at the time of the GIS analysis but were used to check protection status following selection of draft top ranking parcels.

SC-3 Unprotected Natural Areas

The unprotected natural areas data were developed by extracting all natural areas not included within the protected natural areas coverage described above. These data illustrate where opportunities exist for acquiring land and preserving natural areas.

SC-4 Existing Terrestrial Habitat

Terrestrial habitat was defined as any undeveloped area that could potentially provide terrestrial wildlife habitat. The SANDAG 1995 Vegetation data were used to define these areas in the watershed. In addition to the natural areas listed above, the following SANDAG vegetation classes were chosen to represent terrestrial habitat:

- General Agriculture
- Orchards and Vineyards
- Extensive Agriculture - Field/Pasture, Row Crops
- Field/Pasture
- Row Crops
- Non-Native Grassland

These data were used to measure the overall quality of habitat across the watershed. For some species, agricultural and other undeveloped areas are considered important habitat, and the area of terrestrial habitat accounts for this habitat value. To ensure that natural areas be preserved first, terrestrial habitat outside of natural areas was not considered a land acquisition opportunity. Instead, subwatersheds were given priority for land acquisition based on the amount of terrestrial habitat within each subwatershed. This screening criterion measures the extent that wildlife is supported by nearby farms, orchards, non-native grassland, or other terrestrial habitat. Natural areas that are near other terrestrial habitat should support a more diverse wildlife population than natural areas adjacent to large developed areas. Farms and other cleared areas do not provide beneficial habitat to all species; to address this concern, more weight was given to natural areas than to terrestrial habitat outside of natural areas.

SC-5 Invasive Species Extent and Status of Treatment

The San Elijo Lagoon Conservancy (SELC) has been treating invasive species infestations in wetlands and riparian areas throughout the Carlsbad Hydrologic Unit, which includes the Agua Hedionda watershed. This work is funded through a grant from the State Water Resources Control Board. SELC has treated a number of sites within the watershed and has received additional funding to monitor and maintain treated sites and begin treatment on additional sites. The sites were identified through GIS and through local knowledge of infestations. SELC gained permission from a landowner prior to treating a site. Most sites identified in the watershed either are treated or will be treated in the future; however permission to treat several sites is either uncertain or unlikely. GIS data on the SELC invasive species sites were used to prioritize land acquisition and habitat restoration opportunities. Opportunities near a treated site were prioritized higher than sites where treatment was uncertain or unlikely. Information on the geographic location, extent, and status of treatment of the SELC invasive species sites were available as screening criteria (SELC, 2008).

SC-6 Targeted Buffer Area and Existing Riparian Habitat

Riparian habitat is generally defined as terrestrial or wetland habitat that exists between streams and upland areas, usually within floodplain areas. Riparian areas provide important wildlife habitat due to their connectivity to streams and the diversity of plant communities they support. These areas also protect land from erosion, intercept and slow stormwater runoff before it enters the stream, and filter pollutants from stormwater runoff. Riparian vegetation along stream banks helps protect the stream channel from severe erosion and bank failure.

For any point along a stream, the extent of riparian habitat can vary widely depending on climate, drainage area, wetland hydrology, stream geomorphology, floodplain elevation, and other factors. The 100-year floodplain can be a useful surrogate for estimating the riparian habitat. However, Tetra Tech compared the 100-year floodplain to the extent of riparian vegetation delineated in the SANDAG 1995 Vegetation data and found that the 100-year floodplain, and even the 500-year floodplain, did not include the entire extent of riparian vegetation. Therefore, instead of relying solely on floodplain data to delineate the potential extent of riparian habitat, Tetra Tech developed rules of thumb for potential buffer widths based on the width of delineated riparian vegetation specifically for the watershed. For subwatersheds with riparian vegetation, Tetra Tech noted the maximum distance of riparian vegetation from a stream. Tetra Tech then compared these distances to the contributing drainage areas of the subwatersheds and developed the following rules:

- Where cumulative drainage area is less than 1,500 acres, expected riparian vegetation width equals 200 feet (includes all headwater subwatersheds) on either side of a stream.
- Where cumulative drainage area is between 1,500 and 7,000 acres, expected riparian vegetation width equals 300 feet on either side of a stream.
- Where cumulative drainage area is greater than 7,000 acres, expected riparian vegetation width equals 400 feet on either side of a stream.

These rules, to the extent possible, are based on the estimated, natural extent of riparian vegetation, not the extent imposed by development or other human disturbance. Tetra Tech applied the above rules to all streams in the watershed to produce the Targeted Buffer Area, which represents the area along any stream that is likely to support riparian vegetation, regardless of its current condition. The Targeted Buffer Area included the largest area covered by either the rules above or the 100-year floodplain. A 200-foot buffer around any in-line water bodies (lagoon, lakes, and two in-line ponds in the upper watershed) was also included within the Targeted Buffer Area. Since this area includes both natural and disturbed land, the Targeted Buffer Area was used to prioritize parcels for both land acquisition and riparian buffer restoration.

Preserving and restoring riparian vegetation within this area will help provide high quality wildlife habitat corridors and meet multiple habitat-related objectives under Goal #2. Maintaining and restoring vegetation within this corridor will also help protect water quality by controlling erosion, removing pollutants from runoff, and reducing runoff velocity that can lead to channel erosion. The term Existing Riparian Habitat is defined as the extent of natural areas within the Targeted Buffer Area.

SC-7 Priority Subwatersheds

The screening criteria in Table 2-1 that relate to habitat quality and preservation opportunity were used to select priority subwatersheds for habitat preservation and restoration. Tetra Tech selected the subwatersheds that have high quality habitat, significant opportunities for preservation, and a high degree of natural area connectivity, both protected and unprotected. The selection of priority subwatersheds was also compared to the MHCP and MSCP planning areas to ensure that the priority subwatersheds provided overlap and connectivity with these regional priority areas. The priority subwatersheds are used as screening criteria for land acquisition, buffer restoration, and wetlands restoration. By using the priority subwatersheds for restoration as well as land acquisition screening, Tetra Tech prioritized restoration opportunities that would enhance existing habitat quality and connectivity. The methods for selecting these priorities are explained in more detail in Section 3.

SC-8 Restoration Reaches

Tetra Tech has selected reaches within the watershed as priorities for stream restoration. These priorities will be discussed in the Bioengineering Management and Implementation Plan. For the purposes of this report, the locations of the priority reaches were used to prioritize land acquisition and buffer restoration opportunities that would help protect and support future stream restoration.

SC-9 MSCP/MHCP Species

The North County Multiple Species and Multiple Habitat Conservation Plans (MSCP and MHCP) for the San Diego region identify land that is critical to protecting endangered, threatened, and sensitive species and their habitat. These plans are used to target endangered and sensitive species protection and plan for mitigation before impacts occur. Significant tracts of natural area in the City of Carlsbad have already been protected (i.e., placed in preserves) as a result of San Diego County's North County MHCP and Carlsbad's Habitat Management Plan (HMP), which followed the MHCP. The other municipalities in the watershed are in the process of developing HMPs. A portion of the upper watershed within the County's jurisdiction will be considered by the North County MSCP, which is still under development. As a result of these planning efforts, GIS locations of priority species are available from San Diego County (County of San Diego, 2007). The species observed include endangered, threatened, and sensitive species or species that are indicators of critical habitat. These locations were used as measurements of biodiversity, and areas of the watershed were prioritized based on the number of species observations.

SC-10 Aquatic Habitat

The aquatic habitat data include categorical ratings of aquatic habitat based on field observations conducted by Tetra Tech during the October 2007 field reconnaissance. The ratings are grouped into four categories: excellent, good, fair, and poor. These ratings are based on habitat parameters such as embeddedness, presence and type of pools, epifaunal substrate/available cover, streambank vegetation, riparian width and vegetation types, and physical channel stability. These parameters were evaluated together to subjectively categorize the existing aquatic habitat (where flow is present) or the potential aquatic habitat (where channels were dry). Due to the ephemeral nature of most observed reaches, habitat was considered from the perspective of benthic macroinvertebrates and not fish.

SC-11 Wetland Function using CRAM

The California Rapid Assessment Method (CRAM) for Wetlands is a method for rapidly assessing a wetland's functionality through a combination of desktop and field analyses (Collins et al, 2007). CRAM was performed at about 20 locations during the October 2007 field reconnaissance. The composite CRAM scores were grouped into three categories: 0-50: Poor/Marginal; 50-70: Suboptimal; and >70: Optimal. The CRAM categories were used to prioritize areas with high wetlands functionality for habitat preservation and areas with low wetlands functionality for restoration.

SC-12 Lagoon Subwatersheds

One of the objectives under Goal #2 is to maintain and protect lagoon habitat. Lagoon habitat quality is addressed in the existing riparian habitat data through the targeted 200-foot buffer around the lagoon and the prioritized, unprotected natural areas within that buffer. Lagoon habitat restoration opportunities are also considered within the buffer restoration opportunity and wetland restoration opportunity areas. To fully address this objective and ensure that lagoon habitat preservation is a priority, Tetra Tech added screening criteria that identifies the three subwatersheds that contain Agua Hedionda Lagoon. Lagoon habitat quality is also recommended as a tracking indicator for plan implementation.

SC-13 Erosion Hazard Index

A soil erosion hazard index was extracted from the SSURGO database for the Agua Hedionda watershed. The erosion hazard index is broken into five categories: Not Rated, Slight, Moderate, Severe, and Very Severe. The categories are based on the hazard, or risk, of soil loss assuming 50 to 75 percent of the ground surface is exposed to wind and water erosion. This SSURGO index uses the soil erodibility factor (Kw) and percent slope of soils to classify an area into a specific erosion hazard category. For example, an area with a Kw < 0.35 and a percent slope between 36 and 50 percent would be classified as severe (NRCS, 1998). The categories of Severe and Very Severe were used to prioritize highly erodible land for acquisition and protection.

2.2.2 Buffer and Wetland Restoration Screening Criteria

The following screening criteria and associated data were selected to prioritize buffer and wetlands restoration opportunities. Several of the land acquisition screening criteria shown in Table 2-1 and described above were also used to prioritize restoration opportunities. Capitalized terms (e.g., Restoration Opportunity) are defined below to signify screening criteria used in the prioritization.

SC-14 Restoration Opportunity

Opportunities for buffer restoration and wetlands restoration were identified as undeveloped land excluding natural areas. Natural areas were excluded from consideration for restoration so that disturbed land could be identified and recommended for restoring lost riparian and wetland habitat. Following land acquisition and preservation, natural areas may be considered for minor restoration measures, such as vegetation enhancement, as appropriate. Full-scale restoration is not recommended on land where natural vegetation has been established. Wetlands restoration within a natural area, for example, may require the removal of native vegetation, which would increase erosion and may cause invasive species infestations.

The SANDAG vegetation classifications included in the restoration opportunity areas were:

- Disturbed Habitat
- Disturbed Wetland
- Extensive Agriculture - Field/Pasture, Row Crops

- Field/Pasture
- General Agriculture
- Non-Native Grassland
- Orchards and Vineyards
- Row Crops

These areas are referred to, hereafter, as Restoration Opportunity. The following sections on Riparian and Wetland Restoration Opportunity provide more detail on how these areas were used to target each type of opportunity.

SC-15 Riparian Buffer Restoration Opportunity

To identify riparian buffer restoration opportunities, Restoration Opportunity (defined above as undeveloped land outside of natural areas) was measured within the Targeted Buffer Area (defined above under Existing Riparian Habitat). These areas provide a measure of undeveloped land area that may have previously supported riparian vegetation. Hereafter, these areas are referred to as Buffer Restoration Opportunity (BRO).

SC-16 Wetland Restoration Opportunity

The Wetland Restoration Opportunity (WRO) data measure areas where Restoration Opportunity, defined above as undeveloped land outside of natural areas, intersects with hydric soils and the National Wetlands Inventory (NWI; SANDAG, 1985). Hydric soils were identified through the San Diego County list of hydric soils and the Natural Resources Conservation Service (NRCS) SSURGO soils; both datasets were acquired from NRCS (NRCS, 2007; NRCS, 2008). Hydric soils indicate where conditions of soils and associated hydrologic conditions support, or historically supported, wetland hydrology. Land with hydric soils where vegetation cover has been removed presents potential wetlands restoration opportunities. The NWI, developed by the US Fish and Wildlife Service, provided additional locations of existing and historical wetlands that are not covered by hydric soils. The total extent of both the NWI and hydric soils was used to represent present and historical occurrences of wetlands. Tetra Tech intersected the Restoration Opportunity area with these wetland occurrences to produce the Wetland Restoration Opportunity area. These data were used to identify and prioritize opportunities for wetland restoration. Techniques used to restore wetlands may include revegetation, invasive species control, restoration of wetlands hydrology, and other techniques depending on the site-specific impact.

SC-17 Mature Riparian Trees

Locations of mature riparian tree species were approximated with field observations and the SANDAG 1995 Vegetation data. The following SANDAG vegetation classes were used to approximate the locations of mature riparian tree species prioritized by the WPG:

- Coast Live Oak Woodland
- Southern Coast Live Oak Riparian Forest
- Southern Cottonwood-willow Riparian Forest
- Southern Sycamore-alder Riparian Woodland

These trees are prioritized by the WPG because channel erosion has endangered 100-year-old trees along the banks of Agua Hedionda Creek. Their locations were used to prioritize buffer restoration adjacent to existing stands of these priority trees. Willows and alders tend to co-dominate in more disturbed areas (Isabelle Kay, University of California Natural Reserve System, personal communication, March 19,

2008); this could not be addressed by the scope of this analysis, but the field observations were used to verify that these vegetation classifications coincided approximately with where matures trees have been observed as threatened by undercutting.

Preservation is expected to be the least effective management option for protecting mature trees along stream banks. For this reason, mature riparian trees were not used to prioritize land acquisition for preservation. Preservation immediately adjacent to the trees will provide an indirect ecosystem health benefit but will not mitigate for erosive stream flow that is causing bank undercutting and loss of mature trees. Buffer restoration will provide some flow control and will help re-establish lost stands of riparian trees. Upstream, engineered flow controls will provide the best means of protecting these trees, and these management opportunities will be discussed in the Bioengineering Management and Implementation Plan. Although restoration provides more benefits to mature riparian trees, preservation was not eliminated as an opportunity to protect riparian trees. Instead, land acquisition priority was given to all natural areas with riparian habitat, which includes areas with mature riparian trees.

SC-18 Sewer Constraints

The existence of a sewer easement on a wetlands or buffer restoration opportunity was considered a constraint because required sewer easement maintenance would restrict natural revegetation. Fewer opportunities for restoring wetland hydrology would also exist on parcels that are highly constrained by sewer lines. Opportunities with larger areas of sewer easement were given a lower priority.

SC-19 Road and Bridge Constraints

The existence of roads and road crossings within a wetland or buffer restoration opportunity poses a constraint to restoring contiguous natural vegetation. This infrastructure may also restrict options for restoring wetlands hydrology on a site. Opportunities with larger areas of road area (either roads or bridges) were given a lower priority.

SC-20 Priority and Linkage Subwatersheds

In addition to the priority subwatersheds, Tetra Tech selected additional "linkage" subwatersheds based on the degree that they could provide opportunities to restore connectivity to existing habitat. Almost all of the potential linkage subwatersheds were too highly urbanized to provide opportunities for restoring connectivity; Tetra Tech selected one subwatershed to prioritize as a linkage subwatershed. The methods for selecting these priorities are explained in more detail in Section 3.

SC-21 Coastal Subwatersheds

Coastal wetlands restoration opportunities in the San Diego region are rare and difficult to find, and the wetlands restoration opportunities in the lower Agua Hedionda watershed are much smaller than those in the central and upper portions of the watershed. To counterbalance the priorities placed on the area of opportunity, Tetra Tech placed priority on the coastal subwatersheds, defined as the subwatersheds downstream of the confluence of Agua Hedionda Creek and the lagoon. This screening criterion helps ensure that valuable but small coastal wetlands restoration opportunities will be among the top ranking opportunities.

SC-22 Stakeholder Priority

Members of the Watershed Planning Group and other stakeholders provided information on land acquisition and wetlands restoration opportunities in the watershed. When the priority and linkage subwatersheds were selected, Tetra Tech verified that the stakeholder-recommended land acquisition opportunities were located within the priority and linkage subwatersheds. These stakeholder-recommended opportunities will be included in the land acquisition project database along with the

opportunities identified through the formal prioritization. Tetra Tech felt that sufficient screening criteria were available to select high quality habitat areas without a separate stakeholder priority metric. However, a stakeholder priority metric may be considered after the WPG has reviewed the prioritization methods. These opportunities are discussed in more detail in Section 4.3.

Less sufficient screening criteria were available for evaluating wetlands restoration opportunities than for land acquisition opportunities. Therefore, the prioritization of wetlands restoration opportunities partially relied upon opportunities identified by stakeholders. The wetlands restoration opportunities were prioritized based on their location within the same parcel as the stakeholder-recommended opportunities. These opportunities are discussed in more detail in Section 6.3.

2.2.3 Indicators Not Used

Several indicators identified under Goal #2 were not directly incorporated into the land acquisition and restoration prioritization.

Data on aquatic biodiversity, mainly Index of Biotic Integrity (IBI) ratings, were concentrated in a fraction of the watershed and ranged from poor to very poor, which did not provide a significant range of observation to be useful in prioritizing for land acquisition or restoration. If more widespread benthic monitoring is conducted in the future, IBI ratings and other indicators of Aquatic Biodiversity can be used to track plan implementation progress.

Stream stability will be addressed in the evaluation of stream restoration, and extreme high flows will be addressed in the Watershed Management Plan (WMP) where the combined benefits of land acquisition, restoration, BMP retrofit, and other management opportunities will be discussed.

Total riparian habitat, as opposed to unprotected habitat, was targeted to provide a measure of connectivity between protected and unprotected riparian habitat. The indicator Unprotected Natural Area provided a measure of unprotected riparian as well as upland habitat.

Finally, it was determined that MSCP/MHCP species be used as an indicator of overall habitat quality and not quality of unprotected areas because the observation points indicate habitat ranges that are likely to span both protected and unprotected areas.

2.3 ROLE OF CULTURAL RESOURCES

Cultural resources, which include historic burial sites, could not be considered in this analysis because the database of sensitive cultural resources is not publicly available. The opportunities recommended through the methods in this report are likely to provide opportunities for protecting cultural resources. During WMP implementation, it is recommended that implementing agencies cross check the priority parcels with priorities for cultural resources.

