

Hogg Bird Sanctuary

A bird habitat enhancement plan

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I. INTRODUCTION

Long ago, Buffalo Bayou was a healthy riparian and bottomland forest. Over a hundred years ago, John James Audubon reported seeing the now-extinct Ivory-billed Woodpeckers in the area. One could imagine the bottomland forests lighting up in the spring with singing and calling Prothonotary Warblers, Northern Parulas, Hooded Warblers, Yellow-throated Vireos, and Acadian Flycatchers, along with the distant drumming of Pileated and Ivory-billed Woodpeckers. Those days are long gone, and unfortunately, there is no way to turn back time completely. Remnants of this natural habitat remain but are concentrated in a narrow strip along the bayou, mostly within Houston's Memorial Park.



However, this remnant habitat has been permanently transformed by fragmentation, development, erosion, pollution, and introduction of many exotic plants with the growth of Houston's population. While there is no way to turn back the clock, Memorial Park represents the largest tract of green space within the inner loop, making it an oasis for resident and migrating birds as well as other types of wildlife. Memorial Park serves as the primary gateway for urban residents to experience nature. In this study, we focus on the Hogg Bird Sanctuary, located in the eastern part of Memorial Park. Here, we present a planting plan for enhancing bird habitats in the sanctuary. Our objectives are to:

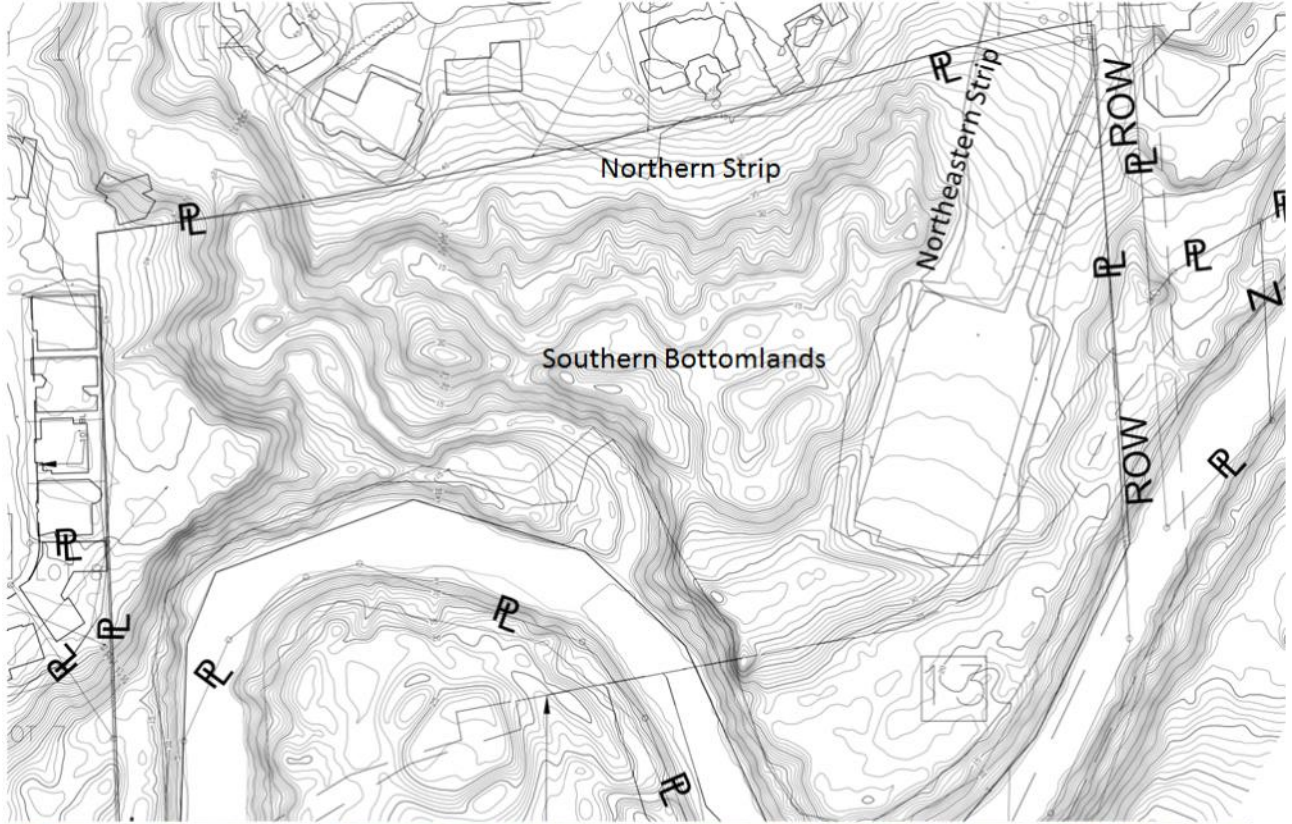
- Design habitat spaces to enhance the diversity and richness of resident and migrating birds
- Establish the Hogg Bird Sanctuary as a premier birding hotspot in Houston
- Insure that any habitat enhancement is also aesthetically appealing and inviting of the community

