3.0 RESOURCE SIGNIFICANCE AND EVALUATION

3.1 Objectives and Approach

Wetlands on the Santa Rosa Plain are important for several reasons. They represent highly productive and valuable natural habitats for indigenous (and some endemic) plants and animals, and are subject to governmental planning consideration under CEQA and federal regulation under the Clean Water Act. Together with vast grassland, oak woodland and savanna, the pristine wetlands provided extremely valuable resources for numerous wildlife species, with the vernal pools in particular representing highly productive and regionally specialized communities. The pools are especially valuable for their roles in supporting complex food webs (bacteria, algae, plants, invertebrates, amphibians, waterbirds, waterfowl, small mammals, and raptors), serving as resting and feeding resources along migratory bird routes, and fostering the evolution of a regionally unique wetland flora. Because of the combination of their resource values and legal constraints, jurisdictional wetlands need to be addressed in a technical manner. This involves identifying and evaluating the functions and values of specific wetland habitats, as well as comparing wetland sites in order to assess potential impacts, determine mitigations, and decide which sites warrant outright preservation.

The purpose of this section is to identify the factors, biological and non-biological, which are most useful in the determination of wetland site quality and significance. While some factors may not be important for certain sites, the discussions that follow are intended to assist in potential preserve evaluations.

3.2 Habitat Extent and Quality

Two of the most important aspects of the Plain's natural ecosystem are the extent of habitat (both wetland and upland) and its quality for indigenous plants and animals. Both of these factors play critical roles in determining what species survive, how productive and stable the system is, and how well an area can tolerate disturbance or change. As resource sites range from small, isolated and degraded sites to larger less altered areas, the ability of the system to support viable populations and communities increases. More precisely, however, as the Plain's mosaic of drainages and plant communities has been converted to human and agricultural uses, its ability to support the entire natural vernal pool - oak savanna ecosystem has severely decreased. Still, habitat extent and quality are important in the review of potential land use (e.g., preservation, mitigation, agriculture, development) on the remaining undeveloped lands.

In evaluating a site for potential preservation or development, the size is easy to quantify, but the amount of a particular habitat (or subtype) required to support each of the many ecosystem components varies greatly. In some cases, sites of less than one or two acres appear to be sufficient to maintain populations of certain native (including sensitive) plants and aquatic animals. Much larger acreage is often needed, however, to attract and support waterbirds, waterfowl, larger mammals, and raptors. Site quality is often difficult to define or quantify, and different conditions may be preferred by different species.

The extent and quality of wetland habitats on the Plain have declined with modern settlement. The natural network of seasonal wetlands and riparian corridors (along most primary creeks) has been dammed and/or diverted, channelized and buried in pipes. The entire headwater area for the Plain, from Windsor and Larkfield-Wikiup in the north, to Rohnert Park and Cotati has been developed, and most of the historic riparian forest and woodland along the primary creeks (Starr, Windsor, Pool, Mark West, Santa Rosa) has been removed. In the middle of the Plain (east to west, just west of the urban corridor along Highway 101), the low gradient drainage swales (meadows), vernal pools, and seasonal and perennial marshes have been fragmented, drained, and farmed, while the flatter, lower part of the valley floor on the western Plain has been extensively cultivated and irrigated.

There are currently about four major areas of wetland concentration in the study area. These are

northwest Santa Rosa, southwest Santa Rosa, the rural lands just west of Santa Rosa, and the immediate Laguna floodplain. These include concentrated areas of remnant wetlands, generally including multiple parcels and significant acreage.

Habitat quality has suffered dramatically, however, both in terms of individual site-by-site conditions as well as through areawide decreases in extent and diversity. Virtually all of the land and all of the wetlands in the study area have been at least moderately altered by past or ongoing land uses, and large sections of the plain's overall habitat landscape have been completely converted to cropland or other intensive non-wetland use. With severe depletion of overall habitat acreage and pervasive degradation, even the remnant habitats no longer represent more than a fraction of what they once did as part of the regional ecosystem. The remaining pools provide some suitable habitat for native plants, invertebrates, and some water dependent birds, although many of the larger mammal and bird species have moved elsewhere. Habitat quality is, therefore, relative, and although knowing the absolute minimum thresholds for sustaining populations and communities is important, current efforts must recognize the meager remaining universe within which any planned conservation/preservation efforts must take place.