2.4 METRICS AND SCORING METHODS

The data and screening criteria above were used to calculate metrics to measure achievement of Goal #2 and its objectives. These metrics were used to develop a scoring system that prioritized management opportunities. A separate scoring system was developed for each type of management. The scoring systems were linked in some cases, where a metric calculated for one type of management helped better prioritize another type of management. For example, the priority subwatershed metric developed for the land acquisition prioritization was also applied to the buffer and wetlands restoration prioritization to identify restoration opportunities that provided connectivity to existing habitat.

A metric is defined, for the purposes of this evaluation, as a measurement that can be used to identify and prioritize management opportunities according to the goals and objectives. Where screening criteria have defined a particular priority area, a metric defines how that area is used to identify and prioritize management opportunities. Metrics methods can vary in complexity, from the count of species observations per subwatershed to a set of rules involving treatment status and distance from invasive species infestations.

The metrics are used to translate data and screening criteria into scores for ranking and prioritizing opportunities. Rules, or thresholds, are defined that translate ranges of metrics values into scores from 1 to 10 points. A score of 10 represents the highest priority opportunity where management is likely to be most successful at achieving the goals and objectives.

Tetra Tech used different methods for setting scoring thresholds depending on the type of data and metric. For metrics using continuous data, scores were based on quartiles, which are statistical ranges that divide the data into four sets, each representing 25 percent of the range. If zero values were prevalent in a data set, zero values were not included when calculating quartiles; instead, zero values were given a separate, lower score. If an area of the watershed did not have data available for a particular metric, a score was not given, and the record was labeled "no data."

Several metrics used qualitative categories or predefined categories as scoring thresholds. Other metrics were defined as presence within a particular priority subwatershed, and in those cases, scoring thresholds were simply defined as 10 points for presence and 1 point for not present within a priority subwatershed. The methods and scoring thresholds for the metrics are described in more detail in the following sections.

A different set of metrics was selected for each of the three opportunity types, and a composite score was calculated for each set that is used to prioritize and rank opportunities. The composite scores were calculated according to how many metrics were available for a particular opportunity so that missing data did not result in a lower score. The composite scores are used as tools to identify the opportunities that are likely to be most successful at achieving the goals and objectives. The top ranking opportunities are evaluated separately from the metrics and scores to ensure that appropriate opportunities are selected. Site characteristics and costs are provided for the top ranking opportunities.

The opportunities are defined in terms of parcels so that contiguous areas owned by one landowner can be targeted for land acquisition or restoration. This level of organization helps identify promising opportunities that require coordination with a minimal number of property owners. Therefore, the top ranking opportunities are reported in terms of parcels.

The purpose of this report is to document the methods used to identify and prioritize preservation and restoration opportunities. This report also provides general information on the characteristics of the draft list of top ranking parcels. To protect both the opportunities and property owners' privacy, ownership information will not be reported in this document. As part of the watershed plan development, Tetra Tech will produce a database of all opportunities that will be maintained by a resource agency. The distribution policy for this information will be determined at a later date.

2.5 COST ESTIMATES

Planning-level costs were estimated for the top ranking parcels in each prioritization. Resource professionals and mitigation bank managers were surveyed to determine a typical range of costs for land acquisition, buffer or wetland restoration, and long-term maintenance, or endowment, in the San Diego region. Those surveyed had observed that undevelopable land, like floodplains, is much less costly to acquire, per acre, than highly developable upland areas. Therefore, separate costs per acre were used for the riparian and upland areas within each parcel. The estimated land acquisition costs for these separate areas were summed to estimate total land acquisition cost.

Land acquisition and wetlands restoration in coastal areas are typically more costly than opportunities in more inland locations. Preservation opportunities identified in the watershed occurred in inland areas, but where wetlands restoration opportunities occurred in coastal subwatersheds, different costs were used for coastal and inland acquisition and restoration. Land acquisition for inland wetland restoration sites was assumed to be similar to acquisition costs for riparian area preservation and restoration.

The land managers surveyed provided cost estimates for endowment, or long-term maintenance, as well as estimates for upfront costs. The endowment provides funding for land ownership costs and stewardship activities required to protect the existing or restored habitat in perpetuity. Restoration cost estimates include design and construction. Land acquisition, restoration, and endowment represent the major costs associated with the opportunities discussed in this report.

Table 2-2 lists the cost per acre estimates for land acquisition and restoration opportunities in the watershed. These costs per acre are used to calculate total cost and total cost per acre for individual opportunities. Low and high estimates were developed to provide a range of likely costs. These ranges may not include extreme situations, but they include a likely range of costs based on past experience of land managers in the area.

The planning-level cost estimates provided in this report should be used as tools in deciding which opportunities to evaluate further. The cost estimates are not expected to be accurate for budgetary purposes. An appraisal of land value for acquisition sites and a conceptual restoration design for the restoration sites would be needed to provide budgetary-level estimates.

Table 2-2. Cost Estimates per Acre for Land Acquisition and Restoration Opportunities

Type of Opportunity	Estimated Cost per Acre[1]	
	Low	High
Land Acquisition		
Acquisition (Undevelopable - Riparian)	$35,000	$70,000
Acquisition (Developable - Upland)	$100,000	$250,000
Endowment	$12,000	$30,000
Buffer Restoration		
Acquisition	$35,000	$70,000
Restoration	$30,000	$50,000
Endowment	$12,000	$30,000
Non-coastal Wetlands Restoration		
Acquisition	$35,000	$70,000
Restoration	$30,000	$125,000
Endowment	$12,000	$30,000
Coastal Wetlands Restoration		
Acquisition	$400,000	$529,000
Restoration	$307,000	$406,000
Endowment	$12,000	$30,000

[1] Cost estimates were derived from the following personal communications: Bruce April, Caltrans, March 2008; Tom Bobowski, Professors Capital, March 2008; Jim Carter, Environmental Land Solutions, March 2008; Mike McCullom, McCollum Associates, March 2008.

3 Priority Subwatersheds

The first step in the prioritization process was to identify priority areas on a subwatershed level. Sections 0, 0 and 6 then discuss further prioritization to the parcel level for land acquisition and preservation, riparian buffer restoration and wetland restoration, respectively. For prioritization purposes, the watershed has been divided into 30 subwatersheds based on topographic features as shown in Figure 3-1. The subwatershed prioritization focused on prioritizing subwatersheds for land acquisition and preservation, although these priority subwatersheds were also used to prioritize restoration based on habitat connectivity. Tetra Tech developed scoring methods that identified the subwatersheds with the most contiguous and highest quality habitat, both terrestrial and aquatic. Tetra Tech addressed the specific habitats outlined by the WPG in the objectives, including wetland, riparian, and lagoon habitat. The selected priority subwatersheds were then used as screening criteria to prioritize land acquisition and restoration opportunities that can preserve and enhance existing connectivity to protected high quality habitat areas. As discussed in Section 2.4, metrics are calculations used to translate the screening criteria into scores. These scores were used to produce a composite score for each subwatershed that provides an overall measurement of habitat quality.

3.1 SUBWATERSHED METRICS

Eight different metrics were calculated for the Agua Hedionda watershed in order to prioritize the subwatersheds for land acquisition and preservation. Four of the metrics were based on area calculations and assigned ranking scores by quartiles. These included:

- Protected Natural Area (includes upland areas)
- Unprotected Natural Area (includes upland areas)
- Terrestrial Habitat (includes upland areas)
- Riparian Habitat (all natural areas within the targeted buffer)

All of the metrics that utilized quartiles were scored as follows, based on the percentage of area in the subwatershed within the four metric categories:

- 0 – 25% = 2.5
- 25 – 50% = 5
- 50 – 75% = 7.5
- 75 – Max% = 10

The four other metrics primarily utilized monitoring data. These metrics included:

- Aquatic Habitat Rating (qualitative rating of observed aquatic habitat)
- CRAM Code (wetlands function index)
- MSCP/MHCP Indicator Species (locations where sensitive species or species indicative of biodiversity have been observed)
- Lagoon Habitat (subwatersheds that include the three lagoon sections)

The following methods were used to calculate the subwatershed priority metrics. Scoring thresholds for these metrics are documented in Table A-1 of Appendix A.

- Percent Protected Natural Area - The protected natural area was intersected with the subwatersheds to calculate the percent of protected natural area within each subwatershed. Scoring was based on quartiles.
- Percent Unprotected Natural Area - Percent of unprotected natural area was calculated for each subwatershed. Scoring was based on quartiles.
- Percent Riparian Habitat - The total natural area (protected plus unprotected) was intersected with the subwatersheds and the Targeted Buffer Area to calculate the percent of riparian natural area within each subwatershed. Scoring was based on quartiles.
- Percent Terrestrial Habitat – The areas designated as terrestrial habitat were intersected with the subwatersheds to calculate the percent of terrestrial habitat area within each subwatershed. Scoring was based on quartiles.
- Aquatic Habitat Rating - Scores were assigned to each subwatershed based on the observed aquatic habitat rating (Excellent = 10, Good = 7.5, Fair = 5, Poor = 2.5). Scores from subwatersheds with multiple sites were averaged, and scores from downstream watersheds were applied to the adjacent upstream subwatershed if no sites existed for that particular subwatershed.
- CRAM Code - This metric utilized CRAM as an indicator of wetland function. Scores were assigned to each wetland site as follows: Optimal = 10, Suboptimal = 5, Poor/Marginal = 1. Scores were averaged for each subwatershed.
- Number of MSCP Indicator Species – The observed locations of MSCP/MHCP indicator species was intersected with the subwatersheds and subtotaled to yield the count of observed species within each subwatershed. Scores were assigned to the subwatersheds based on quartiles of species counts over all subwatersheds.
- Presence of Lagoon Habitat – This metric is a present-absent metric (present = 10, absent = 1).
- Percent of Parcel with Severe or Very Severe Erosion Hazard – The parcels layer was intersected with the erosion hazard index layer. The percent area classified as either a “severe” or “very severe” erosion hazard was calculated for each parcel.

When calculating the subwatershed composite score, the metric for unprotected natural area was given a double weight to ensure that the top ranking subwatersheds provided not only high quality existing habitat but also substantial opportunity for land acquisition and preservation.

3.2 SUBWATERSHED PRIORITIZATION

Table 3-1 lists the metrics’ values, scores, and composite scores for the subwatersheds as well as the acres of unprotected and protected natural areas by subwatershed. The table is sorted by composite score, showing the top ranking subwatersheds at the top. The composite scores ranged from 1.56 to 8.57, indicating a broad range of habitat quality among the subwatersheds.

Tetra Tech reviewed the subwatershed composite scores and the geographical distribution of various habitats. The project team looked for a group of high scoring subwatersheds that provided opportunities to further protect high quality and highly contiguous terrestrial and aquatic habitat. Tetra Tech found that the subwatersheds with composite scores higher than 6 points contained extensive protected natural areas, provided opportunities to protect natural areas contiguous to protected habitat, or both. The largest number of priority species had been observed in these subwatersheds, and aquatic habitat and CRAM wetland function ratings were relatively high in these subwatersheds. Below a composite score of six, significant unprotected natural area existed in some subwatersheds, but connectivity between habitats was much diminished compared to the high ranking subwatershed as a whole. To ensure that these priority

subwatersheds reflected stakeholder priorities accurately, Tetra Tech confirmed that this grouping of subwatersheds contained properties targeted for acquisition by stakeholders. For the current list of stakeholder priorities, all but one property falls within this priority grouping. The remaining property falls within the linkage subwatershed, which was selected as a priority for buffer restoration under Section 5.1. This grouping of subwatersheds also overlaps with the MHCP core and linkage areas, as well as the MSCP study area, and preservation opportunities within these priority subwatersheds would augment the efforts of the regional conservation plans.

The subwatersheds selected as priorities for land acquisition are shown in Figure 3-1 along with the subwatershed composite scores and the full extent of protected natural area. Unprotected natural area is not shown so that priority properties can remain confidential prior to landowner outreach. It is important to note that only the unprotected natural areas within these subwatersheds will be prioritized for management, not the entire subwatershed. These priorities are also used to identify promising opportunities for buffer and wetlands restoration that would enhance existing habitat connectivity.

Land acquisition was not solely targeted in the priority subwatersheds. In the land acquisition parcel prioritization described in Section 0, land within the priority subwatersheds received higher scores than land outside of these subwatersheds, but several parcels outside of the priority subwatersheds received relatively high scores. The priority subwatersheds were used as one of several metrics to ensure that the top ranking parcels will present the most promising opportunities for habitat protection.

Table 3-1. Subwatershed Metrics and Scores for Land Acquisition Priority

SW ID	Unprotected Natural Area			Protected Natural Area			Terrestrial Habitat		Riparian		Aquatic Habitat Metric/ Score	CRAM Wetland Function Metric/	MSCP Species		Lagoon SW Score	Erosion Index		Comp. Score
	Acres	Metric	Score	Acres	Metric	Score	Metric	Score	Percent	Score			Metric	Score		Metric	Score	
1014	136.0	25.8%	20.0	202.0	38.3%	10.0	76.4%	10.0	28.8%	10.0	10	No Data	1	2.5	1	38.84%	10.0	**8.17**
1008	73.5	13.2%	15.0	249.2	44.8%	10.0	85.4%	10.0	11.9%	10.0	3.75	10	4	5.0	1	12.64%	7.5	**7.23**
1006	48.1	8.6%	15.0	145.7	26.0%	10.0	61.6%	7.5	10.9%	10.0	5	5	18	10.0	1	8.16%	7.5	**7.10**
1013	201.0	22.3%	20.0	61.3	6.8%	7.5	67.0%	10.0	7.7%	7.5	5	No Data	7	7.5	1	4.22%	5.0	**7.06**
1025	217.3	20.2%	15.0	253.5	23.5%	10.0	55.7%	7.5	10.3%	7.5	5	10	4	5.0	1	11.32%	7.5	**6.85**
1016	104.4	15.0%	15.0	68.0	9.7%	7.5	24.9%	5.0	8.0%	7.5	5.83	10	6	7.5	1	8.26%	7.5	**6.68**
1024	440.8	61.5%	20.0	6.5	0.9%	5.0	83.6%	10.0	10.7%	7.5	5	No Data	0	1.0	1	36.72%	10.0	**6.61**
1021	160.8	38.6%	20.0	0.0	0.0%	2.5	76.5%	10.0	13.7%	10.0	5	5	3	2.5	1	23.53%	10.0	**6.60**
1019	165.9	59.7%	20.0	0.0	0.0%	1.0	67.9%	10.0	19.4%	10.0	3.75	No Data	3	2.5	1	46.39%	10.0	**6.47**
1004	13.9	5.1%	10.0	148.0	54.8%	10.0	71.1%	10.0	45.3%	10.0	No Data	No Data	4	5.0	1	6.20%	5.0	**6.38**
1002	25.8	4.2%	5.0	49.8	8.1%	7.5	38.6%	5.0	8.4%	7.5	No Data	No Data	12	10.0	10	7.85%	5.0	**6.25**
1027	81.1	8.0%	10.0	216.5	21.3%	7.5	50.3%	7.5	4.9%	5.0	7.5	No Data	19	10.0	1	7.69%	5.0	**5.94**
1020	219.2	41.3%	20.0	0.0	0.0%	1.0	54.5%	7.5	11.7%	10.0	2.5	5.5	0	1.0	1	20.64%	10.0	**5.85**
1009	0.6	0.1%	5.0	197.0	36.1%	10.0	42.2%	7.5	8.8%	7.5	3.75	No Data	8	10.0	1	13.26%	7.5	**5.81**
1012	32.8	3.9%	5.0	227.2	27.4%	10.0	45.7%	7.5	7.4%	5.0	6.25	10	8	10.0	1	4.14%	2.5	**5.73**
1022	305.1	32.8%	20.0	5.8	0.6%	2.5	64.4%	10.0	5.5%	5.0	3.33	3	0	1.0	1	36.41%	10.0	**5.58**
1015	79.7	10.7%	15.0	34.9	4.7%	5.0	17.2%	2.5	5.1%	5.0	5	10	1	2.5	1	5.30%	5.0	**5.10**
1007	30.7	7.3%	10.0	34.4	8.2%	7.5	61.4%	7.5	3.3%	2.5	5	No Data	7	7.5	1	0.10%	2.5	**4.83**
1026	148.3	18.0%	15.0	45.8	5.6%	7.5	32.8%	5.0	7.3%	5.0	2.5	No Data	4	5.0	1	3.21%	2.5	**4.83**
1010	30.8	7.1%	10.0	12.2	2.8%	5.0	15.9%	2.5	5.7%	5.0	No Data	10	0	1.0	1	12.61%	7.5	**4.67**
1000	2.2	1.3%	5.0	1.9	1.1%	5.0	7.7%	2.5	2.2%	2.5	No Data	No Data	0	1.0	10	15.83%	10.0	**4.50**
1023	96.9	8.8%	15.0	2.3	0.2%	2.5	17.2%	2.5	3.6%	5.0	5	5.5	0	1.0	1	1.12%	2.5	**4.00**
1011	61.3	4.8%	10.0	2.6	0.2%	2.5	21.0%	5.0	0.5%	2.5	2.5	2	32	10.0	1	3.88%	2.5	**3.80**
1018	47.8	5.2%	10.0	1.7	0.2%	2.5	18.2%	5.0	1.2%	2.5	3.75	5	3	2.5	1	1.38%	2.5	**3.48**
1017	40.9	4.2%	10.0	0.6	0.1%	2.5	8.6%	2.5	1.9%	2.5	4.17	5	2	2.5	1	0.10%	2.5	**3.27**
1005	24.6	2.5%	5.0	49.6	5.1%	5.0	23.2%	5.0	0.5%	2.5	No Data	No Data	1	2.5	1	7.94%	5.0	**3.25**
1028	0.6	0.1%	5.0	6.7	1.2%	5.0	20.1%	5.0	0.7%	2.5	No Data	No Data	0	1.0	1	0.00%	1.0	**2.56**
1003	5.5	1.2%	5.0	1.8	0.4%	2.5	15.3%	2.5	0.0%	1.0	No Data	No Data	0	1.0	1	5.20%	5.0	**2.25**
999	0.0	0.0%	2.0	0.0	0.0%	1.0	10.4%	2.5	0.0%	1.0	No Data	No Data	3	2.5	1	14.05%	7.5	**2.19**
1001	0.0	0.0%	2.0	0.0	0.0%	1.0	5.1%	2.5	0.0%	1.0	No Data	No Data	2	2.5	1	0.07%	2.5	**1.56**