The project was initiated by The Garden Club of Houston in conjunction with the Memorial Park Conservancy. This recommendation was prepared by Cin-Ty Lee and Kelly Weinersmith, both at Rice University, as a final product of a Field Bird Biology class for undergraduate students. Seven students adopted the Hogg replanting project for their term papers. Their results were incorporated into the final recommendation plan.

II. SITE DESCRIPTION

The Hogg Bird Sanctuary is situated just west of downtown Houston, along the north bank of Buffalo Bayou. The sanctuary is the Eastern most part of Memorial Park, located at 100 Wescott Street, adjacent to the Museum of Fine Arts Bayou Bend Collection Visitor Center. Most of the sanctuary lies on the outer bend of the river and is underlain by sandy loam soils, perched ~20-25 feet above the river bed. South of the river lies the River Oaks Country Club. Single family residences make up the north and west boundaries. To the east lies the Bayou Bend Collection and additional residential housing.

The southern part of the sanctuary (**Southern Bottomlands**) is on a cut bank that is currently undergoing severe erosion. South of the bayou is the River Oaks Country Club. A steep, north-south trending ravine cuts the western edge of the sanctuary and connects with the bayou. Because of the steepness of this ravine, this section is essentially inaccessible. A small swale (i.e., a marshy depression) extends from the bayou northeast into the center of the sanctuary, and usually accommodates some amount of standing water. Our primary study area is the **Northern Strip**, which is defined by a narrow



(~50 feet) east-west trending rectangular strip measuring ~550 feet long on the northern boundary of the sanctuary. Also included in this study is **Northeastern Strip**, located on the northeast corner of the sanctuary, jutting up against an open manicured lawn belonging to the Bayou Bend Collection. The Northern Strip is the highest elevation in the sanctuary and lies just above bankfull height and therefore seldom floods. It receives sunlight most of the day, at all times of the year. The Northeastern Strip receives direct sunlight in the morning, but is shaded in the afternoon, especially during spring, summer and early fall when the trees have leafed out.

While there is perennial water in the bayou and in the swale, the study areas are generally dry due to well-draining soil. Any vegetation plan in the study area must account for these generally dry conditions. There are some local wet spots, however, that may accommodate less drought-tolerant plants. These wet spots include a landscape-designed water seep in the Northeastern Strip and an accidental water seep in the western part of the Northern Strip due to a plumbing or swimming pool leak from one of the residences.



III. CLIMATE

Houston is in a generally moist subtropical climate. However, weather along the Gulf Coast exhibits strong seasonal and even daily fluctuations. Rainfall in Houston ranges from ~10.5 inches in the spring to 15 inches in the summer, but rain often comes in short bursts or downpours, interrupted by long (one or more weeks) bouts of dry and hot conditions. Temperatures exceed 90 °F for ~100 days of the year, mostly in late spring to early fall. However, temperatures in late winter can dip down to freezing or just below. These extreme fluctuations in precipitation and temperature throughout the year must be considered when proposing a plan for re-vegetation.

IV. EXISTING VEGETATION

We conducted several reconnaissance surveys of the plants during the spring of 2015. A list of identified plants is shown at the end of this section (Table 1). This list is not fully comprehensive as there are some grasses, herbaceous annuals, and a number of exotics that we did not identify or may have overlooked. Nevertheless, the plant list below provides a general picture of the current state of the sanctuary. We now discuss the plant species make up of each section of the sanctuary.