In spite of the historic depletion of high quality habitats, there is still an abundance of land in the study area which could be restored because of the very low gradients and underlying dense clay layers. Even if native flora and fauna are not represented on a site, if the physical conditions are still present, restoration of considerable wetland value can still be attained. Sites, therefore, which may have no current sensitive species or natural communities may still constitute significant areas with respect to possible future restoration

In terms of habitat quality, the following are brief descriptions of the most relevant factors that affect wetland quality, determine their current significance, and factor into their potential for preservation/protection, restoration, or development:

3.2.1 Physical Factors

There are four primary natural physical factors that are important to the formation of wetlands on the Santa Rosa Plain. There are three substrate factors, including (1) the basic soil (with or without clays and/or other restrictive layers), (2) the general landscape gradient (facilitating or hindering surface drainage), and (3) the micro-topography (providing basins and runoff routes). Lands with clay soil, low gradient, and undulating topography tend to foster seasonal wetland development, while more porous soils allow water to percolate, slightly steeper slopes drain more thoroughly, and level or uniformly sloping terrain also drains more completely. These factors are inherently present and active (and hence less critical for evaluation) in areas with existing wetlands, while they are especially important considerations when determining the potential of a site for wetland restoration or creation.

The fourth major physical factor is annual rainfall, which is important both in terms of the annual total and the seasonal distribution. The study area's average of 30 inches of rain per year (almost all of which is received during the cooler season) combined with soils that have very low rates of transmissivity results in a relative water surplus during the main growing season (December through April), and hence, the formation of perched water tables and seasonal pools. While the total rainfall here is generally adequate to foster extensive wetland formation, drought is also a typical component of the ecosystem and should be considered in planning for preservation and restoration. Situations of marginal hydrology (e.g., swales, shallow isolated pools) either existing now or under restored conditions should be expected to perform less as wetlands and more as upland grassland in the drier years. Sites under consideration for preservation should be examined for their proportions of marginal versus more well developed wetlands, since in drought periods, shallow habitats may fail to provide significant wetland resources. A mix of habitat conditions (shallow to deep) is preferred in order for a fuller range of resources to be manifest in a given year.

Land use constitutes an important physical habitat factor that has altered several of the substrate parameters. The basic underlying restrictive layers have not been significantly altered, but cultivation and development of the land surface has changed the overall terrain and local

microtopography, turned and mixed the soils, and facilitated dewatering through ditching, channelization, and active draining.

3.2.2 Biotic Factors

The indigenous plants and animals of the Plain played various roles in the formation and functioning of the natural wetland - savanna ecosystem. Many levels of biological activity and ecological interrelationships have evolved, ranging from anaerobic bacteria, algae, and microbial decomposers, through a diverse food web of plants, seeds, invertebrates, and small animals, culminating in a myriad of migratory waterfowl, waterbirds, and raptors. Each species, population, and community contributed to the web, with the higher and more transient species of wildlife being dependent on the overall system. The native species and natural processes have been diminished, however, and now share the remaining habitats with numerous introduced species and human influences. Whole wetland communities and populations (e.g., large mammals, waterfowl, native plants) have been depleted and/or displaced in the study area, and much of the remaining biologic influence arises from livestock, cultivation of crops, and human use of the land. Pesticides, fertilizers, and soil amendments have localized impacts, and cultivation practices and general soil disturbances give exotic weeds an advantage in competition with the native species.

3.2.3 Socioeconomic Factors

Urbanization, agricultural development, and general private land use are major factors that have shaped the Plain's modern and current resource distribution and condition. These factors continue to affect wetlands and their potential for preservation. Dealing with these factors will be a critical component of the wetland conservation efforts on the Plain. As long as agriculture is important and viable economically, disruptive land use will continue to degrade and eliminate wetland resources. To the extent that urbanization continues to move into undeveloped areas, additional resource losses are likely to occur. Urban sites with fragmented wetlands will continue to be influenced by the full range of urban activities, while the urban fringe represents the major realm of potential future conflict between land development and resource conservation.