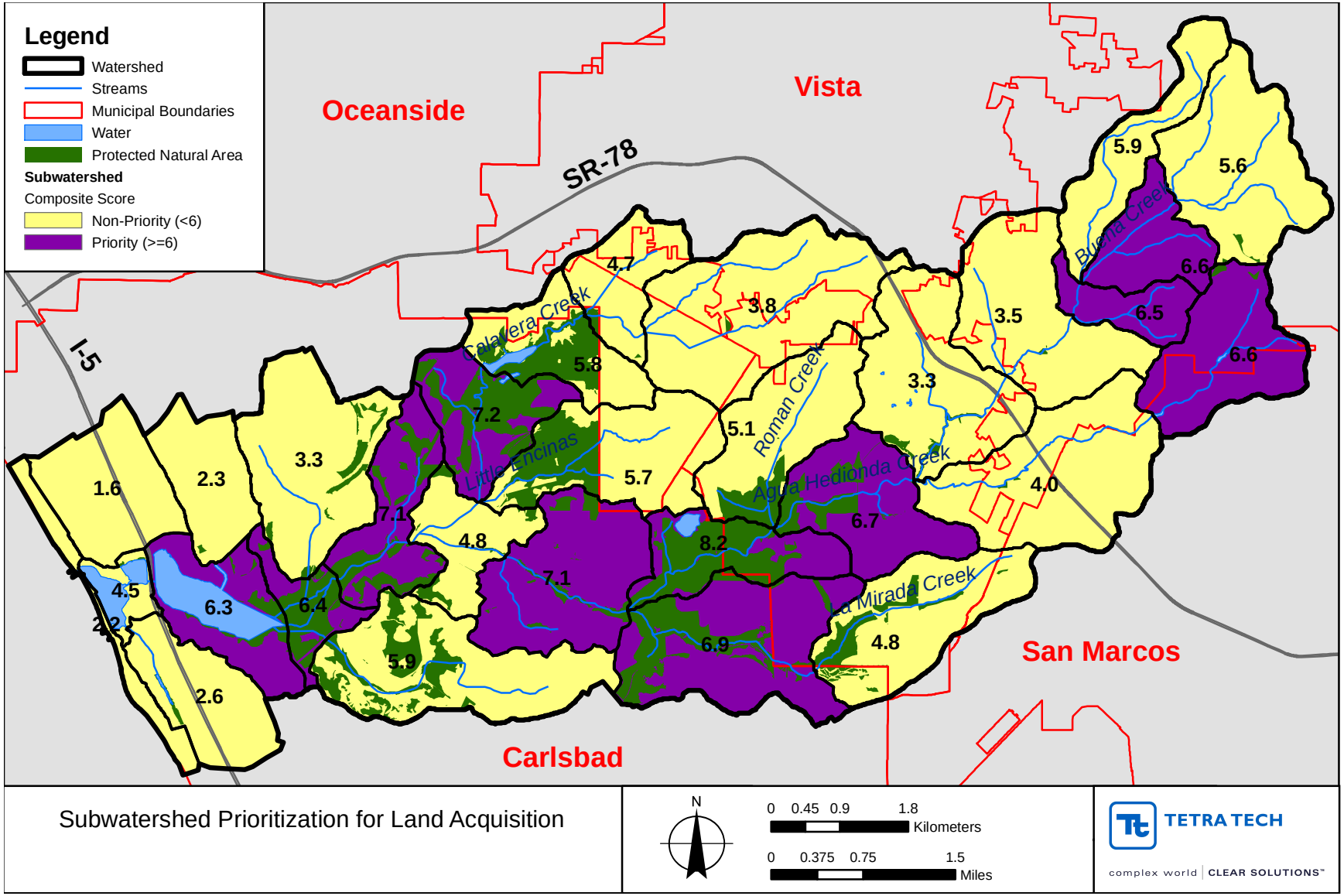

Figure 3-1. Subwatershed-level Land Acquisition Scores and Selected Priority Subwatersheds

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4 Land Acquisition and Preservation

Parcels with unprotected natural area were considered opportunities for land acquisition and habitat preservation within the watershed. Since the priority subwatersheds provide a measure of high quality habitat within the watershed, the parcel-level prioritization focused more on evaluating the quality of the opportunity itself rather than the quality of the surrounding habitat. The priority subwatersheds were used to ensure that top ranking parcels were selected from areas containing high quality, contiguous habitat, and other metrics were used to measure the quality of the preservation opportunities themselves.

4.1 PARCEL METRICS

Six different metrics were calculated for the Agua Hedionda watershed in order to prioritize the parcels for land acquisition of unprotected natural areas. Two of the metrics were based on area calculations and assigned ranking scores by quartiles. These included:

- Unprotected natural area (includes upland areas)
- Riparian Habitat (all natural areas, protected and unprotected, within the targeted buffer)

The metrics that utilized quartiles were scored as follows:

- 0 – 25% = 2.5
- 25 – 50% = 5
- 50 – 75% = 7.5
- 75 – Max% = 10

The other metrics included:

- Priority Subwatersheds (based on subwatershed prioritization)
- Upstream of Restoration Reach (parcels upstream to potential restoration site and within same watershed or adjacent, upstream watershed)
- Invasive Species Treatment Site (parcels intersecting or within 50 feet of treatment site)
- Erosion Hazard (based on SSURGO data for susceptibility to erosion due to land development)

The following methods were used to calculate the parcel priority metrics for land acquisition. The scoring thresholds for these metrics are documented in Table B-1of Appendix B.

- Percent Unprotected Natural Area within Parcel – The percent of unprotected natural area within each parcel was calculated by intersecting the parcel boundaries with the unprotected natural areas. Scoring was based on quartiles.
- Percent Riparian Habitat - The total natural area (protected plus unprotected) was intersected with the parcel boundaries and the targeted stream buffer to calculate the percent of riparian natural area within each parcel. Scoring was based on quartiles.
- Located in a Priority Subwatershed – Parcels located in a subwatershed rated as a priority for land acquisition (composite score > 6.0) according to the subwatershed prioritization were assigned a score of 10 while those located in a non-priority subwatershed were assigned a score of 1.
- Location Relative to Restoration Reach – Based on the location of the parcel centroid, parcels located in subwatersheds with potential stream restoration reaches were selected and assigned a

score of 10 if the centroid was located in the targeted stream buffer and upstream of the restoration reach, or a 7.5 if located upland from the stream buffer and upstream of the restoration reach. Parcels located in subwatersheds upstream of a potential stream restoration reach were also scored; a 5 was assigned if located inside the stream buffer or a 2.5 if located upland from the stream buffer. All other parcels were assigned a score of 1.

- Containing Invasive Species Treatment Sites – A 50-foot buffer was applied to areas designated as invasive species treatment sites to account for GPS error or neighboring infestations. All parcels that intersected the 50-foot buffer but not the treatment site were scored a 10. Parcels intersecting a treatment site and labeled as "Treated" were scored a 7.5. Parcels that intersected a site labeled "Untreated" where future treatment was unlikely were scored a 1. Parcels intersecting treatment sites where future treatment was uncertain received a score of 2.5. Parcels intersecting treatment sites that were not included in the previous categories and marked as "Untreated" received a score of 5; SELC indicated to Tetra Tech that these sites would be treated in the future.
- Percent of Parcel with Severe or Very Severe Erosion Hazard – The parcels layer was intersected with the erosion hazard index layer. The percent area classified as either a "severe" or "very severe" erosion hazard was calculated for each parcel. Scoring was based on quartiles.

When calculating the parcel composite score, the metric for unprotected natural area was given a double weight to ensure that the top ranking subwatersheds provided substantial opportunity for land acquisition and preservation.

4.2 PARCEL PRIORITIZATION

Table B-2 in Appendix B lists the metrics values, scores, and composite scores for the top 100 parcels considered for land acquisition opportunities. The table is sorted by composite score, showing the top ranking parcels at the top. A unique ID is assigned to each parcel based on the rank; these IDs are used instead of parcel numbers so that location and ownership information remain confidential. Nearly 1,400 parcels with unprotected natural area were evaluated, and their composite scores ranged from 1.4 to 9.2, indicating a broad range of preservation opportunity within the watershed.

Table 4-1 lists the 13 parcels identified for the draft list of top-ranking parcels. Tetra Tech selected these parcels by finding a natural break in the composite scores where 10 to 20 parcels provided substantial opportunity for natural area preservation. High resolution aerial photographs, taken in 2005, were used to verify the extent of unprotected natural area and riparian vegetation on the sites. Table 4-1 lists the mapped acres of unprotected natural area and riparian vegetation (from the SANDAG 1995 Vegetation Data) and the acres verified with aerial photographs. Parcels were removed from consideration where most or all of the natural area was developed. Tetra Tech also removed a number of parcels that were known to be recently cleared and approved for development. Some lower ranking parcels were removed, but a comprehensive evaluation was only conducted for the top ranking parcels.

Table 4-1 provides the length of stream within each parcel, the distance between the unprotected natural area and adjacent development, and the dominant vegetation types found within the parcel. The locations of the preservation opportunities are not provided in this report so that priority properties can remain confidential prior to landowner outreach. All of the draft top-ranking parcels are privately owned.

The length of stream measurements provide additional screening criteria to ensure that the top-ranking parcels will help maintain watershed functions, including stream bank protection. All parcels in this draft list contain riparian vegetation, and streams intersect several of the properties, including one with over 2,800 feet of stream. Overall, the draft list of top ranking parcels, if implemented, would be protecting watershed functions pertaining to stream bank stability and water quality.

The distances between unprotected natural area and adjacent development provide a measure of development pressure. All unprotected natural areas in the top ranking parcels are within 800 feet of development, and some are directly adjacent to development. This proximity to development indicates that these natural areas are likely to be threatened by development in the near future.

The vegetation types listed in Table 4-1 illustrate the diversity of habitat that can be preserved by the draft top ranking parcels. Although these parcels support a variety of vegetation types, the most common types represented are Diegan Coastal Sage Scrub, Southern Coast Live Oak Riparian Forest, and Southern Mixed Chaparral.

Lower scoring parcels should also be considered for implementation. The draft top-ranking parcels and ranked list of all opportunities were developed as tools to be used for the Agua Hedionda WMP development. Once all functional benefits are evaluated, including stream restoration and BMP retrofits, lower scoring parcels may provide important opportunities for enhancing connectivity between high ranking parcels and other management opportunities.

Table 4-2 provides the planning-level cost estimates of the top ranking land acquisition opportunities, based on costs per acre documented in Section 2.5. Land acquisition costs are estimated for all opportunities in Table 4-2 because all of these properties are located on private land. Land acquisition by a government agency or conservation organization, either by fee simple or through an easement, provides a means for preserving natural areas in perpetuity. Without land acquisition, it cannot be guaranteed that natural areas will be preserved from clearing or development in the future.

Total cost per acre is provided to compare the cost-effectiveness of the opportunities. Opportunities that have proportionally less developable land are estimated to have a lower total cost per acre. The costs per acre ranges among the top ranking parcels do not differ substantially since most of the parcels have similar proportions of riparian (undevelopable) and upland (developable) area. The opportunities with the lowest cost ranges (LA-08 and LA-15) are those that have relatively small tracts of unprotected natural area with largely riparian vegetation. It is important to note that some acquisition opportunities might present economies for scale that are not reflected in the planning-level cost estimates. It may be more cost effective to prioritize the opportunities with the largest tracts of land (LA-06, LA-10, and LA-11) and minimize the number of landowners involved.

The draft list of top-ranking parcels presents what are likely to be the most promising land acquisition opportunities based on the WPG's goals and objectives. This list is subject to change based on an evaluation of all management needs and opportunities during WMP development. Local governments, resource agencies, conservation organizations, and other parties will need to further evaluate which properties meet their individual goals. The Agua Hedionda WMP will provide recommendations on how these top-ranking opportunities can be integrated with other management opportunities to provide enhanced functional uplift within the watershed.

Table 4-1. Draft List of Top Ranking Parcels for Land Acquisition

Site ID	Composite Score	Unprotected Natural Area (ac)		Riparian Area (ac)		Stream Length within Parcel (ft)	Proximity to Development (ft)	Vegetation Types
		Mapped	Aerial	Mapped	Aerial			
LA-1	9.2	8.5	8.5	3.6	3.6	400	150	Diegan Coastal Sage Scrub
LA-2	9.2	15.7	15.7	8.9	8.9	990	1	Diegan Coastal Sage Scrub, Southern Mixed Chaparral
LA-3	9.2	6.1	6.1	3.3	3.3	390	1	Diegan Coastal Sage Scrub, Southern Mixed Chaparral
LA-4	9.2	7.6	7.6	4.6	4.6	615	200	Diegan Coastal Sage Scrub
LA-5	9.2	5.4	5.4	2.0	2.0	0	15	Coastal Sage-Chaparral Scrub, Southern Coast Live Oak Riparian Forest, Chaparral, Southern Maritime Chaparral
LA-6	8.8	11.8	11.8	6.4	6.4	690	20	Diegan Coastal Sage Scrub, Southern Mixed Chaparral, Southern Sycamore-alder Riparian Woodland, Eucalyptus Woodland
LA-7	8.8	39.6	39.0	14.0	14.0	1,520	10	Diegan Coastal Sage Scrub, Southern Mixed Chaparral
LA-8	8.8	2.3	2.3	2.3	2.3	0	20	Diegan Coastal Sage Scrub, Southern Coast Live Oak Riparian Forest
LA-9	8.6	6.4	5.7	2.1	1.9	0	600	Diegan Coastal Sage Scrub, Southern Mixed Chaparral, Southern Riparian Scrub, Southern Maritime Chaparral
LA-10	8.3	6.5	6.4	0.3	0.3	0	300	Diegan Coastal Sage Scrub
LA-11	8.3	50.1	49.4	1.7	1.7	0	800	Diegan Coastal Sage Scrub
LA-12	8.3	38.6	38.6	15.1	15.1	2,800	700	Diegan Coastal Sage Scrub, Southern Sycamore-alder Riparian Woodland, Eucalyptus Woodland
LA-13	8.3	2.4	1.5	1.4	1.1	160	40	Diegan Coastal Sage Scrub

Table 4-2. Range of Cost Estimates for Top Ranking Land Acquisition Opportunities

ID	Unprotected Natural Area (ac)	Land Acquisition Cost		Endowment Cost		Total Cost		Total Cost Per Acre	
		Low	High	Low	High	Low	High	Low	High
LA-01	8.5	$617,000	$1,479,000	$102,000	$254,000	$719,000	$1,733,000	$85,000	$204,000
LA-02	15.7	$987,000	$2,311,000	$188,000	$470,000	$1,175,000	$2,781,000	$75,000	$178,000
LA-03	6.1	$391,000	$919,000	$73,000	$182,000	$464,000	$1,101,000	$76,000	$181,000
LA-04	7.6	$455,000	$1,058,000	$91,000	$227,000	$546,000	$1,285,000	$72,000	$170,000
LA-05	5.4	$404,000	$974,000	$64,000	$161,000	$468,000	$1,135,000	$87,000	$212,000
LA-06	11.8	$759,000	$1,788,000	$141,000	$353,000	$900,000	$2,141,000	$77,000	$182,000
LA-07	39.0	$2,987,000	$7,223,000	$467,000	$1,169,000	$3,454,000	$8,392,000	$89,000	$215,000
LA-08	2.3	$82,000	$163,000	$28,000	$69,000	$110,000	$232,000	$48,000	$100,000
LA-09	5.7	$451,000	$1,093,000	$69,000	$172,000	$520,000	$1,265,000	$91,000	$220,000
LA-10	6.4	$619,000	$1,544,000	$76,000	$191,000	$695,000	$1,735,000	$109,000	$272,000
LA-11	49.4	$4,832,000	$12,051,000	$593,000	$1,482,000	$5,425,000	$13,533,000	$110,000	$274,000
LA-12	38.6	$2,880,000	$6,936,000	$464,000	$1,159,000	$3,344,000	$8,095,000	$87,000	$210,000
LA-13	1.5	$79,000	$177,000	$18,000	$45,000	$97,000	$222,000	$65,000	$148,000

4.3 STAKEHOLDER RECOMMENDED OPPORTUNITIES

Tetra Tech asked WPG members, resource agencies, conservation organizations, and other stakeholders to recommend locations in the watersheds for land acquisition and preservation. Information was provided on the location, amenities, and status of acquisition for 23 properties in the watershed.

Some of these properties contain contiguous areas of natural, high quality habitat, while others contain large cleared areas or agricultural land. Other properties contain contiguous but relatively small areas of natural vegetation. Although all stakeholder-recommended priorities are located within the priority and linkage subwatersheds, many of these properties did not coincide with the draft top-ranking parcels. The groups and individuals who recommended these properties used different screening criteria and prioritization methods when identifying properties for acquisition. This report's methods differed from the stakeholder criteria in the following ways:

- **Upland Habitat Restoration:** Stakeholders targeted properties with large cleared areas or agricultural land area for upland habitat restoration, which was not within Tetra Tech's scope of work and was not specifically identified by the WPG as a priority for the Agua Hedionda WMP.
- **Present vs. Absent Scale:** A number of the stakeholder-recommended properties were evaluated using a present or absent scale; therefore, if one priority feature, such as a wetland, was located within a parcel, that parcel was weighted the same as another property with a wetland area, regardless of the size difference between the two wetlands.
- **Trail Access:** Properties were prioritized by stakeholders where land acquisition would provide additional trails connecting to existing trails.
- **Proximity to a Specific Reserve:** Some properties were prioritized for being adjacent to a specific ecological reserve. Tetra Tech's screening criteria treated all reserves and other protected areas with equal weight.
- **Cultural Resources:** Stakeholders prioritized some properties if they were likely to contain paleontological, archeological, or other cultural resources.

Tetra Tech's screening criteria were driven by the WPG's goals and objectives which did not include the above priorities. In addition to the above differences, Tetra Tech used several screening criteria that were not directly considered by the stakeholders. The stakeholder-recommended properties with lower scores tended not to contain erodibility hazards and/or were not located upstream of a restoration reach.

It is important to note that both lists of priorities contain valuable properties in need of preservation, and that the prioritization methods did have a number of similarities. Both methods prioritized opportunities for preserving high quality habitat containing native vegetation. Both prioritizations also considered connectivity to existing protected areas and planned conservation areas, including MHCP core and linkage areas as priorities. Riparian habitat preservation and water quality protection was considered by both methods as well.

After reviewing the prioritization methods, the WPG may consider adding a stakeholder screening priority metric to the methods so that these properties are given a higher priority. Since different methods were used to identify these properties, these properties may not receive scores comparable to the top-ranked parcels, even with a stakeholder priority metric. Regardless of further revisions to the prioritization, the stakeholder recommended opportunities should be considered alongside the top-ranking parcels during implementation.

Location, ownership, and supplemental information for these opportunities will be included in the project database being developed by Tetra Tech. The Agua Hedionda WMP will provide recommendations on how these opportunities can be integrated with other management opportunities to provide enhanced functional uplift within the watershed.

