APPENDIX C – PLANT COMMUNITIES

Table C-1. List of Common and Scientific Names of Plants Mentioned in the Text.

Common Name	Scientific Name
valley oak	*Quercus lobata*
interior live oak	*Quercus wislizenii*
black oak	*Quercus kelloggii*
Fremont cottonwood	*Populus fremontii*
white alder	*Alnus rhombifolia*
arroyo willow	*Salix lasiolepis*
red willow	*Salix laevigata*
Oregon ash	*Fraxinus latifolia*
California black walnut	*Juglans californica* var. *hindsii*
sandbar willow	*Salix exigua*
Goodding's willow	*Salix gooddingii*
Himalayan blackberry	*Rubus discolor*
California wild grape	*Vitis californica*
buttonwillow	*Cephalanthus occidentalis* var. *californicus*
California rose	*Rosa californica*
mugwort	*Artemisia douglasiana*
creeping wild rye	*Leymus triticoides*
Baltic rush	*Juncus balticus*
Bermuda grass	*Cynodon dactylon*
velvet grass	*Holcus lanatus*
Dallis grass	*Paspalum dilatatum*
brome grasses	*Bromus* sp.
dock	*Rumex* sp.
nutsedge	*Cyperus esculentus*
cattail	*Typha* sp.
bulrush	*Scirpus* sp.
water primrose	*Ludwigia peploides*
rush	*Juncus* sp.
spikerush	*Eleocharis* sp.
sedge	*Carex* sp.
nutsedge	*Cyperus* sp.
smartweed	*Polygonum* sp.
ryegrass	*Lolium perenne*

Objectives and Approach

The objectives of the plant communities evaluation included the following:

- Comprehensive, detailed mapping of the study area's riparian corridors;
- Analysis of riparian vegetation including species composition, structure, and community health;
- Identification of plant community problems and potential solutions.

The approach to achieve these objectives included review of available information coupled with detailed evaluation of representative locations within the study area.

Methods

Review of Existing Information

Riparian plant communities were mapped by Foothill Associates from aerial images flown in 1999; a digital version of this mapping was provided by the County. The mapping includes the general canopy type, percent canopy closure, and other attributes of riparian vegetation. A reduced version of this map is reproduced in Figure 5-1; a large scale version of the map is included at the back of this report. Although a valuable resource to the current assessment, the mapping does not cover the easternmost portion of the study area or the western portion within Sutter County, and does not provide detailed information about species composition (most of the study area riparian habitat is mapped as "mixed riparian"), structure, or health of the riparian community.

Environmental documents prepared for the following projects in the study area and immediate vicinity were reviewed:

- State Route 65 Lincoln Bypass EIR
- City of Lincoln Public Facilities Element General Plan
- Teichert Aggregate Facility EIR
- Twelve Bridges Specific Plan
- Three D Specific Plan
- Lincoln Crossing Specific Plan
- East Lake Specific Plan
- Bickford Ranch EIR

Other references consulted include Weislander historic vegetation maps; recent orthorectified, black and white and color aerial photos provide by Placer County and the City of Lincoln; orthorectified, black and white aerial photos for the Sutter County portion of the study area obtained from USGS; California Natural Diversity Database records; California Native Plant

Society records; and a number of other relevant sources. These sources are listed in the references section of this report.

Evaluation of Representative Locations

Ideally, in order to accurately characterize riparian habitat in the study area, all stream reaches should be examined in the field. However, given limited budget and private property access issues, such a comprehensive approach was not possible. Following general reconnaissance, and review of aerial photos and topographic maps, 26 locations were selected representing all significant drainages and physiographic regions in the study area. To the extent possible, these representative locations were sited away from road crossings that tend to alter stream morphology and, consequently, riparian vegetation. Table P-2, below, provides summary information regarding the representative locations.

Access was available at 23 of the 26 sites for field assessment. Full access to the riparian corridor was available at 15 sites; limited access (viewing from public roads without actually entering the property) was available at eight sites. Stream assessment methods were reviewed (Delaware River Basin Commission, et al. 1996; Koning, 1999; Rosgen, 1996; U.S.D.I., Bureau of Land Management, 1994, 1993, 1992a, 1992b), and an approach was developed that would provide comprehensive information on a number of key attributes. At each location, data were collected on species composition, community stratification, cover, and health. Additional data were collected on stream morphology and wildlife habitat. Where full access was not available, data sheets were completed to the extent possible based on aerial photos and previous mapping, and observation from nearby road crossings. Upon completion of the field investigation, data were reviewed and vegetation profiles were prepared representing the major physiographic regions.

Factors Affecting Plant Communities

Underlying Soils

In an undisturbed condition, the distribution of riparian plant communities generally corresponds with soil type, which in turn is dictated by the underlying geomorphology. The study area is underlain by basin, terrace, and foothill soil types. The following information is taken from Soil Surveys of Placer and Sutter Counties.

Basin soils are limited to the westernmost portion of the study area, west of Pleasant Grove Ave., and entirely within Sutter County. Riparian areas in basins are underlain by Clear Lake-Capay soils: deep to very deep, slowly permeable clay and silty clay derived from mixed alluvium.

Terrace soils occur from around Pleasant Grove Ave. on the west to the City of Lincoln on the east. Riparian areas associated with the primary drainages through the terrace areas (Coon Creek, Markham Ravine, Auburn Ravine, Orchard Creek, and Ingram Slough) are underlain by undifferentiated Xerofluvents, Kilaga, and Ramona soil types: generally very deep, well drained to somewhat poorly drained soils on mixed alluvial bottoms. Smaller tributary drainages may be underlain any of several granitically derived alluvial soils.