Southern Bottomlands. The Southern Bottomlands is dominated by Cherry Laurel understory with a few tall Loblolly pines, sycamores, American hornbeams, and hackberries scattered throughout, particularly along the upper reaches of the bayou. For the most part, the tall trees are not abundant enough to generate thick extensive canopy except in the east. There are a few black willows along the bayou. Several large American Elms and Green ashes are present along the northeastern edge of the bottomlands. Wild grapes (*Vitis sp.*), Peppervine, greenbriar (*Smilax sp.*), and elderberry are abundant in areas with open canopy. There are a few Red Bays mixed in with the Cherry Laurels in the southern part

of the area. There are a few tall, but deceased pines in the center of the area. These tall trees are serving as territorial posts for hawks and woodpeckers. Standing water in the central part of the swale is ideal for attracting birds. The ponds, however have become over-run with Elephant's ears, an aggressive invasive. Other aggressive invasive species in the southern area include the Air Potato and Glossy Privet. Another notorious invasive in the Houston area is the Chinese Tallow, but fortunately, previous efforts in culling the population have been successful as we found no tall tallow trees. We note, however, that there are a few tallow saplings scattered throughout the area.

Northern Strip

The Northern Strip is on higher and drier ground and is, because of its proximity with the residences to the north, a more open habitat. There are a few tall pines, Water Oaks, and Hackberries in the eastern part of this strip, but for the most part the vegetation here consists of bushes/shrubs and herbaceous perennials and annuals. There is an open area in the center part of this strip, where some native flowers are growing. These include goldenrod, Indian Blanket, Mexican Hat, and Lemon Beebalm. Dog fennel is pervasive in the open areas and should probably be thinned out, but not completely. There are a few Baccharis shrubs interspersed in the open area; these natives should probably be allowed to remain where they are. Dewberry has established itself as an aggressive groundcover in the open areas; some of this dewberry should be removed to make room for native grass and flower planting. Lantana plants are also scattered throughout the northern strip. While these are technically not native, we see no problem in leaving a few as they attract hummingbirds and butterflies.

Along the central part of the Northern Strip, north of the trail, lies a thick tangle of vines and shrubs. This tangle is composed of Roughleaf Dogwood, Elderberry, wild grape, dewberry, blackberry, and baccharis. This tangle should not be disturbed as it provides important shelter and cover for birds throughout all seasons. In the winter of 2015, we discovered an Eastern Towhee (a rare bird associated with dense thickets, see "V. BIRDLIFE" below for more information) in these particular tangles.

Along the trail extending west of the tangles, the vegetation becomes thicker as the density of shrubs and trees increases. Trees here include Cherry Laurel (abundant), box elder (abundant), hackberry and one Eastern Red Cedar. In the understory, there are some Mexican Turk's cap, Mexican Honeysuckle, Mexican Firebush, passionflower, tropical sage, yaupon, and some small mulberries. All of these plants should be preserved if at all possible.

Northeastern strip

The northeastern strip forms the edge between the sanctuary and the wide open, manicured lawn of the Bayou Bend Collections grounds. Sycamores, hackberries, American Hornbeams, and ash trees make up much of this area. The sycamores are dense enough that they form a healthy canopy. The understory is composed of lantana, dogwood, and elderberry. The presence of healthy canopy and edge habitat here potentially makes for an ideal bird habitat. The water seep in the northeastern corner is also an important asset.



Table 1. Current plant species list for Hogg Bird Sanctuary

Shrubs

<i>Baccharis halimifolia</i>	Baccharis	Established in the northern strip
<i>Callicarpa dichotoma</i>	Beautyberry	abundant in the northern strip and bottomlands
<i>Ligustrum sinensis</i>	Chinese Privet	scattered throughout the area
<i>Sambucus canadensis</i>	Elderberry	abundant throughout area
<i>Ligustrum lucidum</i>	Glossy Privet	common understory
<i>Lantana urticoides</i>	Lantana	abundant throughout area
<i>Hamelia patens</i>	Mexican Firebush	3 to 5 bushes in the northern strip
<i>Justicia spicigera</i>	Mexican Honeysuckle	2 bushes in the northern strip
<i>Malvaviscus arboreus</i>	Mexican Turk's cap	several stands in the western part of the northern strip
<i>Phytolacca americana</i>	Pokeberry	a small group in the eastern edge
<i>Ilex decidua</i>	Possum Haw	a few individuals in the northeastern strip
<i>Cornus drummondii</i>	Roughleaf Dogwood	common in northern and eastern areas
<i>Justicia brandegeana</i>	Shrimp Plant	two bushes in the northern strip
<i>Hibiscus syriacus</i>	Shrubby Althea	one bush in the northern strip
<i>Myrica cerifera</i>	Southern Wax Myrtle	several bushes along the parking lot
<i>Ilex vomitoria</i>	Yaupon	common throughout