5 Riparian Buffer Restoration

Riparian buffer restoration will provide an important management strategy when coupled with preservation, bioengineering, and BMP retrofit opportunities. Much of the riparian vegetation in the watershed has been disturbed, and a significant area of land exists where riparian vegetation can be restored. It will be important to prioritize riparian buffer restoration where restoration will provide the greatest benefits for wildlife populations and water quality. One of the WPG's objectives is to enhance and restore riparian habitat. Restoration near or adjacent to existing habitat will directly address this objective because the existing habitat quality will be enhanced by connectivity to the restored areas. When implemented upstream of stream restoration projects, riparian buffer restoration will help protect existing and restored aquatic habitat downstream. Buffer restoration can also enhance efforts to protect mature trees in riparian corridors and will help to establish a new generation of Coast Live Oak and other priority riparian species. Riparian buffers will also provide erosion control and some removal of stormwater pollutants.

Riparian buffer restoration management measures, as considered in this report, would include restoration of riparian vegetation and invasive species removal, as needed. The Bioengineering Management and Implementation Plan will recommend stream restoration opportunities that use additional measures to restore stream functionality.

5.1 PARCEL METRICS

Seven metrics were selected to prioritize the parcels for potential buffer restoration. Buffer widths were determined based on the "Targeted Buffer Area and Existing Riparian Habitat" criteria discussed on page 7 of this document. Only the parcels containing areas of buffer restoration opportunity (BRO) were included in this analysis. Four of the metrics utilized quartiles of percent area calculations for scoring. These metrics included:

- Percent BRO Area by Subwatershed (subwatershed quartile scores assigned to parcels located within each subwatershed)
- Percent BRO Area by Parcel (percent of total watershed BRO area within each parcel)
- Percent BRO Area Occupied by Sewer Constraints (percent of parcel BRO area)
- Percent BRO Area Occupied by Roadways and Bridges (percent of parcel BRO area)

All of the metrics that utilized quartiles were scored as follows (the percentages are reversed for a constraint):

- 0 – 25% = 2.5
- 25 – 50% = 5
- 50 – 75% = 7.5
- 75 – Max% = 10

The three other metrics were assigned scores based on the location of the parcel relative to relevant attributes in the watershed. These metrics included:

- Priority and Linkage Subwatersheds (based on subwatershed prioritization)
- Upstream of Restoration Reach (parcels upstream to potential restoration site and within same watershed or adjacent, upstream watershed)

- Mature Riparian Trees (scoring awarded to parcels adjacent to or upstream of tree species endangered by channel erosion and bank undercutting)

The following methods were used to calculate the parcel priority metrics for buffer restoration. The scoring thresholds for these metrics are documented in Table C-1 of Appendix C.

- Percent BRO Area by Subwatershed – Restoration Opportunity, the layer containing undeveloped land outside of natural areas, was first intersected with the Targeted Buffer Area, which resulted in the Buffer Restoration Opportunity (BRO) area. A subsequent intersection was performed with the subwatersheds in order to calculate the percent of watershed-wide BRO area within each subwatershed.
- Percent BRO Area by Parcel –The BRO area was also intersected with the parcels. This layer, hereafter referred to as BRO_Parcel, was utilized to calculate the percent of total watershed-wide BRO area within each parcel.
- Percent BRO Area Occupied by Sewer Constraints – Known sanitary sewer lines were first assigned a 30-foot buffer to approximate sewer easement width. To prevent the impacts from both sewer and road/bridge easements from being scored twice, the road buffer (described below) was erased from the sewer easement buffer. This layer was subsequently intersected with the BRO_Parcel areas and used to calculate the percent of each parcel's BRO area that is constrained by sewer easements.
- Percent BRO Area Occupied by Road/Bridge Constraints – The rights-of-way for the major roads in the watershed were combined with a 20-foot buffer on all the secondary/subdivision roads not included in the rights-of-way. This layer was then intersected with the BRO_Parcel layer and used to calculate the percent of each parcel's BRO area that is constrained by either roads or bridges.
- Priority and Linkage Subwatersheds – Parcels containing BRO area and residing within priority subwatersheds were scored a 10 while the remaining parcels were scored a 1. One additional subwatershed was classified as "linkage subwatershed" due to the amount of BRO area and connectivity between priority subwatersheds and this additional linkage subwatershed. BRO area parcels located in the linkage subwatershed were also scored a 10 for this metric.
- Location Relative to Mature Riparian Trees – Parcels were selected based on their location relative to the approximated locations of mature riparian trees. Parcels that intersect with or were located within 500 feet upstream from mature riparian trees were scored a 10 while all other parcels were scored a 1.
- Location Relative to Restoration Reach – Based on the location of the parcel centroid, BRO parcels located in subwatersheds with potential stream restoration reaches were selected and assigned a score of 10 if the centroid was located in the targeted stream buffer and upstream of the restoration reach, or a 7.5 if located upland from the stream buffer and upstream of the restoration reach. Parcels located in subwatersheds upstream of a potential stream restoration reach were also scored; a 5 was assigned if located inside the stream buffer or a 2.5 if located upland from the stream buffer. All other parcels within the watershed were assigned a score of 1.

When calculating the parcel composite score, the metrics Percent BRO Area by Parcel and Subwatershed were given a double weight to ensure that the top ranking parcels provided substantial opportunity for riparian buffer restoration.

5.2 PARCEL PRIORITIZATION

Figure 5-1 displays the location of the riparian buffer restoration opportunities in the watershed and their range of composite scores. The extents of terrestrial habitat and protected natural areas are shown for

reference and to illustrate the habitat connectivity that could be provided by the buffer restoration opportunities. All undeveloped land within the Targeted Buffer Area was evaluated as a buffer restoration opportunity. Figure 5-1 also illustrates the extent of riparian buffer lost to development: all area within the Targeted Buffer Area not shaded as buffer restoration opportunity, terrestrial habitat, or protected natural area represents land where development has permanently replaced riparian habitat.

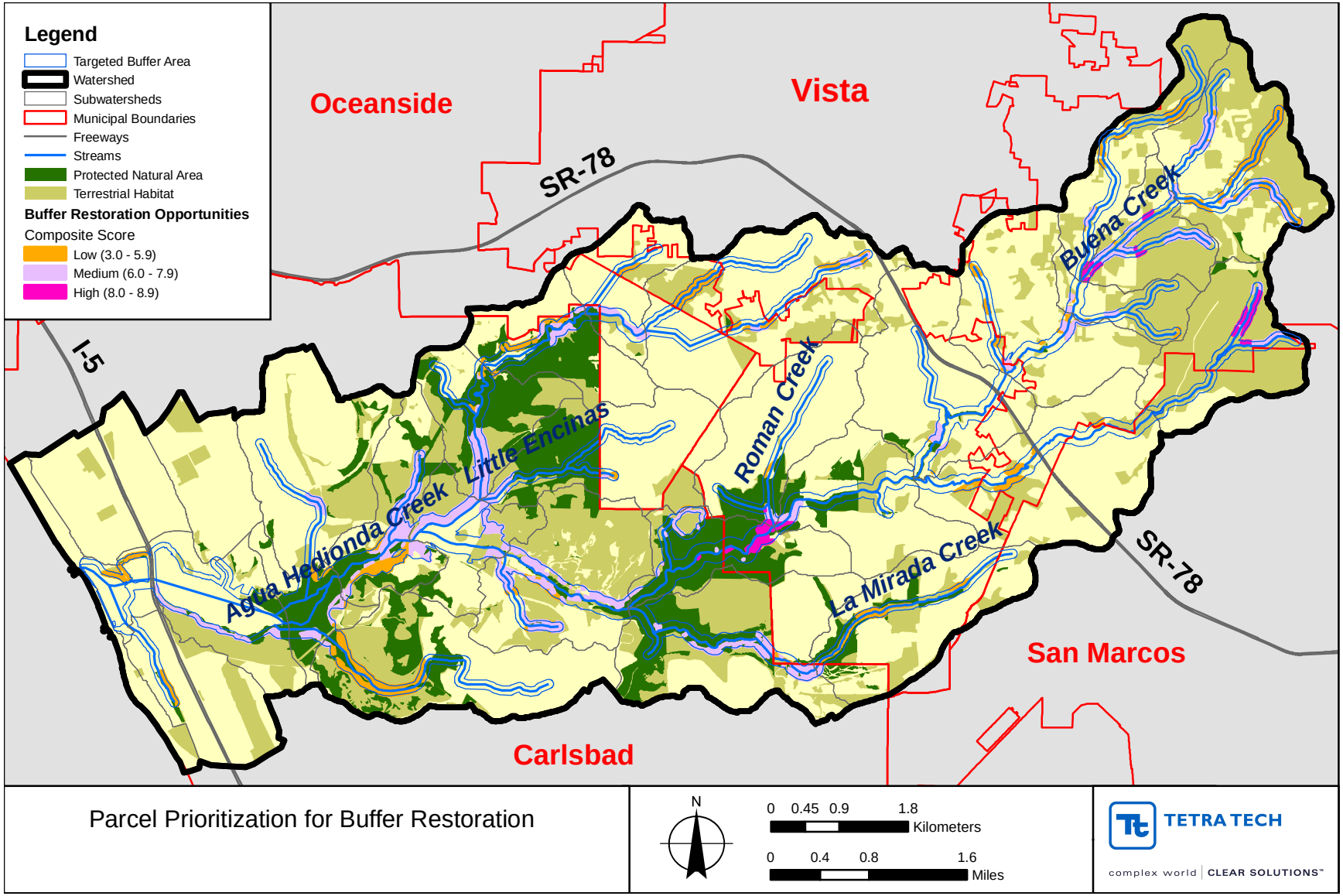

Figure 5-1. Riparian Buffer Restoration Opportunity Score
(Areas have been enlarged proportionally and appear larger than actual acreage.)

Table C-1 in Appendix C lists the metrics values, scores, and composite scores for the top 100 parcels considered for buffer restoration opportunities. The table is sorted by composite score, showing the top ranking parcels at the top. A unique ID is assigned to each parcel based on its rank; these IDs are used instead of parcel numbers so that location and ownership information remain confidential. Nearly 700 parcels with buffer restoration opportunity were evaluated, and their composite scores ranged from 3 to 8.9, indicating a broad range of buffer restoration opportunity within the watershed.

Table 5-1 lists the 16 parcels identified for the draft list of top-ranking parcels based on buffer restoration opportunity composite score. Tetra Tech selected these parcels by finding a natural break in the composite scores where 10 to 20 parcels provided substantial opportunity for riparian buffer restoration. High resolution aerial photographs, taken in 2005, were used to verify the extent of riparian restoration opportunity on the sites. Tetra Tech reviewed land that has recently been cleared or approved for development that coincided with the all-buffer restoration opportunities. These opportunities were not removed because it is likely that a portion of the opportunity will not be developed, and buffer restoration could still be pursued during WMP implementation. A comprehensive evaluation was only conducted for the top ranking parcels.

Table 5-1 lists the mapped acres (from the SANDAG 1995 Vegetation Data) and the acres verified with aerial photographs. To illustrate the potential habitat connectivity provided by these opportunities, this table also provides the proximity of the opportunities to protected and unprotected natural area. The opportunities were generally isolated from protected natural area, but most top ranking parcels were adjacent to unprotected natural area. This indicates that coordination between land acquisition and restoration efforts will be important to enhancing overall habitat connectivity.

Table 5-1. Draft List of Top Ranking Parcels for Riparian Restoration

Site ID	Composite Score	Riparian Restoration Opportunity (ac)		Proximity to Protected Natural Area (ft)[1]	Proximity to Unprotected Natural Area (ft)[1]
		Mapped	Aerial		
BR-01	8.89	10.98	10.98	< 50 ft	Adjacent
BR-02	8.61	4.29	4.29	< 100 ft	Adjacent
BR-03	8.33	1.91	1.88	Isolated	Adjacent
BR-04	8.33	1.60	1.60	Isolated	Adjacent
BR-05	8.33	1.14	0.96	Isolated	Adjacent
BR-06	8.33	0.94	0.84	Isolated	Adjacent
BR-07	8.33	0.84	0.68	Isolated	Adjacent
BR-08	8.06	4.30	4.10	Isolated	Adjacent
BR-09	8.06	3.00	3.00	Adjacent	Adjacent
BR-10	8.06	1.32	1.28	Isolated	Adjacent
BR-11	8.06	1.26	1.18	Isolated	Adjacent
BR-12	8.06	1.13	1.10	Isolated	< 50ft
BR-13	8.06	1.07	1.07	Isolated	Adjacent
BR-14	8.06	0.80	0.80	Isolated	Adjacent
BR-15	8.06	0.72	0.67	Isolated	Adjacent
BR-16	8.06	0.25	0.25	Adjacent	Isolated

[1] "Isolated" indicates that the restoration opportunity was greater than 100 feet from the relevant natural area. "Adjacent" indicates that the opportunity was directly adjacent to the relevant natural area.

Table 5-2 provides the planning-level cost estimates for the draft top ranking riparian buffer restoration opportunities, based on costs per acre documented in Section 2.5. The cost per acre for privately owned opportunities is assumed to range from $77,000 to $150,000 according to the estimates in Section 2.5. Riparian buffer restoration on publicly owned properties is estimated to cost between $40,000 and $80,000 per acre, assuming that no land acquisition is required. Land acquisition by a government agency or conservation organization, either by fee simple or through an easement, provides preservation of the restored riparian habitat in perpetuity. Without land acquisition, it cannot be guaranteed that the restored habitat will be preserved from clearing or development in the future. For some restoration opportunities, the current landowner may allow restoration without land acquisition; in these cases, it will be important to consider how long the site will be protected from clearing or development.

Economies of scale are likely to be realized by prioritizing those draft, top ranking parcels with the largest areas of opportunity. These opportunities include BR-01, BR-02, and BR-08. BR-02 is likely to be among the most cost-effective opportunities because it is located on public land.

The list of top-ranking parcels presents what are likely to be the most promising riparian buffer restoration opportunities based on the WPG's goals and objectives. This list is subject to change based on an evaluation of all management needs and opportunities during WMP development. Local governments, resource agencies, conservation organizations, and other parties will need to further evaluate which properties meet their individual goals. The Agua Hedionda WMP will provide recommendations on how these top-ranking opportunities can be integrated with other management opportunities to provide enhanced functional uplift within the watershed.

Table 5-2. Range of Cost Estimates for Top Ranking Buffer Restoration Opportunities

ID	Acres	Land Acquisition Cost		Restoration Cost		Endowment Cost		Total Cost	
		Low	High	Low	High	Low	High	Low	High
BR-01	10.98	$384,000	$769,000	$329,000	$549,000	$132,000	$329,000	$845,000	$1,647,000
BR-02[1]	4.29			$129,000	$214,000	$51,000	$129,000	$180,000	$343,000
BR-03	1.88	$66,000	$132,000	$57,000	$94,000	$23,000	$57,000	$146,000	$283,000
BR-04	1.60	$56,000	$112,000	$48,000	$80,000	$19,000	$48,000	$123,000	$240,000
BR-05	0.96	$34,000	$67,000	$29,000	$48,000	$12,000	$29,000	$75,000	$144,000
BR-06	0.84	$29,000	$59,000	$25,000	$42,000	$10,000	$25,000	$64,000	$126,000
BR-07	0.68	$24,000	$48,000	$20,000	$34,000	$8,000	$20,000	$52,000	$102,000
BR-08	4.10	$143,000	$287,000	$123,000	$205,000	$49,000	$123,000	$315,000	$615,000
BR-09[1]	3.00			$90,000	$150,000	$36,000	$90,000	$126,000	$240,000
BR-10	1.28	$45,000	$90,000	$38,000	$64,000	$15,000	$38,000	$98,000	$192,000
BR-11	1.18	$41,000	$83,000	$36,000	$59,000	$14,000	$36,000	$91,000	$178,000
BR-12	1.10	$39,000	$77,000	$33,000	$55,000	$13,000	$33,000	$85,000	$165,000
BR-13	1.07	$37,000	$75,000	$32,000	$53,000	$13,000	$32,000	$82,000	$160,000
BR-14	0.80	$28,000	$56,000	$24,000	$40,000	$10,000	$24,000	$62,000	$120,000
BR-15	0.67	$23,000	$47,000	$20,000	$33,000	$8,000	$20,000	$51,000	$100,000
BR-16[1]	0.25			$7,000	$12,000	$3,000	$7,000	$10,000	$19,000

[1]No acquisition cost was assumed because the property is owned by a public entity.

6 Wetlands Restoration

As discussed in Section 1, the Agua Hedionda watershed has most likely lost the majority of its historical wetland habitat. Wetlands restoration would seek to restore some of this lost habitat while enhancing the connectivity of overall habitat in the watershed. Beyond habitat, wetlands restoration would also restore the water quality functions of wetlands, including flood control, sediment trapping, and nutrient attenuation.

The types of wetlands restoration measures will vary depending on site-specific characteristics, however, they will typically involve grading and excavation to restore wetland hydrology, invasive species removal, and revegetation.. Once properties are identified for landowner outreach and implementation, the opportunities will need to be evaluated in the field and conceptual wetlands restoration designs would need to be developed for each opportunity.

Tetra Tech spoke with a number of mitigation bank managers during the development of this report, and those managers generally indicated that wetlands restoration opportunities are difficult to find in the San Diego area, and that coastal wetlands restoration opportunities tend to be both difficult to find and expensive. To ensure that remaining opportunities are captured within the Agua Hedionda WMP, Tetra Tech developed comprehensive geographic information system (GIS) screening methods that identified undeveloped land where wetland vegetation has been cleared or where wetland hydrology has been altered or destroyed. Tetra Tech also documented stakeholder recommendations for wetland restoration opportunities to supplement the opportunities identified through the GIS analysis.

6.1 PARCEL METRICS

Seven metrics were selected to prioritize the parcels for potential wetlands restoration. Only the parcels containing areas of wetland restoration opportunity (WRO) were included in this analysis. As a reminder, WROs occur where undeveloped land (outside of natural areas) intersects with hydric soils and the National Wetlands Inventory. Three of the metrics utilized quartiles of percent area calculations for scoring. These metrics included:

- Percent WRO Area by Parcel (percent of total watershed-wide WRO area within each parcel)
- Percent WRO Area Occupied by Sewer Constraints (percent of parcel WRO area)
- Percent WRO Area Occupied by Roadways and Bridges (percent of parcel WRO area)

All of the metrics that utilized quartiles were scored as follows (the percentages are reversed for a constraint):

- 0 – 25% = 2.5
- 25 – 50% = 5
- 50 – 75% = 7.5
- 75 – Max% = 10

The four other metrics assigned scores based on the location of the parcel relative to relevant attributes in the watershed. These metrics included:

- Priority and Linkage Subwatershed (based on subwatershed prioritization)
- CRAM Code (wetlands function index)
- Coastal Subwatersheds

- Stakeholder Priority (within a parcel that includes a restoration opportunity identified by WPG members of other stakeholders)

The following methods were used to calculate the parcel priority metrics for wetlands restoration. The scoring thresholds for these metrics are documented in Table D-1 of Appendix D.