3.3 Criteria for Site Evaluation

Many factors may have bearing on a given site's level of quality, and therefore, its appropriateness for preservation, restoration, or development. This section identifies the main parameters which are relevant to the evaluation of wetland site quality and suitability for preservation. These are presented singly, but more often than not work in combination with other factors to determine a site's overall value. In general, the degree of disturbance, site size, and relative abundance of sensitive elements are the most important factors, although shape and/or proximity to incompatible land use can critically influence a site's suitability for preservation. Without regard to relative or absolute importance, the following are the parameters of potential value in assessing wetland sites in the study area:

3.3.1 Site Size

The size of a resource occurrence or site is often difficult to define since natural features cross legal lot lines and land uses, and many sites contain only fragments (sometimes physically separated) of a once more pervasive system. Wetland resource sites in the study area range from small urban set-asides and vacant lots of only 0.1 or 0.2 acre, on up to large ranches and dairies of several hundred acres. While some rare plants and even invertebrates may survive in small preserves, the emphasis from CDFG is that for management purposes such preserves should be a minimum of eight to ten acres. Site size is very important to the wildlife aspects of wetland conservation, and it is open to question how much small urban preserves serve the overall ecosystem values. Such small preserves may, however, be important with respect to unique plant or invertebrate resources, and may still warrant preservation.

3.3.2 Site Shape

In urban or rural residential areas, the shape of a potential preserve site can be important, with linear, highly convoluted, or oddly shaped parcels being more vulnerable to adjacent disturbances. Just as larger preserves are generally more stable and defensible, so are round or square parcels that minimize the exposed edges. Each potential conservation site should be evaluated with respect to shape, as should the overall vicinity (a potential collection of parcels) that might end up being placed in conservation use. In the more rural areas, shape is generally not as critical, but should still be considered in relation to the adjacent land uses.

3.3.3 Soil Type

There are four primary soils in the study area that foster seasonal wetland formation (see Section 2.1.1), although there are numerous phases and variations within these. The two main types of wetland soil are the dense clays of the Clear Lake clay series, and the generic silty clay loams over dense clay in the Wright, Huichica, and Zamora soils. Most of the study area's seasonal wetlands occur on only three soils (Wright, Huichica, and Clear Lake), but there are also many acres of degraded land on these and other soils, much of which is suitable for restoration. There are no unusual soils in the study area, but those that are present vary greatly in terms of clay content, depth to restrictive layer, continuity and thickness of restrictive layer, and presence of coarser materials. The analysis of subsoil profiles is an important element in preplanning wetland restoration and/or creation. Also, full representation of the region's soils in the eventual preserve system may be important to maintaining the full range of wetland functions and values (i.e., species, populations, and communities).

3.3.4 Geographic Location

There are several different geographic zones in the study area, but these are defined as much by nearby political entities and local land use as by any habitat zonation or floristic segregation. Based on historic air photographs and current ground conditions, a very large part of the pristine Santa Rosa Plain was dotted with seasonally wet swales and pools. However, large subregions (especially southeast of Santa Rosa, around Rohnert Park/Cotati, and in urban Santa Rosa) have been almost completely leveled, ditched, and converted to cropland or urban land use. While the wetlands tend to not be dramatically different across the various regions (although the backwaters along the Laguna have different hydrological regimes), the floristic aspects warrant some attention. First, the three federally listed plants have different distributions on the Plain (see Figures 6, 7, and 8), and several others (e.g., *Triteliaea peduncularis, Mimulus tricolor,* and *Navarretia leucocephala* ssp. *plieantha*) appear to occur only toward the northern part of the Plain. Whether or not distinct geographic forms exist is unknown, but if present, could argue for substantial geographic representation and careful restoration in order to preserve the full range of habitats, species, and genotypes. Some degree of areawide preserve representation appears to be warranted, but may also need to be weighed against the need for large contiguous preserve lands in the face of limited acquisition funds.

3.3.5 Naturalness - Degree of Disturbance

The degree of naturalness (or disturbance) is a major contributing factor toward site quality. It is likely that there are no truly pristine vernal pool areas left within the study area, since even the secluded, uncultivated, and currently ungrazed habitats were subject to long-term grazing and non-native species invasions. Contiguous expanses of natural topography and minimal land use disturbance greater than about 100 acres are scarce.