Foothill soils underlie most of the remainder of the study area east of Lincoln. The northern portion of the foothill area (generally including the upper Coon Creek watershed) is underlain by metamorphic rock. Topography in this area is generally steeper and more rugged, and the Auburn-Sobrante soils that occur here are generally shallow to moderately deep, well drained, and gravelly, with many rock outcrops. The southern portion of the foothill area is underlain by granitic rock that is deeply weathered. Most of this area is in more gentle terrain. Riparian soils in portions of this area are classified as Xerofluvents, similar to terrace riparian soils. However, most of the streams and surrounding floodplains were placer mined during the mid to late 1800s, and the Xerofluvents - Placer Area soils remaining in these areas are stony, cobbly, and gravelly mixed with fine sand.

Table C-2. Data Sheets and Associated Respective Stream Reaches.

Stream or Channel	Watershed Location	Average Gradient (%)	Data Sheet Numbers
Orr Creek	Upper Coon Creek	1.8	1,4
Dry Creek	Upper Coon Creek	1.5	2,3,4
Rock Creek	Upper Coon Creek	1.5	5
Deadman Canyon	Upper Coon Creek	3.5	7
Coon Creek	Upper Coon Creek	2.0	8,9
Doty Ravine	Upper Doty Ravine	2.0	13
Auburn Ravine	Upper Auburn Ravine	2.0	6,11,14
Dutch Ravine	Upper Auburn Ravine		10
Coon Creek	Lower Coon Creek	0.3 east of SR 65 0.1 Sutter County	12,16,20,23
Doty Ravine	Lower Coon Creek	0.3	12,16,20,23
Markham Ravine	Markham Ravine		17,21
Auburn Ravine	Lower Auburn Ravine	0.3 east of SR 65 0.1 Sutter County	18,22,24
Orchard Creek	Lower Auburn Ravine		19
East Side Canal		0.1	25
Cross Canal		0.1	26

Management Concerns

Himalayan Blackberry

For the upper watershed area, the most significant problem identified is the domination of the riparian zone by Himalayan blackberry. Although many stream reaches support a well

developed and diverse overstory, few areas were observed that were relatively free of blackberries. Those areas that were not infested were either the result of beaver dam impoundments, or vegetation management through mechanical control, grazing, or other means.

As noted previously, one of the most serious implications of riparian understory domination by Himalayan blackberry is the species' affect on regeneration of natives. Where streambank and floodplain areas are overgrown with masses of vegetation (e.g., blackberry thickets) the germination opportunity for native riparian trees is greatly reduced. Consequently, many of the area's riparian corridors lack sapling trees. The resulting lack of structural directly affects wildlife diversity within the riparian corridor.

Narrowed Riparian Corridors

In the lower watershed, Himalayan blackberry infestation appears to be less severe and more localized (perhaps due to more grazing or other alteration of the riparian zone). The most significant problem in this area is the artificial narrowing of the streams and associated riparian corridors, generally through channelization and construction of levees. Bottomland streams historically supported broad, meandering riparian corridors dominated by Valley oak, cottonwood and other species, and backwater areas supporting expansive freshwater marsh. Today, the lower reaches of most streams in the study area have been channelized to some extent, and the riparian corridor reduced to narrow stringers of trees. Most areas of freshwater marsh that remain are now artificial.

Other Potential Problems

Other potential problems identified in the study area include an abundance of nonnative predators; lack of adequate buffers along stream corridors; overgrazing; artificial flows during summer; and water quality degradation.

Nonnative Predators

Nonnative aquatic predators include bullfrogs, bass, catfish, mosquitofish, and crayfish. Bullfrogs, which eat virtually anything they can catch, can wreak havoc on populations of California red-legged frogs, foothill yellow-legged frogs, and northwestern pond turtles by consuming frog tadpoles and young turtles. The abundance of artificial ponds, irrigation ditches, and summer water in the study area provide ideal conditions for bullfrogs and other nonnative predators to thrive.

Feral domestic cats can have a significant impact on wildlife populations. Careful estimates place the number of free-ranging feral cats in North America at about 40 million (Coleman, Temple, and Craven, 1997). Research in Wisconsin indicates that rural free-ranging cats kill 39 million birds each year (Coleman and Temple, 1996). Nationwide, hundreds of millions of birds are killed each year by rural cats.

Recognizing the seriousness of this problem, the National Audubon Society Board of Directors adopted a resolution in 1997 regarding the cat issue. The resolution concludes that feral and

free-ranging domestic cats are exceptional and prolific predators of small mammals, song birds, small reptiles, large amphibians, and large insects, predators; are proven to have serious negative impacts to bird populations; and have contributed to the decline of many bird species.

Inadequate Buffers

In many portions of the study area, grazing, agricultural production, road construction, and development have occurred directly adjacent to the creeks. Many species, such an pond turtles and red-legged frogs, require upland areas adjacent to creeks for nesting, overwintering, or dispersal. Buffers also benefit species such as Cooper's hawks that tend to forage along habitat edges.

Overgrazing

It is generally preferred to exclude cattle from riparian zones. Cattle can cause considerable damage to riparian habitats. Cattle consume new shoots and young saplings, trample vegetation, compact soils, accelerate bank erosion, and contribute pollutants to streams. These problems are aggravated if cattle become too numerous or forage is inadequate.

Summer Flows

The abundance of water during summer in many of the study area's streams creates a paradox for biological resources. Conditions for some species are improved and most riparian vegetation thrives with summer irrigation. However, a consistent supply of summer water year after year is not a natural condition within the study area, and certain problems, including the abundance of nonnative predators and Himalayan blackberry, may be aggravated by this condition.