- Percent WRO Area by Parcel – Locations of current or historical wetlands were approximated by using the total area of hydric soils and NWI wetlands (see Section 2.2 for further explanation). This wetland area was intersected with Restoration Opportunity, the layer containing all of the restoration opportunities within the watershed. The WRO area was also intersected with the parcels. This layer, hereafter referred to as WRO_Parcel, was utilized to calculate the percent of total watershed WRO area within each parcel.
- Percent WRO Area Occupied by Sewer Constraints – Known sanitary sewer lines were first assigned a 30-foot buffer to approximate sewer easement width. To prevent the impacts from both sewer and road/bridge easements from being scored twice, the road buffer (described below) was erased from the sewer easement buffer. This layer was subsequently intersected with the WRO_Parcel areas and used to calculate the percent of each parcel's WRO area that is constrained by sewer easements.
- Percent WRO Area Occupied by Road/Bridge Constraints – The rights-of-way for the major roads in the watershed were combined with a 20-foot buffer on all the secondary/subdivision roads not included in the rights-of-way. This layer was then intersected with the WRO_Parcel layer and used to calculate the percent of each parcel's WRO area that is constrained by either roads or bridges.
- Priority and Linkage Subwatersheds – Parcels containing WRO area and residing within priority subwatersheds were scored a 10 while the remaining parcels were scored a 1. One other subwatershed was classified as "linkage subwatershed" due to its amount of WRO area and connectivity between priority subwatersheds. WRO area parcels located in these subwatersheds were also scored a 10.
- CRAM Code – This metric utilized CRAM ratings as an indicator of wetland function. Scores assigned to each wetland site used the subwatershed metric developed for the subwatershed prioritization in Section 3.1. To prioritize wetlands restoration in subwatersheds with degraded wetlands function, scores were reversed to place a higher priority on restoration opportunity near observed degraded wetlands as follows: Optimal = 1, Suboptimal = 5, Poor/Marginal = 10.
- Coastal Subwatershed – All subwatersheds downstream of the confluence of Agua Hedionda Creek and the lagoon were considered coastal for the purposes of prioritizing wetland restoration in coastal areas of the watershed. Opportunities within coastal subwatersheds received a score of 10 for this metric, and all other opportunities received a score of 1.
- Stakeholder Priority – Wetlands restoration opportunities that were located within the same parcel as stakeholder recommended wetlands restoration opportunities received a score of 10 for this metric, and all other opportunities received a score of 1. The stakeholder recommended opportunities are documented in Section 6.3.

When calculating the parcel composite score, the metric Percent WRO Area by Parcel was given a double weight to ensure that the top ranking parcels provided substantial opportunity for wetlands restoration.

6.2 PARCEL PRIORITIZATION

Table D-2 in Appendix D lists the metrics values, scores, and composite scores for the top 100 parcels considered for wetland restoration opportunities. The table is sorted by composite score, showing the top

ranking parcels at the top. A unique ID is assigned to each parcel based on the rank; these IDs are used instead of parcel numbers so that location and ownership information remain confidential. Over 400 parcels with wetland restoration opportunity were evaluated, and their composite scores ranged from 2.9 to 8.7, indicating a broad range of wetland restoration opportunity within the watershed.

Table 6-1 lists the 11 parcels identified as the draft top ranking opportunities based on the wetlands restoration opportunity composite score. Tetra Tech selected the top ranking parcels by finding a natural break in the composite scores where 10 to 20 parcels provided substantial opportunity for potential wetland restoration. High resolution aerial photographs, taken in 2005, were used to verify the extent of wetland restoration opportunity on the sites. Several parcels were removed from consideration where development had occurred or where restoration would remove dense, naturally-occurring vegetation. Tetra Tech also removed a number of parcels that were known to be recently graded and approved for development. Some lower ranking parcels were removed, but a comprehensive evaluation was only conducted for the top ranking parcels. The top-ranking parcels include those with a composite score of 7.6 or higher.

Table 6-1 lists the mapped acres (from the SANDAG 1995 Vegetation Data) and the acres verified with aerial photographs. This table also provides comments on the type of vegetation or disturbance existing on the site according to the 2005 aerial photographs.

Since wetlands restoration opportunity is likely to be limited within the watershed, it is important to assess the likelihood of finding a parcel that provides a feasible restoration opportunity. The most promising parcels tend to have a large area of land where most of the vegetation is either disturbed or heavily managed. A large contiguous area of opportunity would be preferred over a parcel with separate areas of opportunity that have the same total areas as the large, contiguous opportunity. Development or utilities existing on a parcel may constrain wetland opportunity. Based on these factors, the most promising opportunities are likely to be WR-01, WR-03, WR-06, WR-08, and WR-09. All of these opportunities coincide with a stakeholder-recommended opportunity except for the two coastal opportunities WR-03 and WR-06.

Two of the stakeholder-recommended opportunities were confidential, and locations could not be published at the time of this report. Therefore, the locations of the stakeholder recommended opportunities that match those identified by Tetra Tech could not be provided in this report but will be provided in the database available to organizations who will be implementing the plan.

Table 6-1. Draft List of Top Ranking Parcels for Wetlands Restoration

ID	Composite Score	Wetlands Restoration Opportunity (Acres)		Comments
		Mapped	Aerial	
WR-01	8.7	6.4	6.1	Land is naturally but sparsely vegetated. Opportunity is within one contiguous area.
WR-02	8.7	4.2	3.6	Land is mostly disturbed, with very sparse vegetation. Two opportunity areas exist within the parcel and are separated by natural areas.
WR-03	8.7	1.0	1.0	Land is mostly in agriculture. The opportunity is within one contiguous area and is adjacent to a major road.
WR-04	8.7	0.4	0.4	Land is mostly vegetated but disturbed by an unpaved road. Parcel contains one contiguous area of opportunity.
WR-05	8.4	0.9	0.9	About 0.25 acre of land is in natural vegetation, and the remaining land is cleared and in low growing vegetation. The vegetation appears to be regularly managed. The land is in one contiguous area.
WR-06	8.0	3.0	2.7	Land is mostly in agriculture. The opportunity is within one contiguous area. A portion of the site is disturbed near a large culvert or tunnel passing under the adjacent road.
WR-07	8.0	0.2	0.2	Most of the land is disturbed and very sparsely vegetated. The land is in one contiguous area.
WR-08	7.8	4.4	4.3	Land is naturally but sparsely vegetated and disturbed in areas. Parcel contains one contiguous area of opportunity.
WR-09	7.8	3.4	3.3	Land is naturally but sparsely vegetated and disturbed in areas. Parcel contains one contiguous area of opportunity.
WR-10	7.8	3.0	3.0	About 1.5 acres of the land contains disturbed or regularly managed vegetation. The remaining land is naturally vegetated. The parcel contains two areas of opportunity separated by upland natural areas.
WR-11	7.6	0.2	0.1	Most of the land is cleared and in low growing vegetation. The vegetation appears to be regularly managed. The land is in one contiguous area.

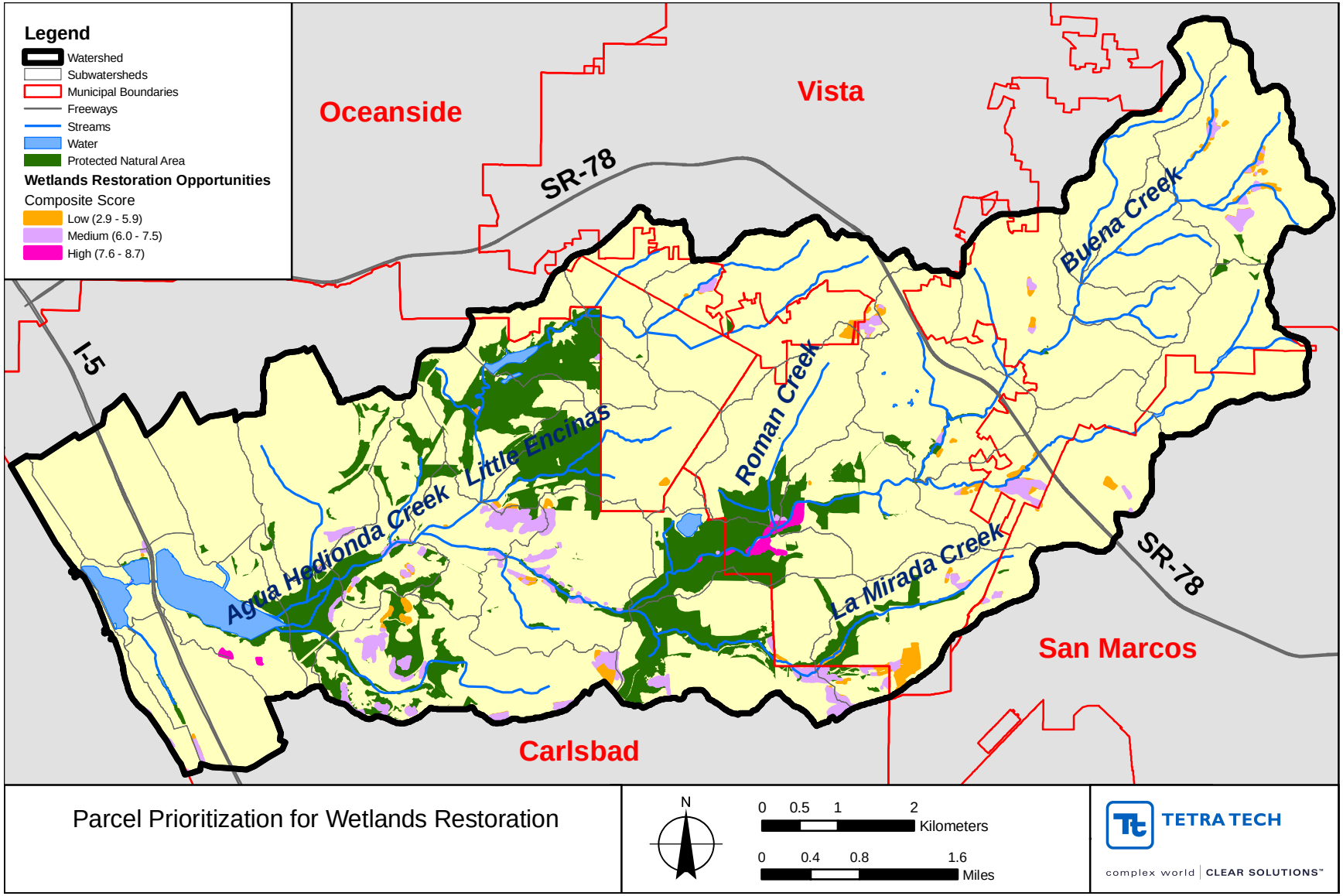

Figure 6-1. Wetlands Restoration Opportunity Score
(Areas have been enlarged proportionally and appear larger than actual acreage.)

Table 6-2 provides the planning-level cost estimates of the draft top ranking wetlands restoration opportunities, based on costs per acre documented in Section 2.5. Cost estimates assume that substantial excavation will be needed to restore wetlands hydrology; costs may be less if only revegetation and minor grading are needed. Total cost per acre for non-coastal wetlands are estimated to range from $77,000 to $225,000 per acre, and total cost per acre for coastal wetlands are estimated to range from $719,000 to $965,000 per acre. Wetlands restoration on publicly owned properties is estimated to cost between $42,000 and $155,000 per acre, assuming that no land acquisition is required.

Land acquisition by a government agency or conservation organization, either by fee simple or through an easement, provides preservation of the restored wetland habitat in perpetuity. Without land acquisition, it cannot be guaranteed that the restored habitat will be preserved from clearing or development in the future. For some restoration opportunities, the current landowner may allow restoration without land acquisition; in these cases, it will be important to consider how long the site will be protected from clearing or development.

During plan implementation, the area of wetlands restoration opportunity may be smaller or greater than the opportunity area identified through GIS. These cost estimates should be used as tools to prioritize sites for further evaluation, and larger sites should not be ruled out based on cost. Economies of scale are likely to be realized by prioritizing those parcels with the largest areas of contiguous opportunity. The largest area of opportunity is provided by WR-01. With over 3 acres of contiguous opportunity in each parcel, WR-08 and WR-09 represent the second-largest areas of opportunity. The next largest opportunities among the top ranking have less than 3 acres of contiguous wetlands restoration opportunity. WR-08 and WR-09 are also likely to be among the most cost-effective opportunities since they are located on public land.

The list of top-ranking parcels presents what are likely to be the most promising wetland restoration opportunities based on the WPG's goals and objectives. This list is subject to change based on an evaluation of all management needs and opportunities during WMP development. Local governments, resource agencies, conservation organizations, and other parties will need to further evaluate which properties meet their individual goals. The Agua Hedionda WMP will provide recommendations on how these top-ranking opportunities can be integrated with other management opportunities to provide enhanced functional uplift within the watershed.

Table 6-2. Range of Cost Estimates for Top Ranking Wetlands Restoration Opportunities

ID	Acres	Land Acquisition Cost		Restoration Cost		Endowment Cost		Total Cost	
		Low	High	Low	High	Low	High	Low	High
WR-01	6.1	$213,000	$426,000	$183,000	$761,000	$73,000	$183,000	$469,000	$1,370,000
WR-02[2]	3.6			$108,000	$448,000	$43,000	$108,000	$151,000	$556,000
WR-03[1]	1.0	$393,000	$520,000	$302,000	$399,000	$12,000	$29,000	$707,000	$948,000
WR-04	0.4	$16,000	$31,000	$13,000	$56,000	$5,000	$13,000	$34,000	$100,000
WR-05	0.9	$33,000	$66,000	$28,000	$118,000	$11,000	$28,000	$72,000	$212,000
WR-06[1]	2.7	$1,094,000	$1,446,000	$839,000	$1,110,000	$33,000	$82,000	$1,966,000	$2,638,000
WR-07[2]	0.2			$7,000	$30,000	$3,000	$7,000	$10,000	$37,000
WR-08[2]	4.3			$130,000	$543,000	$52,000	$130,000	$182,000	$673,000
WR-09[2]	3.3			$100,000	$417,000	$40,000	$100,000	$140,000	$517,000
WR-10[2]	3.0			$90,000	$377,000	$36,000	$90,000	$126,000	$467,000
WR-11	0.2	$7,000	$13,000	$6,000	$24,000	$2,000	$6,000	$15,000	$43,000

[1]Opportunity is located in coastal subwatersheds.

[2]No acquisition cost was assumed because the property is owned by a public entity.

6.3 STAKEHOLDER RECOMMENDED OPPORTUNITIES

Tetra Tech asked the WPG and other stakeholders to recommend locations in the watersheds for wetlands restoration. The WPG members provided information on stream and wetland impacts observed in the watershed and recommended management measures for these impacts. The status of ongoing management efforts was also provided.

Tetra Tech reviewed the results of the 2005 stream survey conducted by Preserve Calavera volunteers (D. Nygaard, Preserve Calavera volunteer, April 1, 2008, personal communication). Where observed wetland impacts coincided with available opportunities, these impacts were added to the list of stakeholder opportunities.

Table 6-3 summarizes the information provided by the WPG members as well as the 2005 stream survey sites that coincided with opportunities identified by Tetra Tech. Several of the opportunities would require bank stabilization, channel recontouring, or other stream restoration measures; other impacts may require upstream flow controls. Following the completion of this report, Tetra Tech will produce the Bioengineering Management and Implementation Plan, which will address the streambank and channel restoration needs reported by the WPG members.

Two of the stakeholder-recommended opportunities were confidential, and locations could not be published at the time of this report. Therefore, the locations of the stakeholder recommended opportunities that match those identified by Tetra Tech could not be provided in this report but will be provided in the database available to organizations who will be implementing the plan.

Location and ownership information for these opportunities will be included in the project database being developed by Tetra Tech. The Agua Hedionda WMP will provide recommendations on how these opportunities can be integrated with other management opportunities to provide enhanced functional uplift within the watershed.

Table 6-3. Wetland Restoration Opportunities Identified by Stakeholders

Name	Jurisdiction	Impacts	Needs	Currently Being Pursued?	Status
Green Oak Ranch	Vista	Erosion of creek banks due to unchecked runoff; silt build-up; invasive plants	Repair and stabilize Agua Hedionda creek banks; silt removal; removal of invasive species (e.g., *Arundo* grass and palms)	By owner as limited resources are available.	One large stand of *Arundo* grass has been largely eradicated. A pass through the pond dam was installed to encourage silt to pass through during heavy runoff. Bank stabilization, silt removal, and additional invasive plant removal are still needed.
Discharge Wetlands from Ocean Terrace/Spinnaker Ridge	Carlsbad	Willow riparian area impacted by invasive plants	Removal of invasive species (e.g., artichoke thistle and tamarisk)	No	City staff toured the site; management need was observed, but plans have not yet been made to pursue.
Calavera Creek through Oak Riparian Park	Oceanside	Silt deposits from upstream; erosion from undercut concrete structures in creek channel; unofficial trails across creek; areas of bare slope	Silt removal, erosion repairs, improve trail design, revegetation	City of Oceanside had developed a project several years ago; more work is needed.	Invasive plants have been removed through Carlsbad Watershed Network project. Other management is still needed.
Lake Calavera Area Trails	Carlsbad	Erosion, long-term impacts from public use, including motorcycles and horses	Improve trail design and maintenance	Stakeholder is commenting on trail plan and discussing with wildlife agencies.	Trail plan has been prepared and is going through environmental review.
Calavera Creek Downstream from Lake Calavera Dam	Carlsbad	Mass wasting of creek channel	Recontour channel; address flow velocity and revegetation	No	The City is aware of the impacts but has not indicated any plans to pursue.

Name	Jurisdiction	Impacts	Needs	Currently Being Pursued?	Status
Little Encinas Bank Undercutting	Carlsbad	Increased runoff flow velocity causing areas of major undercutting and loss of riparian tree canopy	Upstream flow controls	No	New land manager is aware of problem.
Confluence of Buena and Agua Hedionda Creeks	Vista	Tree canopy loss due to undercutting; invasive species.	Upstream flow controls; invasive species control; buffer revegetation.	No	Identified as part of 2005 stream survey walk.
Agua Hedionda Creek Upstream of Confluence with Buena Creek	Vista	Tree canopy loss due to undercutting; invasive species; erosion from footbridge.	Upstream flow controls; invasive species control; buffer revegetation; stabilize slopes near bridge.	No	Identified as part of 2005 stream survey walk.
Agua Hedionda Creek Downstream of Melrose Drive	Vista	Tree canopy loss due to undercutting; invasive species; erosion from trail over outflow culvert.	Upstream flow controls; invasive species control; buffer revegetation; additional rip rap need to protect bank around culvert outflow.	No	Identified as part of 2005 stream survey walk.
Buena Creek Upstream of Confluence with Agua Hedionda Creek	Vista	Tree canopy loss due to undercutting; erosion from bridge abutments.	Upstream flow controls; allow natural regrowth of native species and refrain from mowing in buffer; stabilize banks adjacent to bridge abutments.	No	Identified as part of 2005 stream survey walk.