Several categories of naturalness can be recognized, including (1) the actual terrain or topography, (2) the soil profile, (3) local and/or areawide hydrology, (4) vegetation cover, (5) fauna, (6) land use, and (7) general degree of human use (e.g., degree of encroachment, human activities, ongoing ground disturbances). A lesser amount of alteration within any or all of these categories generally contributes to higher site quality, although topographic, hydrologic, and human use

factors are generally the most severe in their effects. If the terrain, buried soil conditions, and/or hydrology have been destroyed or substantially altered, wetland situations tend to be more tenuous, and restoration to a natural situation is more difficult. On the other hand, however, habitats can be lightly cultivated, disked, even planted, as well as thoroughly invaded by exotics, but if the natural topography, underlying restrictive soil layers, and hydrology are still present, even the most ruderal habitats have the potential to be restored to a relatively natural community.

The degree of disturbance or naturalness should be evaluated when considering the quality of a site, but objective, measurable methods are generally not available. Professional judgment and comparison with other sites could be used to assess various sites, but a large amount of variability is to be expected between evaluators based on perceptions of disturbance and non-quantifiable parameters (degree of human disturbance, extent of hydrologic alteration, etc.). Simple measurements or classifications of several factors could be used, such as the basic location of a site (urban, rural, agricultural), the presence and percent of natural terrain and vegetation, and ongoing land use, but considerable refinement and definition would be needed to implement a consistent 'naturalness' rating method.

3.3.6 Wetland Extent

The total amount of wetland on a site should not necessarily be a major evaluation factor, but in general, the larger the wetland area, the greater the value associated with the site. However, graded fields can be close to 100 percent jurisdictional wetland, but have no aquatic habitat values, nor any native vegetation, while tiny isolated fragments can still support unique floral or faunal elements. Some consideration of wetland extent is appropriate for site assessment, but absolute acreage should be integrated with other habitat values, location, and site quality. The objectives to be served by each prospective site acquisition should also be clarified in order to determine whether or not wetland extent is critical.

3.3.7 Wetland/Upland Ratio

There is a wide range of wetland/upland ratios present in the study area, from zero to almost 100 percent. Under natural conditions and without regard to legal boundaries, roughly between about 10 and 30 percent of a given land area could be expected to qualify as wetland on much of the Santa Rosa Plain. The definition of what constitutes a "site", however, is as relevant as the actual landscape configuration and should be considered when evaluating wetland to upland ratios. While the ratio of one habitat type to the other varies across the Plain, the important consideration is simply to allow for an adequate amount of upland to function with the wetland, be it in a natural wetland preserve or on a mitigation site. Isolated wetland with no appreciable upland is not representative of the Plain's natural conditions and does not offer the best opportunity for long term wetland resource conservation. While the natural target range of 20 to 30 percent (or perhaps as much as 40 percent) wetland on a given site can be used as an ideal, the actual total amount on a given site is probably not one of the more important factors and should be used as a secondary evaluation tool, primarily in the comparison of sites.

3.3.8 Habitat Diversity

As with most ecosystems, simple homogeneous habitat expanses are generally less productive, less stable, and less ecologically valuable than those with greater habitat diversity. While most seasonal wetlands in the study area are strictly herbaceous and dry in summer, there is still considerable variation and diversity within the habitats present. Each separate habitat supports a slightly different plant community, which in turn favors different assemblages of animals. The regional range includes non-ponded, shallow and intermittently ponded, deeper and persistently ponded features, plus grasslands and oak communities of different compositions and plant densities. The resulting mosaic of many such habitats and communities comprises the overall ecosystem which provides the numerous ecological values to the associated food web. The fewer the habitats and/or communities, the less well developed the overall web or ecosystem is likely to be. With a full spectrum of habitat conditions and communities, the resulting system is more

productive, more efficient in resource use, and more resistant to perturbation.

The significance of habitat diversity and/or community variation in smaller fragmented habitats is not known, but in general, the greater the habitat variation in a given area, the better it can weather droughts, species invasions, and other disturbances. A potentially significant topic for investigation would be to determine whether fragmented habitat areas can ever regain major ecosystem values, or if at some threshold acreage (possibly even different for different land uses), smaller areas simply cannot support more than certain adaptable individual elements of the overall system. Without knowing if there is a minimum size or degree of diversity for the ecosystem to function, it is generally assumed here that greater habitat variability and community diversity are favorable traits and desired aspects of wetland conservation areas.

3.3.9 Species Richness

Similar to habitat diversity, a greater number of species supported by a community generally translates into higher productivity, better resource use, and higher resiliency to disturbance. Native wetlands in the study area typically support anywhere from just a few plants (often less than about eight in shallow swales), to more than 15 species in larger wetland features with deep and shallow zones (C. Patterson, unpubl. field data). Little is known about the floristic variation in wetlands across the Plain, although at least a few species are known to be restricted to particular geographic sub-regions.