Trees

<i>Tilia americana</i>	American Basswood	one sapling in Northern Strip
<i>Ulmus americana</i>	American Elm	Several tall trees in Northeastern Strip
<i>Ilex opaca</i>	American Holly	Two unhealthy trees in Northern Strip
<i>Carpinus caroliniana</i>	American Hornbeam	Low to middle understory in bottomland and northeastern strip
<i>Taxodium distichum</i>	Bald Cypress	Several tall trees planted beside parking lot
<i>Salix nigra</i>	Black Willow	Bottomland
<i>Acer negundo</i>	Box Elder	Common understory tree
<i>Prunus caroliniana</i>	Cherry Laurel	Abundant understory tree, especially in southern part
<i>Triadica sebifera</i>	Chinese Tallow	Small saplings scattered throughout sanctuary
<i>Lagerstroemia indica</i>	Crape Myrtle	Very small saplings in northern strip
<i>Juniperus virginiana</i>	Eastern Red Cedar	Two trees in northern strip
<i>Koelreuteria elegans</i>	Golden Rain Tree	Abundant along western ravine
<i>Fraxinus pennsylvanica</i>	Green Ash	Two large trees in eastern part
<i>Celtis laevigata</i>	Hackberry	Common throughout park
<i>Pinus taeda</i>	Loblolly Pine	A dozen tall trees scattered throughout
<i>Prunus mexicana</i>	Mexican Plum	One tree in the northern strip
<i>Persea borbonia</i>	Red Bay	Several trees in the southern part
<i>Morus rubra</i>	Red Mulberry	Up to 10 small trees or saplings in the northern strip
<i>Quercus virginiana</i>	Southern Live Oak	Several individuals along the parking lot and entrance road
<i>Magnolia grandiflora</i>	Southern Magnolia	Several individuals near entrance road
<i>Quercus falcata</i>	Southern Red Oak	One tree in the bottomlands
<i>Platanus occidentalis</i>	Sycamore	Numerous tall trees in the bottomlands
<i>Cercis canadensis var. texensis</i>	Texas Redbud	Two trees in the eastern and northeastern edges
<i>Quercus nigra</i>	Water Oak	Up to 10 medium to large trees in the bottomland and in northern strip

Herbaceous annuals/perennials

<i>Eupatorium coelestinum</i>	Blue Mistflower	present in northern strip
<i>Eupatorium serotinum</i>	Boneset	abundant in northern strip
<i>Canna sp.</i>	Canna	occurs in northern strip where water is leaking from residences
<i>Eupatorium capillifolium</i>	Dog fennel	abundant in northern strip
<i>Colocasia sp.</i>	Elephant Ears	abundant in the bottomland ponds
<i>Solidago sp.</i>	Goldenrod	abundant in northern and eastern part
<i>Gaillardia puchella</i>	Indian Blanket	abundant in northern strip
<i>Monarda citriodora</i>	Lemon Beebalm	abundant in northern strip
<i>Ratibida columnifera</i>	Mexican Hat Flower	abundant in northern strip
<i>Helianthus sp.</i>	sunflower	present in northern strip
<i>Salvia coccinea</i>	Tropical Sage	common in northern strip

Vines

<i>Dioscorea bulbifera</i>	Air potato	abundant invasive in the bottomlands
<i>Rubus flagellaris</i>	Blackberry	common in northern strip
<i>Rubus trivialis</i>	Dewberry	common in northern strip
<i>Smilax sp.</i>	Greenbriar	common throughout
<i>Lonicera japonicus</i>	Japanese Honeysuckle	common in bottomland
<i>Vitis mustangensis</i>	Mustang Grape	abundant invasive in the bottomlands
<i>Passiflora platyloba</i>	Passionflower	a few vines in the northern strip
<i>Ampelopsis arobroea</i>	Peppervine	abundant throughout
<i>Toxicodendron radicans</i>	Poison ivy	sparse in bottomland
<i>Campsis radicans</i>	Trumpet Vine	creeping up the tallest trees
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	creeping up the tallest trees

V. BIRDLIFE

There is not yet a comprehensive list of birds for the Hogg Bird Sanctuary proper as there has been less birder coverage of the sanctuary than in nearby Memorial Park or Rice University campus. However, there have been regular monthly surveys by the Audubon Society over the last several years. The total number of surveys reported in ebird.org (an online, crowdsourced database ran by the Cornell Lab of Ornithology and the National Audubon Society) is 72 and the total number of birds recorded to date on ebird.org is 116 species. On ebird.org, the far larger Memorial Park has a list of 117 species over 138 surveys. However, we note that at Rice University, 222 species have been recorded over 824 surveys. In all likelihood, the actual number of birds passing through the Hogg Sanctuary and Memorial Park could approach 150; the low numbers reflect the relatively low number of reported surveys. A list of possible birds in the Hogg Bird Sanctuary is presented in Table 2.