Name	Jurisdiction	Impacts	Needs	Currently Being Pursued?	Status
Confidential	Vista	Upstream development has caused increased erosion of unnamed tributary and mainstem of Agua Hedionda Creek	Restoration of natural hydrology; backfilling of eroded channel or bioengineering; acquisition or easement	No	Willing landowner.
Confidential	Vista	Runoff from development affects water quality and quantity	Restoration of natural hydrology; protection from further development by acquisition.	No	Willing landowner; property for sale.
Dawson Reserve	Vista, Carlsbad	Upstream development causing increased erosion of mainstem of Agua Hedionda Creek, degrading banks, downcutting, undermining oaks and sycamores, opening up stream to sunlight; invasives introduced by stream flows; water quality degraded by urbanization and park activities upstream	Restoration of natural hydrology to reduce down-cutting within the Buena Vista Park and the Dawson Reserve; improvement of Buena Vista Park detention basin; bioengineering to restore creek banks; outreach to reduce contaminant inputs	Yes	Ongoing: Removal of invasive *Vinca*, palms, *Arundo*, other plants; minor filling of tributaries with brush to reduce erosion; willow cuttings above Parcel 169-230-43

6.4 LAGOON HABITAT RESTORATION OPPORTUNITIES

One of the WPG's objectives for the Agua Hedionda WMP is to maintain and protect lagoon habitat. Since WMP scope of work included consideration of wetlands restoration opportunities as well, Tetra Tech researched potential protection and restoration opportunities for the lagoon.

The Encina Power Plant uses the lagoon for cooling water and dredges the outer lagoon about every two years. The Agua Hedionda Lagoon is the only lagoon in the area to receive continuous tidal flushing because it is regularly dredged and has jetties (State Coastal Conservancy, 1989). Tidal flushing helps to maintain low concentrations of pollutants within the lagoon and reduce eutrophication (Howes et al, 1991). The entire lagoon was completely dredged during 1998 through 1999, which significantly increased tidal flushing. Following the dredging, eelgrass beds were restored to provide enhanced marine nursery areas (San Diego Wetlands, 2008).

The most recent restoration project successfully removed an infestation of *Caulerpa taxifolia*, an invasive seaweed. This invasive species was discovered in the lagoon in June 2000. Treatment occurred between June 2000 and September 2001, and following treatment, surveys were conducted four times per year. The last patch of *Caulerpa taxifolia* was eradicated in September 2002. Surveys were conducted twice per year from summer 2003 through December 2005, and no additional patches were discovered (SCCAT, 2008). The removal of this invasive species has protected and enhanced the eel grass beds within the lagoon, which are an important habitat for fish and other aquatic species. If left uncontrolled, *Caulerpa taxifolia* could be a major threat to California marine and tidal ecosystems. In the Mediterranean Sea, where similar climatic conditions exist, the seaweed covers 30,000 acres of sea floor and has destroyed natural aquatic communities, displaced native plants and animals, and decreased overall biodiversity. The Mediterranean infestation has also caused economic damage to fishing, tourism, boating, and other recreational industries (SCCAT, 2008). Protection from further infestations will be an important management activity for the lagoon.

Sediment loading to the lagoon has caused impacts to lagoon habitat in the past, but dredging the inner lagoon on a regular basis could be cost prohibitive. Considering the success of recent restoration efforts, the most promising restoration opportunity for lagoon habitat is likely to be the control of upstream sediment loading. Upstream sediment controls and restoration opportunities that help reduce erosion could help protect the recently restored lagoon habitat. If a dredging project occurs in the future, upstream sediment management will help protect the benefits of that dredging project as well. Land acquisition and buffer restoration adjacent to and near the lagoon would enhance the diversity and health of the lagoon habitat and the wildlife communities supported by the lagoon.

7 References

Collins, J.N., E.D. Stein, M. Sutula, R. Clark, A.E. Fetscher, L. Grenier, C. Grosso, and A. Wiskind. 2007. California Rapid Assessment Method (CRAM) for Wetlands. Version 5.0.1. 151 pp.

County of San Diego. 2007. Biological Observation Points. County of San Diego Department of Planning and Land Use. Accessed February 2008. http://www.sangis.org/

Howes, Mike, Mario Monroy, and Marge Monroy. 1991. Agua Hediodna Lagoon Past Present Future. Agua Hedionda Lagoon Foundation. Hofman Planning Associates, California.

Mitch, W.J., and J.G. Gosselink. 2000. Wetlands, 3rd. ed. John Wiley and Sons, Inc., New York, 2000.

NRCS. 1998. National Forestry Manual, Part 537.22b – National Soil Information System (NASIS) Interpretations, and Exhibit 537-3. Natural Resources Conservation Service.

NRCS. 2007. Soil Survey Geographic Database (SSURGO) for San Diego County. Natural Resources Conservation Service. Accessed August 2007. http://www.soils.usda.gov/survey/geography/ssurgo/

NRCS. 2008. National Hydric Soils List by State (January 2008). Natural Resources Conservation Service. Accessed February 2008. http://soils.usda.gov/use/hydric/lists/state.html

San Diego Wetlands. 2008. Agua Hedionda Lagoon. San Diego Wetlands. SeaWorld/Busch Gardens Animal Information Database. Accessed April 2008. http://www.swbg-animals.org/swc/wetlands/sd_county_wetlands/agua_hedionda_lagoon.htm

SANDAG. 1985. National Wetlands Inventory for the San Diego Region. San Diego Association of Governments. Accessed February 2008. http://www.sandag.org/resources/maps_and_gis/gis_downloads/downloads/metadata/nwidoc.htm

SANDAG. 1995. VEG95: SANDAG Vegetation Communities GIS Data. San Diego Association of Governments. Accessed April 2008. http://www.sandag.org/resources/maps_and_gis/gis_downloads/downloads/metadata/veg95doc.htm

SANDAG. 2004. 2004 Base Year Public Ownership for the Series 11 Regional Growth Forecast. San Diego Association of Governments. Accessed February 2008. http://www.sandag.org/resources/maps_and_gis/gis_downloads/downloads/zip/Land/CurrentLand/owndoc.htm

SCCAT. 2008. The Caulerpa Information Center. Southern California Caulerpa Action Team. Access April 2008. http://www.sccat.net/#the-caulerpa-information-center-1e86c5

SELC. 2008. San Elijo Lagoon Conservancy: Watershed Protection Program. Accessed March 2008. http://www.sanelijo.org/

State Coastal Conservancy. 1989. The Coastal Wetlands of San Diego County. California State Coastal Conservancy and the Batiquitos Lagoon Foundation.

Tetra Tech. 2007. Agua Hedionda Watershed Water Quality Analysis and Recommendations Report. Prepared for City of Vista, California. Prepared by Tetra Tech, Inc.

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Appendix A. Subwatershed Metrics and Scoring for Land Acquisition

Table A-1. Scoring Thresholds for Land Acquisition Subwatershed Priority

1. Unprotected Natural Area		
Quartiles for percent of unprotected natural area in subwatershed	**Upper Limit**	**Score**
0 - 25%	4.2%	2.5
25 - 50%	8.3%	5
50 - 75%	20.7%	7.5
75 - Max%	61.5%	10
2. Protected Natural Area		
Quartiles for percent of unprotected natural area in subwatershed	**Upper Limit**	**Score**
0 - 25%	0.7%	2.5
25 - 50%	5.3%	5
50 - 75%	23.0%	7.5
75 - Max%	54.8%	10
3. Terrestrial Habitat		
Quartiles for percent of unprotected natural area in subwatershed	**Upper Limit**	**Score**
0 - 25%	17.5%	2.5
25 - 50%	40.4%	5
50 - 75%	63.7%	7.5
75 - Max%	85.4%	10
4. Riparian Habitat		
Quartiles for percent of unprotected natural area in Targeted Buffer Area within each subwatershed	**Upper Limit**	**Score**
0 - 25%	3.4%	2.5
25 - 50%	7.4%	5
50 - 75%	10.8%	7.5
75 - Max%	45.3%	10

5. Aquatic Habitat		
Aquatic Habitat Rating Summarized by Subwatershed	**Upper Limit**	**Score**
Excellent	NA	10
Good	NA	7.5
Fair	NA	5
Poor	NA	2.5
6. Wetland Function		
CRAM - Wetland Function Index	**Upper Limit**	**Score**
Optimal	NA	10
Sub-optimal	NA	5
Poor\marginal	NA	1
7. MSCP/MHCP Indicator Species		
Quartiles for number of observed locations of sensitive or biodiversity indicator species	**Upper Limit**	**Score**
0 - 25%	3	2.5
25 - 50%	4	5
50 - 75%	7.75	7.5
75 - Max%	32	10
8. Lagoon Habitat		
Presence of lagoon habitat in subwatershed?	**Upper Limit**	**Score**
Yes	NA	10
No	NA	1
9. SSURGO Erosion Hazard Index		
Quartiles for percent of subwatershed area classified as severe or very severe	**Upper Limit**	**Score**
0 - 25%	4.14%	2.5
25 - 50%	7.94%	5
50 - 75%	14.05%	7.5
75 - Max%	46.39%	10

Appendix B. Land Acquisition Parcel Metrics and Scoring

Table B-1. Scoring Thresholds for Land Acquisition

Unprotected Natural Area		
Quartiles for percent of unprotected natural area in each parcel	**Upper Limit**	**Score**
0 - 25%	8.8%	2.5
25 - 50%	34.1%	5
50 - 75%	90.7%	7.5
75 - Max%	100.0%	10
Riparian Habitat		
Quartiles for percent of natural area in target buffer	**Upper Limit**	**Score**
0 - 25%	3.4%	2.5
25 - 50%	14.8%	5
50 - 75%	38.2%	7.5
75 - Max%	100.0%	10
Priority Subwatershed		
Based on subwatershed composite scores for preservation opportunity	**Limit**	**Score**
Priority subwatershed	>= 6	10
Non-priority subwatershed	< 6	1
Stream Restoration Reaches		
Location of parcels relative to potential stream restoration sites	**Upper Limit**	**Score**
Downstream of all restoration sites		1
Upland from stream buffer - upstream subwatershed		2.5
Within targeted buffer area- upstream subwatershed		5
Upland from stream buffer - restoration subwatershed		7.5
Within targeted buffer area- restoration subwatershed		10
Invasive Species Treatment Sites		
Priority of treatment for invasive species	**Upper Limit**	**Score**
Within 50 ft from invasive site		10
Active treatment	Treated	7.5
Future treatment	Untreated	5
Uncertain treatment	Untreated or Treated	2.5
Treatment unlikely	Untreated	1
SSURGO Erosion Hazard Index		
Quartiles for percent of parcel area classified as severe or very severe	**Upper Limit**	**Score**
0 - 25%	5.61%	2.5
25 - 50%	21.21%	5
50 - 75%	53.72%	7.5
75 - Max%	100.00%	10

Table B-2. Land Acquisition Parcel Metrics and Scores

Site ID	Unprotected Natural Area			Riparian Habitat		Priority Subwatershed	Stream Restoration Reaches	Invasive Species Treatment	Erosion Hazard		Composite Score
	Acres	Metric	Score	Metric	Score	Metric/Score	Metric/Score	Metric/Score	Metric	Score	
LA-01	8.5	100.0%	20.0	42.0%	10.0	10	5		100.0%	10.0	9.2
LA-02	15.7	100.0%	20.0	56.9%	10.0	10	5		78.1%	10.0	9.2
LA-03	6.1	97.7%	20.0	53.6%	10.0	10	5		97.7%	10.0	9.2
LA-04	7.6	96.7%	20.0	59.0%	10.0	10	5		87.3%	10.0	9.2
LA-05	5.4	91.2%	20.0	34.3%	7.5	10	7.5		90.9%	10.0	9.2
LA-06	11.8	100.0%	20.0	54.5%	10.0	10	5		22.0%	7.5	8.8
LA-07	39.0	99.9%	20.0	35.3%	7.5	10	5		91.9%	10.0	8.8
LA-08	2.3	67.1%	15.0	66.8%	10.0	10	7.5		63.2%	10.0	8.8
LA-09	5.7	99.7%	20.0	32.3%	7.5	10	5	10	37.6%	7.5	8.6
LA-10	6.4	100.0%	20.0	4.1%	5.0	10	5		87.0%	10.0	8.3
LA-11	49.4	100.0%	20.0	3.5%	5.0	10	5		99.2%	10.0	8.3
LA-12	38.6	97.0%	20.0	37.9%	7.5	10	5		48.5%	7.5	8.3
LA-13	1.5	91.2%	20.0	52.0%	10.0	10	5		6.2%	5.0	8.3
LA-14	14.8	100.0%	20.0	45.6%	10.0	10	5	5	39.0%	7.5	8.2
LA-15	1.6	35.5%	15.0	20.8%	7.5	10	7.5	10	35.0%	7.5	8.2
LA-16	5.7	91.2%	20.0	38.2%	7.5	10	5		17.9%	5.0	7.9
LA-17	3.9	85.6%	15.0	55.1%	10.0	10	5		25.7%	7.5	7.9
LA-18	7.6	68.2%	15.0	36.1%	7.5	10	5		65.9%	10.0	7.9
LA-19	0.6	40.1%	15.0	40.1%	10.0	10	5		40.1%	7.5	7.9

Site ID	Unprotected Natural Area			Riparian Habitat		Priority Subwatershed	Stream Restoration Reaches	Invasive Species Treatment	Erosion Hazard		Composite Score
	Acres	Metric	Score	Metric	Score	Metric/Score	Metric/Score	Metric/Score	Metric	Score	
LA-20	0.9	34.7%	15.0	34.7%	7.5	10	7.5		34.7%	7.5	7.9
LA-21	4.3	49.6%	15.0	49.6%	10.0	10	7.5	7.5	12.1%	5.0	7.9
LA-22	0.1	100.0%	20.0	100.0%	10.0	10	5		0.0%	1.0	7.7
LA-23	0.1	100.0%	20.0	58.0%	10.0	10	5		0.0%	1.0	7.7
LA-24	0.1	100.0%	20.0	41.2%	10.0	10	5		0.0%	1.0	7.7
LA-25	1.5	100.0%	20.0	100.0%	10.0	10	5		0.0%	1.0	7.7
LA-26	7.2	100.0%	20.0	40.9%	10.0	1	5		70.6%	10.0	7.7
LA-27	0.1	100.0%	20.0	48.9%	10.0	10	5		0.0%	1.0	7.7
LA-28	2.9	99.9%	20.0	69.8%	10.0	10	5		0.0%	1.0	7.7
LA-29	5.2	99.7%	20.0	99.2%	10.0	10	5		0.0%	1.0	7.7
LA-30	1.7	99.0%	20.0	59.1%	10.0	10	5		0.0%	1.0	7.7
LA-31	23.3	95.2%	20.0	41.7%	10.0	10	5		0.0%	1.0	7.7
LA-32	1.0	94.3%	20.0	78.2%	10.0	10	5		0.0%	1.0	7.7
LA-33	5.4	93.3%	20.0	38.7%	10.0	1	5		66.4%	10.0	7.7
LA-34	9.9	90.1%	15.0	72.9%	10.0	10	5		9.8%	5.0	7.5
LA-35	38.3	80.9%	15.0	10.2%	5.0	10	5		73.7%	10.0	7.5
LA-36	0.7	37.2%	15.0	19.2%	7.5	10	5		35.9%	7.5	7.5
LA-37	1.3	34.1%	10.0	31.9%	7.5	10	7.5	10	34.1%	7.5	7.5
LA-38	7.9	92.7%	20.0	92.7%	10.0	10	5	5	0.0%	1.0	7.3
LA-39	3.3	68.1%	15.0	42.3%	10.0	10	7.5	7.5	0.0%	1.0	7.3
LA-40	0.1	100.0%	20.0	36.5%	7.5	10	5		0.0%	1.0	7.3
LA-41	2.8	100.0%	20.0	0.0%	1.0	10	2.5		62.0%	10.0	7.3

Site ID	Unprotected Natural Area			Riparian Habitat		Priority Subwatershed	Stream Restoration Reaches	Invasive Species Treatment	Erosion Hazard		Composite Score
	Acres	Metric	Score	Metric	Score	Metric/Score	Metric/Score	Metric/Score	Metric	Score	
LA-42	18.5	100.0%	20.0	0.0%	1.0	10	2.5		100.0%	10.0	7.3
LA-43	29.4	100.0%	20.0	0.0%	1.0	10	2.5		100.0%	10.0	7.3
LA-44	18.7	100.0%	20.0	0.0%	1.0	10	2.5		90.2%	10.0	7.3
LA-45	4.0	100.0%	20.0	0.0%	1.0	10	2.5		100.0%	10.0	7.3
LA-46	8.2	100.0%	20.0	0.0%	1.0	10	2.5		100.0%	10.0	7.3
LA-47	0.3	100.0%	20.0	36.5%	7.5	10	5		0.0%	1.0	7.3
LA-48	3.2	100.0%	20.0	0.0%	1.0	10	2.5		100.0%	10.0	7.3
LA-49	0.3	100.0%	20.0	30.1%	7.5	10	5		0.0%	1.0	7.3
LA-50	2.0	100.0%	20.0	0.0%	1.0	10	2.5		100.0%	10.0	7.3
LA-51	0.1	100.0%	20.0	22.9%	7.5	10	5		0.0%	1.0	7.3
LA-52	37.7	99.9%	20.0	0.0%	1.0	10	2.5		99.9%	10.0	7.3
LA-53	16.8	99.7%	20.0	0.0%	1.0	10	2.5		77.1%	10.0	7.3
LA-54	2.3	97.8%	20.0	11.7%	5.0	1	10		23.5%	7.5	7.3
LA-55	2.0	97.7%	20.0	0.0%	1.0	10	2.5		97.7%	10.0	7.3
LA-56	1.8	95.1%	20.0	17.6%	7.5	10	5		0.0%	1.0	7.3
LA-57	4.0	93.9%	20.0	0.0%	1.0	10	2.5		93.9%	10.0	7.3
LA-58	6.5	93.0%	20.0	0.0%	1.0	10	2.5		93.0%	10.0	7.3
LA-59	17.3	91.0%	20.0	32.9%	7.5	10	5		0.0%	1.0	7.3
LA-60	5.0	89.8%	15.0	0.0%	1.0	10	7.5		60.9%	10.0	7.3
LA-61	1.2	43.3%	15.0	43.3%	10.0	1	10		27.4%	7.5	7.3
LA-62	0.1	43.0%	15.0	43.0%	10.0	1	10		43.0%	7.5	7.3
LA-63	0.5	16.2%	10.0	16.2%	7.5	10	7.5	10	16.2%	5.0	7.1