In terms of the region's wetlands, shallow to medium depth vernal pools have the highest species richness, while deep pools become somewhat more depauperate as the harshness of the growing conditions intensifies. Swales are dominated by just a few well adapted (meadow) species (not to mention that they have been overwhelmed by common introduced grasses).

3.3.10 Other Habitat Values

While wetlands and endangered species are the two primary factors of significance, the presence of other natural elements such as native oaks, riparian corridors, extensive open grassland, or creekbeds may add to the overall value and integrity of a site. It is difficult to quantify how such features function or add to the habitat mix, but it should be kept in mind that such elements can be very important and should be considered when evaluating lands with wetlands. The degree to which such other features may be important depends on many factors, but case by case analyses by qualified biologists are needed to make such determinations.

3.3.11 Number of Sensitive Species/Elements

As discussed above regarding habitat diversity and species richness, a general increase in the number of sensitive elements that occur together indicates a higher degree of overall value and sensitivity, but all relevant factors must still be considered in making evaluations. Multiple occurrences of sensitive species (ensemble sites) are not common, however, and almost all such situations should be regarded as relatively unique and worthy of close consideration for preservation. Sites with both sensitive plants and animals probably constitute the most important habitats since they clearly serve the needs of more than just one or two components.

3.3.12 Population Size(s)

At least as important as the number of sensitive species present is the population size (or more accurately, viability) of such species present. No minimum population sizes necessary for maintaining a population have been determined for the species in this region (plant or animal), but the issue of habitat amount and population size may be paramount to the long term survival of the species involved. Several sensitive species appear to be able to persist in small habitat pockets and with low total colony numbers (e.g., Burke's goldfields at the Pioneer 2000 and Seville Estates set-asides, tiger salamanders at the Finley/Wright Road site), but other sites with small reported

numbers have also apparently disappeared in recent years. Compounded by the ability of several vernal pool annuals to fluctuate widely in numbers from year to year, the factor of population size is largely an unknown. One conclusion, however, that can be made, is that larger populations (or at least more extensive occupied habitat) are generally better able to cope with various environmental stresses than small ones, and larger populations are desirable in preserve situations. Careful long term monitoring is needed to clarify the abilities of vernal pool species to adapt and persist, as well as to simply define the natural range of variation that should be expected under stable conditions.

3.3.13 Genetic Variability

Although there are only meager data, the results of two studies indicate that genetic isolation and differentiation in plants may be occurring on the Plain. The potential for such genetic divergence is an important factor in considering if or where to move salvaged materials, and may be important in determining what combination of sites is placed in preserves. Burke's goldfields appears to be arranged into at least three somewhat different forms (B. Guggolz, pers. comm.), including the populations outside of Sonoma County, and two forms in the study area: one along the Laguna and another in the headwater systems east of the Laguna floodplain. Studies by Schaffer (1992) on the California tiger salamander also indicate that the regional form may be genetically distinct from the populations of the central Valley and other parts of the state. Both the unknown existing variation and the issue of mitigation salvage and transfer will continue to be factors to consider.

3.3.14 Associated Species

In addition to the sensitive species that have been officially recognized and protected (and which factor heavily into site preservation considerations), there are numerous other species associated with the study area's wetlands that are worthy of consideration. In general, sites that support multiple native wetland species (e.g., entire wetland communities) are more productive and ecologically stable (and represent better preservation opportunities) than sites with just a single sensitive species occurrence. In some cases, sites with exceptionally large populations of a single sensitive species would still represent important preservation elements, even if other native vegetation is not present (or at least not abundant). However, in the consideration of sites for preservation, habitats that represent a wider range of natural wetland conditions and a richer flora are probably better suited for long term wetland conservation and may constitute higher priorities. Occurrences of sensitive species that also include other native wetland vegetation are generally more valuable than more homogeneous stands of a single species. An inventory of all species present on a given wetland site should be made, especially when development or land use changes are proposed.

While there are only a few individual species that are formally protected, their scarcity is the result of habitat depletion. As a generic habitat type, vernal pools warrant preservation efforts with or without sensitive species, and sites with exceptional examples of natural pool communities should all be considered for preservation. There may be sites that warrant preservation on the basis of containing exemplary habitats and/or abundant native species, even though none of the recognized sensitive plants or animals may be present.