There are 21 species of resident birds that nest in the sanctuary or in the immediate vicinity. These include Cooper's Hawk, Red-shouldered Hawk, Red-tailed Hawk, Mourning Dove, White-winged Dove, Eastern Screech-Owl, Great Horned Owl, Red-bellied Woodpecker, Pileated Woodpecker, Downy Woodpecker, Carolina Wren, Carolina Chickadee, Tufted Titmouse, American Robin, Northern Mockingbird, European Starling, American Crow, Blue Jay, Northern Cardinal, Brown-headed Cowbird, House Finch, and House Sparrow. Common and Great-tailed Grackles are resident year round, but probably nest elsewhere. Purple Martin and Great Crested Flycatcher are spring/summer residents and



may nest in the general area. Of the nesting birds that may nest in Hogg Bird Sanctuary, the presence of Carolina Wren, Carolina Chickadee and Tufted Titmouse reflect the presence of a reasonably extensive forest with understory in an urban environment. For example, at Rice University, these birds are rare due to the limited understory and hence minimal cover for birds to hide in. The Pileated Woodpecker prefers to nest in large trees, often in tall dead trees. The presence of Pileateds indicate the presence of some mature trees in the sanctuary, but there are only a few such trees present. Pine Warblers breed in the immediate vicinity, but there are not enough pines in the sanctuary for a stable population even though they breed in Memorial Park proper. In mid-May, 2015, we discovered a singing Yellow Warbler. This bird breeds in healthy riparian habitats, particularly where there are willows.

The great majority of birds recorded in the sanctuary are transients or present only as winter residents. These are too many to list explicitly here. However, some of the more regular wintering species include: Yellow-bellied Sapsucker, Eastern Phoebe, Blue-headed Vireo, Ruby-crowned Kinglet, Brown Thrasher, Hermit Thrush, Cedar Waxwing, Yellow-rumped Warbler, Orange-crowned Warbler, White-throated Sparrow, American Goldfinch. The presence of Brown Thrashers and White-throated Sparrows indicate a reasonably healthy understory. House Wren is an occasional winterer, though more dense understory and edge habitats are needed to support this bird. During the winter of 2014-2015, we discovered a wintering Eastern Towhee, which is a bird that frequents dense thickets. The Eastern Towhee used to be much more common in East Texas, but its numbers have dropped, particularly in Harris County due to removal or disturbance of habitat. As far as we know, this is the first record of Eastern Towhee in the sanctuary and one of few seen annually within Harris County. A good test of the re-vegetation plan would be the establishment of Eastern Towhee as a regular winterer. Another desired wintering bird is the Winter Wren. This bird requires piles of dead wood or tangles in shaded areas.

Spring and fall migrating birds make up the bulk of the birds that could be seen or heard in the sanctuary. The sanctuary is an ideal spring migratory bird trap, being an “island” of green within urban Houston. Spring migrants include more than 25 different species of warblers, Summer and Scarlet Tanagers, Rose-breasted Grosbeaks, various flycatchers (Acadian, Least, Yellow-bellied), Eastern Wood-Pewee, vireos (Red-eyed, Warbling, Philadelphia, Yellow-throated, White-eyed), thrushes (Swainson’s, Gray-cheeked, Wood, Veery), Gray Catbird, Ruby-throated Hummingbirds, Indigo Bunting, and orioles (Baltimore, Orchard). Having a diverse habitat structure would enhance the number of birds stopping over. High canopy is essential for certain types of warblers and vireos, but a healthy and extensive understory is important for thrushes and a few skulking warblers (Hooded, Kentucky, Wilson’s, Swainson’s, and Canada). Some native grass areas with interspersed bushes could help attract some sparrows, such as Song, Lincoln’s, Chipping and Field.