Site ID	Unprotected Natural Area			Riparian Habitat		Priority Subwatershed	Stream Restoration Reaches	Invasive Species Treatment	Erosion Hazard		Composite Score
	Acres	Metric	Score	Metric	Score	Metric/Score	Metric/Score	Metric/Score	Metric	Score	
LA-64	42.0	95.0%	20.0	1.8%	2.5	10	5		16.7%	5.0	7.1
LA-65	26.3	65.0%	15.0	16.7%	7.5	10	5		15.3%	5.0	7.1
LA-66	0.2	57.2%	15.0	1.0%	2.5	10	5		57.2%	10.0	7.1
LA-67	4.1	43.0%	15.0	36.7%	7.5	10	5		10.9%	5.0	7.1
LA-68	1.7	42.5%	15.0	0.0%	2.5	10	7.5		42.0%	7.5	7.1
LA-69	1.0	98.8%	20.0	98.8%	10.0	1	1		68.6%	10.0	7.0
LA-70	1.3	95.6%	20.0	0.0%	1.0	10	1		85.9%	10.0	7.0
LA-71	38.7	100.0%	20.0	22.6%	7.5	1	5		42.3%	7.5	6.8
LA-72	3.0	100.0%	20.0	0.0%	1.0	10	2.5		51.4%	7.5	6.8
LA-73	0.1	100.0%	20.0	7.5%	5.0	10	5		0.0%	1.0	6.8
LA-74	3.3	98.4%	20.0	11.6%	5.0	1	5		98.4%	10.0	6.8
LA-75	1.8	96.4%	20.0	82.5%	10.0	1	5		20.9%	5.0	6.8
LA-76	4.8	95.2%	20.0	8.8%	5.0	1	10		21.1%	5.0	6.8
LA-77	0.8	88.2%	15.0	88.2%	10.0	10	5		0.0%	1.0	6.8
LA-78	4.5	81.1%	15.0	25.7%	7.5	1	10		49.5%	7.5	6.8
LA-79	0.1	79.7%	15.0	63.4%	10.0	10	5		0.0%	1.0	6.8
LA-80	0.8	61.5%	15.0	61.5%	10.0	10	5		0.0%	1.0	6.8
LA-81	1.3	58.1%	15.0	58.1%	10.0	10	5		0.0%	1.0	6.8
LA-82	0.5	50.1%	15.0	50.1%	10.0	10	5		0.0%	1.0	6.8
LA-83	0.4	42.3%	15.0	42.3%	10.0	10	5		0.0%	1.0	6.8
LA-84	0.1	40.3%	15.0	40.3%	10.0	10	5		0.0%	1.0	6.8
LA-85	0.1	36.5%	15.0	36.5%	7.5	1	10		36.5%	7.5	6.8

Site ID	Unprotected Natural Area			Riparian Habitat		Priority Subwatershed	Stream Restoration Reaches	Invasive Species Treatment	Erosion Hazard		Composite Score
	Acres	Metric	Score	Metric	Score	Metric/Score	Metric/Score	Metric/Score	Metric	Score	
LA-86	0.0	36.1%	15.0	36.1%	7.5	1	10		36.1%	7.5	6.8
LA-87	4.3	28.7%	10.0	18.7%	7.5	10	7.5	7.5	11.4%	5.0	6.8
LA-88	0.1	100.0%	20.0	100.0%	10.0	1	5	10	0.0%	1.0	6.7
LA-89	12.3	34.7%	15.0	6.9%	5.0	10	5		21.1%	5.0	6.7
LA-90	0.3	31.8%	10.0	20.6%	7.5	10	5		31.4%	7.5	6.7
LA-91	0.5	30.4%	10.0	15.0%	7.5	10	5		30.4%	7.5	6.7
LA-92	5.0	24.5%	10.0	6.1%	5.0	10	10		9.6%	5.0	6.7
LA-93	1.2	24.2%	10.0	24.2%	7.5	10	5		24.2%	7.5	6.7
LA-94	4.5	100.0%	20.0	0.0%	1.0	1	7.5		100.0%	10.0	6.6
LA-95	9.6	100.0%	20.0	0.0%	1.0	1	7.5		92.1%	10.0	6.6
LA-96	0.2	100.0%	20.0	0.0%	1.0	10	1		40.4%	7.5	6.6
LA-97	0.1	100.0%	20.0	0.0%	1.0	10	1		49.2%	7.5	6.6
LA-98	38.9	99.9%	20.0	57.6%	10.0	1	1		51.7%	7.5	6.6
LA-99	10.9	99.9%	20.0	21.6%	7.5	1	1		78.2%	10.0	6.6
LA-100	8.8	99.8%	20.0	0.0%	1.0	1	7.5		99.8%	10.0	6.6

Appendix C. Riparian Buffer Restoration Parcel Metrics and Scoring

Table C-1. Scoring Thresholds for Riparian Buffer Restoration

Percent Buffer Restoration Opportunity by Subwatershed		
Quartiles for percent of buffer restoration opportunity in each subwatershed	**Upper Limit**	**Score**
0 - 25%	1.4%	2.5
25 - 50%	2.7%	5
50 - 75%	5.1%	7.5
75 - Max%	12.9%	10
Percent Buffer Restoration Opportunity by Parcel		
Quartiles for percent of buffer restoration opportunity in each parcel	**Upper Limit**	**Score**
0 - 25%	0.01%	2.5
25 - 50%	0.03%	5
50 - 75%	0.11%	7.5
75 - Max%	4.94%	10
Priority or Linkage Subwatersheds		
Based on subwatershed composite scores for preservation opportunity	**Limit**	**Score**
Priority subwatershed	>= 6	10
Non-priority subwatershed	< 6	1
Stream Restoration Reaches		
Location of parcels relative to potential stream restoration sites	**Upper Limit**	**Score**
Downstream of restoration site	NA	1
Within stream buffer - upstream subwatershed	NA	5
Adjacent to restoration site - restoration subwatershed	NA	7.5
Upstream of stream buffer - restoration subwatershed	NA	10

Mature Riparian Trees		
Location of parcels relative to mature riparian trees	**Upper Limit**	**Score**
Intersects or upstream of **mature riparian trees**	NA	10
Downstream of **mature riparian trees**	NA	1
Sewer Constraints		
Quartiles for percent of buffer restoration opportunity occupied by road rights-of-way	**Upper Limit**	**Score**
0 - 25%	2.16%	10
25 - 50%	8.05%	7.5
50 - 75%	26.67%	5
75 - Max%	100.00%	2.5
Road/Bridge Constraints		
Quartiles for percent of buffer restoration opportunity occupied by road rights-of-way	**Upper Limit**	**Score**
0 - 25%	1.97%	10
25 - 50%	9.04%	7.5
50 - 75%	21.72%	5
75 - Max%	100.00%	2.5

Table C-2. Riparian Buffer Restoration Parcel Metrics and Scores

Site ID	Buffer Restoration Opportunity (Acres)	% in Buffer - Parcel		% in Buffer - Subwatershed		Priority or Linkage Subwatershed	Stream Restoration Reaches	Mature Riparian Trees	Sewer Constraints		Bridge/Road Constraints		Composite Score
		Metric	Score	Metric	Score	Metric/Score	Metric/Score	Metric/ Score	Metric	Score	Metric	Score	
BR-01	11.0	1.86%	20.0	3.05%	10.0	10	10	10	0.00%	10.0	0.00%	10.0	**8.89**
BR-02	4.3	0.73%	20.0	3.05%	10.0	10	7.5	10	0.00%	10.0	0.00%	10.0	**8.61**
BR-03	1.9	0.32%	20.0	3.55%	10.0	10	5	10	0.00%	10.0	0.00%	10.0	**8.33**
BR-04	1.6	0.27%	20.0	3.55%	10.0	10	5	10	0.00%	10.0	0.00%	10.0	**8.33**
BR-05	1.0	0.19%	20.0	3.55%	10.0	10	5	10	0.00%	10.0	0.00%	10.0	**8.33**
BR-06	0.8	0.16%	20.0	3.55%	10.0	10	5	10	0.00%	10.0	0.00%	10.0	**8.33**
BR-07	0.7	0.14%	20.0	3.55%	10.0	10	5	10	0.00%	10.0	0.00%	10.0	**8.33**
BR-08	4.1	0.73%	20.0	4.49%	7.5	10	5	10	0.00%	10.0	0.00%	10.0	**8.06**
BR-09	3.0	0.51%	20.0	1.41%	2.5	10	10	10	0.00%	10.0	0.00%	10.0	**8.06**
BR-10	1.3	0.22%	20.0	3.55%	10.0	10	5	10	0.00%	10.0	4.67%	7.5	**8.06**
BR-11	1.2	0.21%	20.0	3.55%	10.0	10	5	10	0.00%	10.0	4.77%	7.5	**8.06**
BR-12	1.1	0.19%	20.0	4.49%	7.5	10	5	10	0.00%	10.0	0.00%	10.0	**8.06**
BR-13	1.1	0.18%	20.0	3.55%	10.0	10	5	10	0.00%	10.0	2.75%	7.5	**8.06**
BR-14	0.8	0.14%	20.0	4.49%	7.5	10	5	10	0.00%	10.0	0.00%	10.0	**8.06**
BR-15	0.7	0.12%	20.0	3.55%	10.0	10	5	10	0.00%	10.0	11.17%	7.5	**8.06**
BR-16	0.2	0.04%	15.0	3.05%	10.0	10	7.5	10	0.00%	10.0	0.00%	10.0	**8.06**
BR-17	1.0	0.17%	20.0	3.55%	10.0	10	1	10	0.00%	10.0	0.00%	10.0	**7.89**
BR-18	2.1	0.36%	20.0	4.49%	7.5	10	5	10	0.79%	10.0	19.22%	7.5	**7.78**
BR-19	1.2	0.20%	20.0	8.37%	5.0	10	8	10	0.00%	10.0	4.86%	7.5	**7.78**
BR-20	0.9	0.15%	20.0	4.49%	7.5	10	5	10	1.15%	10.0	10.91%	7.5	**7.78**
BR-21	0.8	0.14%	20.0	4.35%	5.0	10	5	10	0.00%	10.0	0.00%	10.0	**7.78**

Site ID	Buffer Restoration Opportunity (Acres)	% in Buffer - Parcel		% in Buffer - Subwatershed		Priority or Linkage Subwatershed	Stream Restoration Reaches	Mature Riparian Trees	Sewer Constraints		Bridge/Road Constraints		Composite Score
		Metric	Score	Metric	Score	Metric/Score	Metric/Score	Metric/ Score	Metric	Score	Metric	Score	
BR-22	0.8	0.13%	20.0	4.49%	7.5	10	5	10	7.97%	7.5	0.00%	10.0	**7.78**
BR-23	0.6	0.10%	15.0	3.55%	10.0	10	5	10	0.00%	10.0	0.00%	10.0	**7.78**
BR-24	0.2	0.03%	15.0	3.55%	10.0	10	5	10	0.00%	10.0	0.00%	10.0	**7.78**
BR-25	0.1	0.01%	10.0	3.05%	10.0	10	10	10	0.00%	10.0	0.00%	10.0	**7.78**
BR-26	21.2	3.59%	20.0	5.70%	10.0	10	1	10	3.89%	7.5	0.00%	10.0	**7.61**
BR-27	3.3	0.56%	20.0	3.05%	10.0	10	10	1	0.00%	10.0	20.36%	7.5	**7.61**
BR-28	3.1	0.53%	20.0	6.34%	10.0	10	7.5	1	0.22%	10.0	0.00%	10.0	**7.61**
BR-29	0.8	0.14%	20.0	3.55%	10.0	10	1	10	0.00%	10.0	44.29%	7.5	**7.61**
BR-30	1.2	0.20%	20.0	8.37%	5.0	10	8	10	3.00%	7.5	11.36%	7.5	**7.50**
BR-31	0.4	0.07%	15.0	8.37%	5.0	10	8	10	0.00%	10.0	0.80%	10.0	**7.50**
BR-32	0.4	0.07%	15.0	4.49%	7.5	10	5	10	0.52%	10.0	0.00%	10.0	**7.50**
BR-33	0.3	0.05%	15.0	4.49%	7.5	10	5	10	0.00%	10.0	0.03%	10.0	**7.50**
BR-34	0.3	0.04%	15.0	4.49%	7.5	10	5	10	0.00%	10.0	0.00%	10.0	**7.50**
BR-35	0.1	0.01%	10.0	3.05%	10.0	10	7.5	10	0.00%	10.0	0.00%	10.0	**7.50**
BR-36	29.2	4.94%	20.0	12.89%	5.0	10	1	10	0.02%	10.0	0.00%	10.0	**7.33**
BR-37	12.4	2.09%	20.0	12.89%	5.0	10	1	10	0.03%	10.0	0.00%	10.0	**7.33**
BR-38	11.0	1.86%	20.0	8.37%	5.0	10	1	10	0.00%	10.0	0.64%	10.0	**7.33**
BR-39	8.6	1.45%	20.0	8.37%	5.0	10	1	10	0.00%	10.0	1.06%	10.0	**7.33**
BR-40	7.2	1.22%	20.0	8.37%	5.0	10	1	10	0.00%	10.0	1.14%	10.0	**7.33**
BR-41	3.7	0.62%	20.0	3.55%	10.0	10	5	1	0.00%	10.0	0.00%	10.0	**7.33**
BR-42	3.4	0.58%	20.0	1.41%	7.5	1	7.5	10	0.00%	10.0	0.00%	10.0	**7.33**
BR-43	1.1	0.19%	20.0	1.41%	7.5	1	7.5	10	0.00%	10.0	0.00%	10.0	**7.33**
BR-44	0.8	0.14%	20.0	3.55%	10.0	10	5	1	0.00%	10.0	0.00%	10.0	**7.33**

Site ID	Buffer Restoration Opportunity (Acres)	% in Buffer - Parcel		% in Buffer - Subwatershed		Priority or Linkage Subwatershed	Stream Restoration Reaches	Mature Riparian Trees	Sewer Constraints		Bridge/Road Constraints		Composite Score
		Metric	Score	Metric	Score	Metric/Score	Metric/Score	Metric/ Score	Metric	Score	Metric	Score	
BR-45	1.0	0.17%	20.0	0.98%	2.5	10	5	10	2.17%	7.5	0.01%	10.0	**7.22**
BR-46	0.9	0.15%	20.0	8.37%	5.0	10	8	10	0.00%	10.0	14.67%	2.5	**7.22**
BR-47	0.6	0.10%	15.0	4.49%	7.5	10	5	10	0.00%	10.0	21.82%	7.5	**7.22**
BR-48	0.4	0.07%	15.0	4.49%	7.5	10	5	10	0.00%	10.0	2.04%	7.5	**7.22**
BR-49	12.4	2.10%	20.0	4.35%	5.0	10	1	10	7.09%	7.5	0.00%	10.0	**7.06**
BR-50	9.9	1.68%	20.0	5.70%	10.0	10	1	10	8.49%	5.0	4.77%	7.5	**7.06**
BR-51	3.1	0.52%	20.0	1.41%	2.5	10	1	10	1.99%	10.0	0.00%	10.0	**7.06**
BR-52	3.0	0.50%	20.0	1.41%	2.5	10	1	10	0.00%	10.0	0.00%	10.0	**7.06**
BR-53	2.2	0.37%	20.0	1.02%	2.5	1	10	10	0.00%	10.0	0.00%	10.0	**7.06**
BR-54	2.0	0.33%	20.0	6.34%	10.0	10	1	10	34.14%	2.5	0.17%	10.0	**7.06**
BR-55	1.6	0.27%	20.0	1.02%	2.5	1	10	10	0.00%	10.0	0.00%	10.0	**7.06**
BR-56	1.0	0.16%	20.0	8.37%	5.0	10	1	10	5.92%	7.5	0.00%	10.0	**7.06**
BR-57	0.6	0.11%	15.0	4.49%	7.5	10	1	10	0.00%	10.0	0.00%	10.0	**7.06**
BR-58	0.1	0.02%	10.0	4.49%	7.5	10	5	10	0.00%	10.0	0.00%	10.0	**6.94**
BR-59	0.1	0.02%	10.0	4.49%	7.5	10	5	10	0.00%	10.0	0.00%	10.0	**6.94**
BR-60	10.7	1.82%	20.0	6.34%	10.0	10	1	1	0.00%	10.0	0.00%	10.0	**6.89**
BR-61	2.1	0.36%	20.0	3.55%	10.0	10	1	1	0.00%	10.0	0.00%	10.0	**6.89**
BR-62	1.3	0.22%	20.0	6.34%	10.0	10	1	1	0.00%	10.0	0.00%	10.0	**6.89**
BR-63	0.8	0.14%	20.0	6.34%	10.0	10	1	1	0.00%	10.0	0.00%	10.0	**6.89**
BR-64	0.8	0.14%	20.0	3.55%	10.0	10	1	1	0.00%	10.0	0.00%	10.0	**6.89**
BR-65	12.3	2.08%	20.0	4.35%	5.0	10	1	10	13.30%	5.0	0.00%	10.0	**6.78**
BR-66	4.6	0.77%	20.0	10.05%	5.0	1	5	10	0.00%	10.0	0.00%	10.0	**6.78**
BR-67	1.6	0.28%	20.0	10.05%	5.0	1	5	10	0.00%	10.0	0.00%	10.0	**6.78**