3.3.15 Habitat Stability

Wetlands on the Plain are not only subject to the wide natural fluctuations in annual weather patterns, but are also influenced by ongoing and often changing land uses. The ecological stability of a given wetland site is related to the integrity of the topography, soil, hydrology, plants and animals, both onsite and on adjacent lands. If any or all of these components are altered, the stability of a site's wetland resources(species and communities) can be affected. The basic physical factors of soil impermeability and very low grade are difficult to change without grading, filling, or excavation, and even intense long term farming on the Plain has not broken the underlying clay layers. Surface soils have been turned and compacted, but their inherent propensity to pond remains. Physical substrate conditions are, therefore, relatively stable over a large part of the study

area. However, site specific analysis is recommended to determine if current conditions are stable or subject to recent, ongoing, or future changes. The lower the degree of physical substrate disturbance and alteration, the more stable a site is likely to be over the long term, and the better it will be as a preservation site.

Altered hydrology is pervasive in the study area, and although the effects of such dewatering are not well known, this phenomenon probably accentuates the periodic droughty conditions (and may reduce the acreage of wetlands on adjacent lands) and tends to decrease a site's long term habitat stability. Hydrological integrity (or alteration), historic or future, is an important evaluation factor and may require investigation both onsite and on nearby lands. What constitutes hydrological stability is not clear given the extreme fluctuations in rainfall, but most likely the effects of development have been to dewater the Plain slightly, accentuate drought conditions, and introduce incremental instability. Without broad landscape sheet flow, smaller isolated wetland sites are likely to suffer hydrologically over the long term.

Overall habitat stability depends on many factors, including substrate and hydrological alterations, habitat fragmentation, and land use, but is difficult to evaluate objectively. It is also difficult to assess whether or not previously disturbed sites have stabilized or continue to change. The important consideration here is to identify what land use and habitat changes have occurred already, or are likely to occur in the future, and to determine whether or not such changes have stabilized or are likely to continue. Recent changes made in the landscape (such as along the urban boundary) indicate that a new habitat equilibrium may be years away.

3.3.16 Biotic Uniqueness

The great complexity of natural communities occasionally results in features or sites that are exceptional or very unique. Such situations may not be apparent from the assessment of other more definable factors, but should be recognized and considered. Examples include uncommon co-occurrences of species (e.g., sites with multiple species in key genera such as *Blennosperma* and *Limnanthes*), unusual substrate conditions (such as the seep-supported meadowfoam colonies at the "Gundelfinger" site), sites with historically favorable management regimes, populations of key species with recognizable variation, features of peculiar shape or configuration (e.g., individual pools of extremely large size), and situations with exemplary habitats or populations. Most determinations of such conditions will depend on careful evaluation by trained biologists.

3.3.17 Proximity to Other Valuable Habitats

Just as offsite disruptive influences can have an adverse effect on the integrity and quality of a given site, the presence nearby of additional resource values can also have a positive effect. Sites being considered for preservation should be analyzed with respect to possible additional habitat values on adjacent lands. Similarly, for wetland sites that are preserved, the possibility of adding adjacent lands that would increase the overall value through larger area protection should be considered, even if wetlands are not a primary issue with those lands.

3.3.18 Land Use

Basic land use (past and present) dictates the nature and degree of disturbance on a given wetland site, and plays a primary role in determining habitat quality. Land use in the study area is primarily agricultural and ranges from light to heavy grazing (savanna and open pasture to feedlot), from dryland hayfields to irrigated croplands and orchards. Urban areas typically include complete leveling, landscaping and artificial drainage, but vacant parcels may still support wetland resources. For some land uses, such as heavy grazing or summer irrigation, simple removal or modification of the activity may result in substantial habitat recovery. More intense land uses have the potential to irreversibly alter soils (compaction, broken clay layers, fill, amendments), hydrology (dewatering, contamination, drainage patterns), and topography.

Land use trends indicate continued intense land management in the study area, and many activities

allowed on private lands are not compatible with the conservation of wetland resources. The effects on wetlands are often direct (filled, drained, graded) and relatively obvious, but may be more difficult to define on sites with intermittent, low-level, or changing uses. Multiple land uses on a single legal parcel or across a larger wetland area may be problematic and should be evaluated when considering site acquisition or preservation. Future land use, proposed or as allowed under City/County planning provisions can also be an important factor in the success or failure of a given preservation effort.