Finally, the sanctuary holds great promise for attracting an array of wintering hummingbird species if appropriate habitat is emplaced. So far, only the Ruby-throated is regular in the sanctuary. If, however, the sanctuary could attract Calliope, Black-chinned, Rufous, Allen’s, Broad-tailed and Buff-bellied Hummingbirds on a regular basis during the winter, the sanctuary would establish itself as the prime hummingbird locale in the inner loop. Combined with greater habitat for migrating songbirds, the Hogg Bird Sanctuary could be a magnet for birders within the inner loop.

Table 2. List of Possible Bird Species in the Hogg Bird Sanctuary. The time of year when birds are likely to be observed and how common they are likely to be (black = common, medium grey = fairly common, light grey = rare to uncommon). Birds likely to nest (“Nest”) in the Sanctuary are indicated by an “N”, and birds that have been recorded in the sanctuary (“Record”) are indicated with an “x”.

Bird Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Nest	Record
Black-bellied Whistling-Duck														x
Greater White-fronted Goose														
Snow Goose														
Neotropic Cormorant														
Double-crested Cormorant														
American White Pelican														
Great Blue Heron														x
Great Egret														x
Snowy Egret														x
Little Blue Heron														x
Cattle Egret														
Green Heron														x
Black-crowned Night-Heron														x
Yellow-crowned Night-Heron													N	x
White Ibis														x
White-faced Ibis														x
Black Vulture														x
Turkey Vulture														x
Mississippi Kite														x
Sharp-shinned Hawk														x
Cooper's Hawk														x
Red-shouldered Hawk													N	x
Broad-winged Hawk														x
Swainson's Hawk														x
Red-tailed Hawk													N	x
Spotted Sandpiper														x
Caspian Tern														x
Laughing Gull														
Franklin's Gull														
Ring-billed Gull														
Herring Gull														
Rock Pigeon													N	x
Inca Dove														x
White-winged Dove													N	x
Mourning Dove													N	x
Yellow-billed Cuckoo														x
Eastern Screech-Owl													N	x
Great Horned Owl													N	x
Common Nighthawk													N	x
Chuck-will's-widow														
Chimney Swift														x
Ruby-throated Hummingbird														x
Black-chinned Hummingbird														
Broad-tailed Hummingbird														
Rufous Hummingbird														
Calliope Hummingbird														
Belted Kingfisher														x
Red-bellied Woodpecker													N	x
Yellow-bellied Sapsucker														x
Downy Woodpecker													N	x
Northern Flicker														x
American Kestrel														
Merlin														
Peregrine Falcon														
Olive-sided Flycatcher														x
Eastern Wood-Pewee														x
Yellow-bellied Flycatcher														x
Acadian Flycatcher														x

Table 2 (continued)

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Bird Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Nest	Record
Magnolia Warbler														x
Bay-breasted Warbler														x
Blackburnian Warbler														x
Yellow Warbler														x
Chestnut-sided Warbler														x
Pine Warbler														x
Yellow-rumped Warbler														x
Yellow-throated Warbler														x
Black-throated Green Warbler														x
Canada Warbler														x
Wilson's Warbler														x
Yellow-breasted Chat														x
Eastern Towhee														x
Chipping Sparrow														
Field Sparrow														
Savannah Sparrow														
Song Sparrow														
Lincoln's Sparrow														
Swamp Sparrow														x
White-throated Sparrow														x
Dark-eyed Junco														
Summer Tanager														
Scarlet Tanager														
Northern Cardinal													N	x
Rose-breasted Grosbeak														x
Blue Grosbeak														x
Indigo Bunting														x
Painted Bunting														x
Dickcissel														
Red-winged Blackbird														x
Common Grackle													N	x
Great-tailed Grackle													N	x
Bronzed Cowbird														
Brown-headed Cowbird														x
Orchard Oriole														x
Baltimore Oriole														x
House Finch													N	x
American Goldfinch														x
House Sparrow													N	x

VI. RECOMMENDED REPLANTING PLAN

Challenges

There will be some challenges in replanting and managing the land. 1) The study areas will not be irrigated so all plants need to be drought-tolerant. 2) The re-vegetation plan must adhere to fire code because the study area abuts directly against the backyards of residential homes. This means that tall shrubs or thickets should not be planted directly against the border so as to prevent the generation of fire “ladders” that hop across the property lines. 3) The re-vegetation should be aesthetically pleasing in order to maintain “buy-in” from homeowners. 4) Non-native invasive plants are pervasive and must first be extracted and then the land managed. 5) Finally, we have to work with existing water seeps associated with pools in the residential areas.