Site ID	Buffer Restoration Opportunity (Acres)	% in Buffer - Parcel		% in Buffer - Subwatershed		Priority or Linkage Subwatershed	Stream Restoration Reaches	Mature Riparian Trees	Sewer Constraints		Bridge/Road Constraints		Composite Score
		Metric	Score	Metric	Score	Metric/Score	Metric/Score	Metric/ Score	Metric	Score	Metric	Score	
BR-68	1.4	0.24%	20.0	3.16%	5.0	1	5	10	0.00%	10.0	0.00%	10.0	**6.78**
BR-69	1.2	0.20%	20.0	3.16%	5.0	1	5	10	0.00%	10.0	0.00%	10.0	**6.78**
BR-70	1.1	0.19%	20.0	3.16%	5.0	1	5	10	0.06%	10.0	0.00%	10.0	**6.78**
BR-71	1.0	0.17%	20.0	3.16%	5.0	1	5	10	0.15%	10.0	0.00%	10.0	**6.78**
BR-72	1.0	0.16%	20.0	10.05%	5.0	1	5	10	0.00%	10.0	0.00%	10.0	**6.78**
BR-73	0.9	0.16%	20.0	4.49%	7.5	10	1	10	14.61%	5.0	10.04%	7.5	**6.78**
BR-74	0.9	0.15%	20.0	10.05%	5.0	1	5	10	0.00%	10.0	0.00%	10.0	**6.78**
BR-75	0.7	0.12%	20.0	3.16%	5.0	1	5	10	0.00%	10.0	0.00%	10.0	**6.78**
BR-76	0.7	0.11%	15.0	3.55%	10.0	10	5	1	0.00%	10.0	0.00%	10.0	**6.78**
BR-77	0.6	0.11%	15.0	3.55%	10.0	10	5	1	0.00%	10.0	0.00%	10.0	**6.78**
BR-78	0.3	0.06%	15.0	4.35%	5.0	10	1	10	0.00%	10.0	0.00%	10.0	**6.78**
BR-79	0.3	0.04%	15.0	3.55%	10.0	10	5	1	0.00%	10.0	0.00%	10.0	**6.78**
BR-80	0.3	0.04%	15.0	8.37%	5.0	10	1	10	0.00%	10.0	0.00%	10.0	**6.78**
BR-81	0.2	0.03%	15.0	4.35%	5.0	10	1	10	0.27%	10.0	0.00%	10.0	**6.78**
BR-82	0.2	0.03%	15.0	8.37%	5.0	10	1	10	0.78%	10.0	0.00%	10.0	**6.78**
BR-83	0.2	0.03%	15.0	8.37%	5.0	10	1	10	0.00%	10.0	0.00%	10.0	**6.78**
BR-84	0.1	0.02%	10.0	3.05%	10.0	10	1	10	0.00%	10.0	0.00%	10.0	**6.78**
BR-85	0.6	0.10%	15.0	0.98%	2.5	10	5	10	0.47%	10.0	19.94%	7.5	**6.67**
BR-86	0.4	0.06%	15.0	8.37%	5.0	10	8	10	0.00%	10.0	30.03%	2.5	**6.67**
BR-87	0.3	0.05%	15.0	4.49%	7.5	10	5	10	17.28%	5.0	6.78%	7.5	**6.67**
BR-88	0.0	0.01%	5.0	3.55%	10.0	10	5	10	0.00%	10.0	0.00%	10.0	**6.67**
BR-89	16.6	2.82%	20.0	2.30%	7.5	10	1	1	0.00%	10.0	0.00%	10.0	**6.61**
BR-90	11.2	1.90%	20.0	2.96%	7.5	1	1	10	0.00%	10.0	0.00%	10.0	**6.61**

Site ID	Buffer Restoration Opportunity (Acres)	% in Buffer - Parcel		% in Buffer - Subwatershed		Priority or Linkage Subwatershed	Stream Restoration Reaches	Mature Riparian Trees	Sewer Constraints		Bridge/Road Constraints		Composite Score
		Metric	Score	Metric	Score	Metric/Score	Metric/Score	Metric/ Score	Metric	Score	Metric	Score	
BR-91	9.9	1.67%	20.0	4.49%	7.5	10	1	1	0.00%	10.0	0.00%	10.0	**6.61**
BR-92	3.1	0.53%	20.0	2.30%	7.5	10	1	1	0.00%	10.0	0.00%	10.0	**6.61**
BR-93	2.9	0.50%	20.0	6.34%	10.0	10	1	1	4.35%	7.5	1.40%	10.0	**6.61**
BR-94	1.8	0.30%	20.0	4.49%	7.5	10	1	1	0.00%	10.0	0.00%	10.0	**6.61**
BR-95	1.0	0.16%	20.0	4.49%	7.5	10	1	1	0.00%	10.0	0.00%	10.0	**6.61**
BR-96	4.1	0.70%	20.0	1.01%	2.5	1	5	10	1.35%	10.0	0.00%	10.0	**6.50**
BR-97	0.8	0.13%	20.0	8.37%	5.0	10	1	10	14.04%	5.0	74.92%	7.5	**6.50**
BR-98	0.7	0.11%	20.0	2.31%	5.0	1	5	10	0.00%	10.0	15.58%	7.5	**6.50**
BR-99	0.3	0.05%	15.0	4.49%	7.5	10	5	1	0.00%	10.0	0.00%	10.0	**6.50**
BR-100	0.2	0.03%	15.0	1.02%	2.5	1	10	10	0.00%	10.0	0.00%	10.0	**6.50**

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Appendix D. Wetlands Restoration Parcel Metrics and Scoring

Table D-1. Scoring Thresholds for Wetlands Restoration

1. Percent of Wetland Restoration Opportunity		
Quartiles for percent of total wetlands restoration opportunity	**Upper Limit**	**Score**
0 - 25%	0.0%	2.5
25 - 50%	0.0%	5
50 - 75%	0.1%	7.5
75 - Max%	15.1%	10
2. Sewer Lines		
Quartiles for percent of sewer lines within opportunity	**Upper Limit**	**Score**
0 – 25%	1.3%	10
25 – 50%	6.8%	7.5
50 – 75%	25.4%	5
75 – Max%	100.0%	2.5
3. Roads and Bridges		
Quartiles for percent of roads within opportunity	**Upper Limit**	**Score**
0 – 25%	1.5%	10
25 – 50%	8.8%	7.5
50 – 75%	30.8%	5
75 – Max%	100.0%	2.5
4. CRAM Code (Wetland Function)		
CRAM Code	**Upper Limit**	**Score**
Optimal	NA	1
Suboptimal	NA	5
Poor\marginal	NA	10
5. Priority Habitat/Linkage Subwatershed		
Centroid of parcel exists within priority or linkage subwatershed?	**Upper Limit**	**Score**
Yes	NA	10
No	NA	1

6. Stakeholder Priority		
Opportunity within same parcel as stakeholder-recommended opportunity?	**Upper Limit**	**Score**
Yes	NA	10
No	NA	1
7. Coastal Subwatershed		
Centroid of parcel exists within coastal subwatershed?	**Upper Limit**	**Score**
Yes	NA	10
No	NA	1

Table D-2. Wetlands Restoration Parcel Metrics and Scores

ID	Wetlands Restoration Opportunity (Acres)	Percent of Wetland Restoration Opportunity		Sewer Lines		Roads and Bridges		CRAM Code (Wetland Function)	Priority Habitat/Linkage Subwatershed		Stakeholder Priority		Coastal Subwatershed		Composite Score
		Metric	Score	Metric	Score	Metric	Score	Metric/Score	Metric	Score	Metric	Score	Metric	Score	
WR-01	6.1	1.91%	20	0.0%	10	0.6%	10	No Data	Yes	10	Yes	10	No	1	8.7
WR-02	3.6	1.26%	20	0.0%	10	0.0%	10	No Data	Yes	10	Yes	10	No	1	8.7
WR-03	1.0	0.30%	20	0.0%	10	0.0%	10	No Data	Yes	10	No	1	Yes	10	8.7
WR-04	0.4	0.14%	20	0.0%	10	0.0%	10	No Data	Yes	10	Yes	10	No	1	8.7
WR-05	0.9	0.28%	20	0.0%	10	4.9%	7.5	No Data	Yes	10	Yes	10	No	1	8.4
WR-06	2.7	0.91%	20	3.7%	7.5	2.2%	7.5	No Data	Yes	10	No	1	Yes	10	8.0
WR-07	0.2	0.07%	15	0.0%	10	0.0%	10	No Data	Yes	10	Yes	10	No	1	8.0
WR-08	4.3	1.33%	20	0.0%	10	0.0%	10	1	Yes	10	Yes	10	No	1	7.8
WR-09	3.3	1.02%	20	0.0%	10	0.0%	10	1	Yes	10	Yes	10	No	1	7.8
WR-10	3.0	0.91%	20	0.0%	10	0.0%	10	1	Yes	10	Yes	10	No	1	7.8
WR-11	0.2	0.06%	15	0.0%	10	7.0%	7.5	No Data	Yes	10	Yes	10	No	1	7.6
WR-12	20.6	6.20%	20	0.0%	10	0.0%	10	No Data	Yes	10	No	1	No	1	7.4
WR-13	20.5	6.15%	20	0.0%	10	0.0%	10	No Data	Yes	10	No	1	No	1	7.4
WR-14	4.2	1.55%	20	0.0%	10	0.4%	10	No Data	Yes	10	No	1	No	1	7.4
WR-15	0.4	0.52%	20	0.0%	10	0.0%	10	No Data	Yes	10	No	1	No	1	7.4
WR-16	0.4	0.14%	20	0.0%	10	0.0%	10	No Data	No	1	Yes	10	No	1	7.4
WR-17	0.4	0.11%	20	0.0%	10	0.0%	10	No Data	Yes	10	No	1	No	1	7.4
WR-18	0.3	0.11%	20	0.0%	10	0.0%	10	No Data	Yes	10	No	1	No	1	7.4
WR-19	0.0	0.01%	10	0.0%	10	0.0%	10	No Data	Yes	10	Yes	10	No	1	7.3
WR-20	0.0	0.01%	10	0.0%	10	0.0%	10	No Data	Yes	10	Yes	10	No	1	7.3
WR-21	3.3	1.00%	20	0.0%	10	0.0%	10	5	Yes	10	No	1	No	1	7.1
WR-22	1.0	0.32%	20	0.0%	10	5.4%	7.5	No Data	Yes	10	No	1	No	1	7.1
WR-23	1.1	0.33%	20	3.5%	7.5	0.0%	10	5	Yes	10	No	1	No	1	6.8
WR-24	2.7	0.82%	20	4.7%	7.5	2.6%	7.5	No Data	Yes	10	No	1	No	1	6.7
WR-25	0.7	0.20%	20	0.0%	10	15.4%	5	No Data	Yes	10	No	1	No	1	6.7
WR-26	0.2	0.07%	15	0.0%	10	0.0%	10	No Data	Yes	10	No	1	No	1	6.7
WR-27	0.2	0.07%	15	0.0%	10	0.0%	10	No Data	Yes	10	No	1	No	1	6.7
WR-28	0.2	0.07%	15	0.0%	10	0.0%	10	No Data	No	1	No	1	Yes	10	6.7
WR-29	0.2	0.06%	15	0.0%	10	0.0%	10	No Data	No	1	No	1	Yes	10	6.7

ID	Wetlands Restoration Opportunity (Acres)	Percent of Wetland Restoration Opportunity		Sewer Lines		Roads and Bridges		CRAM Code (Wetland Function)	Priority Habitat/Linkage Subwatershed		Stakeholder Priority		Coastal Subwatershed		Composite Score
		Metric	Score	Metric	Score	Metric	Score	Metric/Score	Metric	Score	Metric	Score	Metric	Score	
WR-30	0.2	0.06%	15	0.0%	10	0.0%	10	No Data	No	1	No	1	Yes	10	6.7
WR-31	0.2	0.05%	15	1.4%	10	0.0%	10	No Data	Yes	10	No	1	No	1	6.7
WR-32	0.2	0.05%	15	0.0%	10	0.0%	10	No Data	No	1	No	1	Yes	10	6.7
WR-33	0.1	0.04%	15	0.0%	10	0.0%	10	No Data	Yes	10	No	1	No	1	6.7
WR-34	7.1	2.14%	20	0.0%	10	1.9%	10	1	Yes	10	No	1	No	1	6.6
WR-35	5.5	1.64%	20	0.0%	10	0.0%	10	1	Yes	10	No	1	No	1	6.6
WR-36	4.5	1.37%	20	0.0%	10	0.0%	10	1	Yes	10	No	1	No	1	6.6
WR-37	2.8	0.86%	20	0.0%	10	0.0%	10	1	Yes	10	No	1	No	1	6.6
WR-38	2.7	0.82%	20	0.0%	10	0.0%	10	1	Yes	10	No	1	No	1	6.6
WR-39	2.5	0.74%	20	0.0%	10	0.0%	10	1	Yes	10	No	1	No	1	6.6
WR-40	2.4	0.73%	20	1.1%	10	0.0%	10	1	No	1	Yes	10	No	1	6.6
WR-41	0.5	0.14%	20	0.0%	10	0.0%	10	1	Yes	10	No	1	No	1	6.6
WR-42	0.0	0.01%	5	0.0%	10	0.0%	10	No Data	Yes	10	Yes	10	No	1	6.6
WR-43	0.6	0.20%	20	9.6%	5	0.0%	10	5	Yes	10	No	1	No	1	6.5
WR-44	0.2	0.06%	15	0.0%	10	0.0%	10	5	Yes	10	No	1	No	1	6.5
WR-45	0.2	0.06%	15	0.0%	10	0.0%	10	5	Yes	10	No	1	No	1	6.5
WR-46	0.2	0.05%	15	0.0%	10	0.0%	10	5	Yes	10	No	1	No	1	6.5
WR-47	0.2	0.05%	15	0.0%	10	0.0%	10	5	Yes	10	No	1	No	1	6.5
WR-48	0.2	0.05%	15	0.0%	10	0.0%	10	5	Yes	10	No	1	No	1	6.5
WR-49	0.2	0.05%	15	0.0%	10	0.0%	10	5	Yes	10	No	1	No	1	6.5
WR-50	0.2	0.05%	15	0.0%	10	0.0%	10	5	Yes	10	No	1	No	1	6.5
WR-51	0.2	0.05%	15	0.0%	10	0.0%	10	5	Yes	10	No	1	No	1	6.5
WR-52	0.1	0.04%	15	0.0%	10	0.0%	10	5	Yes	10	No	1	No	1	6.5
WR-53	0.1	0.04%	15	0.0%	10	0.0%	10	5	Yes	10	No	1	No	1	6.5
WR-54	4.3	1.30%	20	0.0%	10	0.0%	10	8.75	No	1	No	1	No	1	6.5
WR-55	3.1	0.94%	20	0.3%	10	0.4%	10	8.75	No	1	No	1	No	1	6.5
WR-56	0.7	0.21%	20	0.0%	10	1.1%	10	8.75	No	1	No	1	No	1	6.5
WR-57	0.5	0.15%	20	0.0%	10	0.0%	10	8.75	No	1	No	1	No	1	6.5
WR-58	0.5	0.15%	20	0.0%	10	0.0%	10	8.75	No	1	No	1	No	1	6.5
WR-59	0.4	0.12%	20	0.0%	10	0.0%	10	8.75	No	1	No	1	No	1	6.5

ID	Wetlands Restoration Opportunity (Acres)	Percent of Wetland Restoration Opportunity		Sewer Lines		Roads and Bridges		CRAM Code (Wetland Function)	Priority Habitat/Linkage Subwatershed		Stakeholder Priority		Coastal Subwatershed		Composite Score
		Metric	Score	Metric	Score	Metric	Score	Metric/Score	Metric	Score	Metric	Score	Metric	Score	
WR-60	0.6	0.17%	20	27.2%	2.5	0.0%	10	No Data	No	1	No	1	Yes	10	6.4
WR-61	11.0	3.31%	20	7.1%	7.5	0.0%	10	1	Yes	10	No	1	No	1	6.3
WR-62	9.7	2.92%	20	0.0%	10	0.0%	10	7.5	No	1	No	1	No	1	6.3
WR-63	1.5	0.46%	20	0.0%	10	1.1%	10	7.5	No	1	No	1	No	1	6.3
WR-64	1.5	0.44%	20	0.0%	10	0.0%	10	7.5	No	1	No	1	No	1	6.3
WR-65	1.1	0.32%	20	0.0%	10	0.0%	10	7.5	No	1	No	1	No	1	6.3
WR-66	0.6	0.17%	20	0.0%	10	0.0%	10	7.5	No	1	No	1	No	1	6.3
WR-67	0.6	0.17%	20	0.0%	10	0.7%	10	7.5	No	1	No	1	No	1	6.3
WR-68	0.5	0.14%	20	0.0%	10	0.0%	10	7.5	No	1	No	1	No	1	6.3
WR-69	0.4	0.12%	20	0.0%	10	0.0%	10	7.5	No	1	No	1	No	1	6.3
WR-70	0.4	0.11%	20	0.0%	10	0.0%	10	7.5	No	1	No	1	No	1	6.3
WR-71	0.6	0.17%	20	0.0%	10	3.7%	7.5	8.75	No	1	No	1	No	1	6.2
WR-72	16.5	4.95%	20	0.3%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-73	12.8	3.84%	20	0.2%	10	0.6%	10	No Data	No	1	No	1	No	1	6.1
WR-74	8.6	2.59%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-75	7.9	2.39%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-76	6.1	1.83%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-77	3.1	0.93%	20	1.1%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-78	2.2	0.68%	20	0.1%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-79	1.7	0.50%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-80	1.6	0.48%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-81	1.5	0.45%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-82	1.3	0.39%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-83	1.1	0.32%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-84	1.0	0.30%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-85	1.0	0.29%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-86	0.8	0.23%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-87	0.7	0.21%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-88	0.4	0.14%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1
WR-89	0.4	0.12%	20	0.0%	10	0.0%	10	No Data	No	1	No	1	No	1	6.1

ID	Wetlands Restoration Opportunity (Acres)	Percent of Wetland Restoration Opportunity		Sewer Lines		Roads and Bridges		CRAM Code (Wetland Function)	Priority Habitat/Linkage Subwatershed		Stakeholder Priority		Coastal Subwatershed		Composite Score
		Metric	Score	Metric	Score	Metric	Score	Metric/Score	Metric	Score	Metric	Score	Metric	Score	
WR-90	8.2	2.45%	20	0.1%	10	0.0%	10	5.5	No	1	No	1	No	1	6.1
WR-91	2.6	0.78%	20	0.0%	10	0.0%	10	5.5	No	1	No	1	No	1	6.1
WR-92	2.2	0.66%	20	0.0%	10	0.0%	10	5.5	No	1	No	1	No	1	6.1
WR-93	2.0	0.61%	20	0.0%	10	0.0%	10	5.5	No	1	No	1	No	1	6.1
WR-94	2.0	0.59%	20	0.0%	10	0.0%	10	5.5	No	1	No	1	No	1	6.1
WR-95	1.3	0.41%	20	0.0%	10	0.0%	10	5.5	No	1	No	1	No	1	6.1
WR-96	1.0	0.29%	20	0.0%	10	0.0%	10	5.5	No	1	No	1	No	1	6.1
WR-97	0.6	0.18%	20	0.0%	10	0.0%	10	5.5	No	1	No	1	No	1	6.1
WR-98	0.5	0.16%	20	0.0%	10	0.0%	10	5.5	No	1	No	1	No	1	6.1
WR-99	2.0	0.60%	20	9.6%	5	0.0%	10	1	Yes	10	No	1	No	1	6.0
WR-100	1.0	0.30%	20	0.0%	10	0.0%	10	5	No	1	No	1	No	1	6.0