Evaluation of potential future land use should consider what is possible on a given site as an economic activity for the owner. The pressure for landowners to use their land in an economically viable manner increases with time, and the need to intensify use occurs. In considering potential preservation sites, the allowable use of the land may be paramount to the acquisition effort. Land zoned for urban development is generally more immediately threatened than rural lands, and is more expensive as well. Even in rural areas where land is not zoned for subdivision or development, small changes in land use for the owner (such as accepting treated wastewater for irrigation) may result in drastic changes to the local biological communities and the viability of preservation. Certain geographic locations may make a site highly valuable for particular activities such as wastewater pond construction, airport runway clear zones, wastewater irrigation, utility corridors, road widening projects, agricultural preserves, community separators, and open space designations. Acquisition efforts, particularly in the urban setting, need to assess the value of the specific resources to be preserved in light of the area's predominant land use trend.

An important factor to consider then, is what land use changes may be likely over the foreseeable future. In evaluating a prospective preservation site, some attention needs to be given to (1) what future land uses could occur here (or on adjacent lands), (2) what type of pressure is there in this particular area for land use change (prime for grapes?, wastewater available nearby?, subdivision?, potential annexation?, etc.), (3) has the property recently changed ownership, (4) what is the minimum lot size in the area, (5) is there pressure to change from the current use, (6) is the land in any community separator or open space designation, and (7) are there any actual plans to change land use.

While it may be subjective, some effort is needed to assess how urgently a site needs to be protected in the face of likely land use changes. The degree of potential threat to a site varies over time and according to factors that are not well defined (e.g., stocking rates, fertilization and irrigation, crop management). Some acquisition decisions may need to be made on the basis of which properties are most threatened with new land use changes. In general, lands which are not under immediate pressure to be used differently (or more intensively) are less threatened and may be lower priorities for preservation. However, given the unpredictability of private land use and management in the region, it should never be assumed that a given site is safe from disruptive land use changes simply because there may be no apparent current need or desire to so change. Further, many incompatible land uses are legally possible without the need for review or permitting. Virtually all privately owned wetland sites should be regarded as vulnerable until actually protected under fee title or conservation easements.

3.3.19 Adjacent Zoning and Land Uses

Just as nearby (offsite) resource values can add to a given site's ecological value, so can nearby land uses detract from it. Acquisition and/or easement protection for a given site should involve some consideration of what land use changes are occurring or are likely on adjacent lands, especially for smaller sites. Potential preserve establishment in areas of probable future land use changes (e.g., annexation or wastewater irrigation) may need to include greater efforts to preserve larger buffers, or may render medium and smaller sites without exemplary resources as lower priorities for preservation. Adjacent land uses in urban areas often render preservation efforts for small vacant lot situations of questionable value. Many such sites may need to be evaluated with a different perspective than more rural lands.

Especially problematic are the lands that occur along the urban boundary. These are areas where current conditions may include significant wetland resources (often without major urban influences

at this time), but where surrounding properties are becoming ever more valuable for residential development or other more intensive uses. Preserve design and protective buffers in such areas may need to be different (or even designed for different purposes) than for sites located in more rural areas. Adjacent uses and future development need to be major considerations when evaluating urban resource pockets.

3.3.20 Defensibility

The defensibility of a potential preservation site is an important factor, but one which is difficult to quantify or accurately evaluate. This factor relates to how well a site can be protected from unauthorized use (trash dumping, off-road vehicles, wildlife harassment) and general daily disturbances. In general, the larger a site is and the more rural and less convoluted in physical shape, the more defensible it will be. Also, woody vegetation around the edges, the presence of major barriers (e.g., flood channels, railroads or major roadways) along certain sides, and the amount of existing fencing all help make a site more defensible. Shape and proximity to other disruptive land uses are important considerations.

To a certain extent, fencing, tree planting, and other measures can be used to increase defensibility. However, some situations, such as being next to major subdivisions, schools, industrial uses, or in a linear configuration can severely constrain the ability to protect a site over the long term. A more subtle component in the long term maintenance and protection of a site may relate to nearby hydrological changes or influences that may not be under the control of the resource managing entity on a given preserve. Sites that receive runoff from urban or industrial land uses (or have been completely cut off from natural watershed input) may be greatly compromised, thus effectively reducing the ability to maintain or "defend" the site's resources.