Guiding philosophy

The key element of enhancing bird diversity throughout the year is to construct a diverse ecosystem. Birds need food, cover, water and appropriate nesting/territorial sites, so any replanting plan must incorporate a diverse set of plant species and a balanced vertical and areal vegetation structure. Below, we describe some qualities of plants that benefit birds:

- **Food:** nectar-producing plants (hummingbirds); berry fruits (grosbeaks, mockingbirds, orioles, tanagers, waxwings); samara seeds, such as ash and hornbeam (goldfinches); grass and sunflower family seeds (goldfinches, sparrows).
- **Understory cover:** dense thickets for towhees, wrens, and thrushes; open under-story for chickadees and titmice; in winter, much of the understory plants lose their leaves, so strategic planting of a few evergreen shrubs may help in maintain understory throughout the year
- **Canopy:** small stands of tall leafy canopy for migrating warblers, tanagers, orioles, etc.; nesting or roosting sites for hawks and owls.
- **Open field:** native prairie habitats for sparrows and buntings.

Below, we recommend the planting plan centered around three micro-habitat themes along with designs for how to enhance the transitions between each micro-habitat and integrate them into the existing landscape of the sanctuary. These micro-habitats include shrub-forest edge habitat, native prairie and wildflower habitat, and a hummingbird/butterfly habitat.

Shrub-forest edge habitat

The purpose of the shrub-forest edge habitat for this project is to provide a transition between the forested bottomland and the more open habitat in the Northern Strip. We have chosen to focus on low understory shrubs (<8 feet) and medium height shrubs (<20 feet), but we have selected a few tall trees (>20 feet) to diversify the habitat. All plants below are drought-tolerant.

- **Rusty Blackhaw Viburnum** – native; medium sized deciduous shrub; white blossoms in spring; provides fruits in the summer and into the fall; prefers partial shade; visually attractive as an understory and border shrub; orioles, tanagers, mockingbirds, etc.
- **Eastern Red Cedar** – native; medium sized evergreen tree (up to 20-30 feet) with dense juniper-type foliage; produces berries that provide food in fall and into winter for waxwings and robins; dense foliage is good for nesting birds and for roosting owls; plant in small stands so as to provide more cover for roosting birds in the winter.
- **Possumhaw** – native; deciduous holly; a type of holly with very attractive red berries in late fall and winter; provides food for cardinals, white-throated sparrows, towhees, and mockingbirds.
- **Yaupon** – native; evergreen holly; small to medium sized shrub; very attractive red berries in late fall and winter, providing food for many wintering birds; dense foliage provides cover for wrens, towhees, cardinals, etc.
- **Baccharis** – native; evergreen shrub in the “sunflower” family; this is not a particularly attractive plant, but it is integral to the transition between shrublands and prairies; baccharis tends to have a moderately dense foliage and when present on the edge or as isolated clumps in a prairie, provides additional cover for wintering grassland sparrows.
- **Coral bean** – native; low sprawling bush that generates a dense network of branches; bright red flowers in the spring through fall; highly attractive to hummingbirds and orioles; dense network of branches provides cover for many skulking birds; best to plant in direct sunlight on edge of a thicket.
- **Red Mulberry** – native; deciduous tree that can grow to well over 20 feet; leafy canopy in mature tree can be very thick, providing shady cover for thrushes, robins, etc.; fruits in spring are good for tanagers, orioles, warblers, vireos, and thrushes; this is a bird magnet; best to plant as isolated individuals because when mature, these trees can block out the sunlight for understory plants; note that there are a number of red mulberry saplings already present.
- **Box Elder** – native; small to medium-sized shrub/tree that forms a good transition plant; there is likely no need to plant anymore box elders because saplings are abundant in the area.