3.3.21 Accessibility

In general, accessibility is not a factor which enters prominently into potential preserve acquisition. In most cases, in fact, lack of public access is a positive aspect. This factor is often interrelated with site size and shape, geographic location, adjacent land uses, and overall defensibility. Public access may be desired in some cases and can serve a useful purpose in public education and local policing (trash cleanup, reporting unauthorized activities), as well as cultivating a general land stewardship ethic and appreciation for wetland resources. Existing and historically established public access may be a problem in some areas, especially where residents have already come to regard certain vacant lands as available for walking, pet exercising, off-road vehicle use, and other recreational pursuits. Public access is not, however, a necessary condition of site preservation, and in most cases, restricted access should be preferred. Urban preserves may need to be designed differently (with greater access restrictions for critical resource features) or even with different goals (e.g., geared toward limited public use and/or education rather than the preservation of full ecosystem values) than the more rural preserves.

3.3.22 Site Availability

Site availability is always a factor based on the reality of whether or not a landowner is willing to sell or grant a conservation easement. While various public land acquisition entities are often bound by law or policy to only pursue lands with willing sellers, the evaluation of potential preserve sites should not necessarily use this factor in completing relative site rankings or priorities. Site evaluations geared toward the ranking of resource occurrences should focus on the resource values present, socioeconomic factors of location, size, land use, and defensibility, with site availability left to the acquisition process. Sites with high resource values should still be identified as such, and may need to be left out of active pursuit efforts, but whether or not a site is currently available should not be a major factor in completing the resource assessment and site ranking process.

The availability of land changes with time, and site information should be compiled for all significant resource areas in the event that future landowners (e.g., heirs) decide to make the land available. It does not appear that legal condemnation and forced acquisition from unwilling

"sellers" is a viable or desirable means of acquiring preservation sites. The process of identifying high quality sites and pursuing their protection will need to address this issue as the overall wetland conservation effort progresses on the Plain. However, it may be feasible in the future for the City, County, or State to provide incentives and/or programs involving compensation, land trades, or other economic offers (e.g., sale as mitigation banks) whereby currently "unavailable" lands may be protected.

3.3.23 Management Potential

The management potential of a given site depends on numerous factors (many of which have been identified earlier), and is an overall aspect of site preservation that is difficult to define or quantify. It may be even more important, however, to be able to effectively manage a preserve over the long term as it is to simply acquire the site and establish the initial physical protection. This is especially true in the more urban areas where significant landscape alterations may already have occurred to a point where long term viability is not feasible. The overall manageability of a given site should be evaluated as a synthesis of the other more distinct factors, and some reduction in priority may be warranted for situations where control over the basic habitat processes is not possible.

3.3.24 Economic Feasibility

Similar to the issue of availability, the cost of acquiring a given site will ultimately come into play during the acquisition process, but should not be given importance in the evaluation phase. Larger sites and those in the urban sphere of influence will tend to be more expensive, but if the resources are high quality, the primary ranking of priorities should reflect this. A comparison of sites and their costs will likely be necessary once the acquisition effort is implemented.

3.3.25 Areawide Planning

Related to future land use changes, site defensibility, and overall manageability, the areawide planning process needs to be factored into the preservation effort. Changing development pressures and resource protection needs should be recognized and addressed according to subregions and more localized planning areas. General Plan amendments, urban boundary issues, and the growth of the region in general need to be considered when determining the larger system of preserves to be established. Given the costs and management problems associated with preserving the more valuable urban lands, certain areas may warrant different guidelines and requirements depending on their geographic location, biologic uniqueness/commonness, and/or the ability to maintain viable long term resource values.

Some general (i.e., urban) areas that contain relatively minimal, common, or highly fragmented wetland resources may be more suitable for development (with the appropriate permitting and mitigation) than for conservation. Highly urbanized areas may not necessarily warrant the same level of protection given to other areas with greater integrity, wetland density, or resource quality. Still other areas that contain highly unique sites or populations (even though fragmented or less extensive) may need to direct changes in the currently planned growth of such areas. The eventual system of preserves should not only encompass the full range of hydrologic, soil, biologic, and geographic wetland resources, it should also be cognizant of the everchanging socioeconomic landscape, the need to accommodate some urban expansion, and the increasing pressures on landowners to realize a return from their lands