- **Wax Myrtle** – native; evergreen shrub with very dense foliage; berries attract some birds; dense foliage provides cover for birds but also makes the wax myrtle great for hedges; however, foliage may be too dense and may block visibility if too many are planted together; ideally, should plant only a few in selected areas to insure winter coverage but not obstruct views.
- **Texas Redbud** – native; deciduous understory tree that enriches vertical vegetation structure; should only plant a few
- **American Basswood** – native; deciduous understory tree that enriches vertical vegetation structure
- **American Holly** – native; evergreen medium-sized tree; provides berries in late fall and early winter; attractive to waxwings, orioles, tanagers, mockingbirds; foliage tends to be thick; plant near eastern red cedars to accentuate the fruit crop in a given area but also to enhance a region with thicker foliage that persists during the winter.
- **Roughleaf Dogwood** – native; deciduous understory shrub; produces attractive flowers in the spring and berries in summer and fall; highly attractive to grosbeaks, orioles, tanagers, mockingbirds, etc.; this is a good plant to fill understory or forest edges; there are many saplings in the Northern Strip already so there may not be a need to plant any new dogwoods.
- **Mexican Turk's Cap** – semi-native; deciduous to evergreen understory plant; does well in shade; has large bright red flowers that are attractive to hummingbirds; compared to Drummond's Turk's cap below, this one can do well even in the shade; flowers almost all year round.
- **Drummond's Turk's Cap** – native; deciduous to evergreen low-lying shrub; generates small, visually attractive red flowers, which are highly attractive to hummingbirds; plant in large stands on edges; does best in direct sun or partial shade.
- **Parsley Hawthorne** – native; deciduous understory shrub that enhances the vertical vegetation structure; produces berries in the fall.
- **Pecan** – native; very tall deciduous tree; blossoms in spring are highly attractive to migrating warblers, vireos, tanagers, and orioles; provides good nesting structure for hawks; planting two of these will enhance some of the canopy structure in the area
- **American Beautyberry** – native; deciduous understory shrub; produces purple berries that last through the fall, forming a staple for wintering birds.
- **Red Bay** – native; evergreen medium-height tree; helps to provide shelter at all times of the year; fruits attract robins, orioles, doves, etc.
- **Coral Honeysuckle** – native; evergreen vine with small red tubular flowers; inconspicuous vine or low sprawling bush; attracts hummingbirds.

Native prairie and wildflower habitat

The amount of space allotted for a native prairie habitat is too small to develop a truly self-sustaining healthy native prairie for wintering grassland birds. Nevertheless, by planting a native prairie, we can enhance this part of the sanctuary for migrating birds, while at the same time, providing an aesthetic experience for visitors. The native prairie will be dominated by grasses and annual flowers, which should reseed each season. Any shrubs will be planted on the edges of the prairie. The goal is for the prairie to be alive with flowers in the spring. In the fall and winter, the rusty orange inflorescences of bluestems should also provide an attractive background color along the trail. All plants are drought-tolerant.

- **Sunflower, Maximilian** – native; medium-sized perennial with showy yellow sunflowers in the spring and summer; best planted on the edge of the prairie so as not to obstruct views; seeds are favored by finches.
- **Goldenrod** – native; medium-sized perennial that dies down in the winter but sprouts back up in the spring; produces bright yellow “rods” of little flowers, providing a nice backdrop in the fall;

place on edge of prairie; flowers are frequented by warblers; although native, this species can become invasive; best to cut down in late fall to prevent spreading

- **Big Bluestem** – native; a key grass species of coastal prairies; provides shelter and food for sparrows and buntings; plant in abundance; medium height.
- **Indiangrass** – native; a key grass species of coastal prairies; provides shelter and food for sparrows and buntings; often taller than bluestem and provides spiky inflorescences rather than bushy inflorescences; spikes can be used as perches for sparrows; plant in less abundance than bluestem, interspersing within the bluestem prairie and possibly as background grasses.
- **Little Bluestem** – native; key grass species of coastal prairies; provides shelter and food for sparrows and buntings; plant in abundance.
- **Aster** – native; perennial with small attractive white to purple flowers; good for butterflies; plant by seed.
- **Tropical Sage** – native; perennial; small herb with red tubular flowers; attractive to hummingbirds; best to plant at the transition between prairie and trail or prairie and shrubs; does best in partial shade; reseeds.
- **Mexican Hat** – native; annual; small plant with attractive yellow to dark orange flowers; plant in abundance; also good for butterflies; reseeds.
- **Lemmon Beebalm** – native; annual to perennial; small plant with small yellowish sage-like flowers; plant by seed; reseeds; good for butterflies and hummingbirds.
- **Pink Evening Primrose** – native; annual; small plant with showy, pink flowers; plant by seed; reseeds.
- **Sweet Gaura** – native; perennial; small plant with small pink to white flowers; good for hummingbirds and butterflies; plant initially by transplanting.
- **Butterfly weed** – native; perennial; small plant with small pink flowers; attracts butterflies; plant by seed or transplant; best to plant on edge of prairie.
- **Gayfeather/Blazing star** – native; perennial; produces tall color flower spikes; attracts hummingbirds and butterflies; plant along edge of prairie.
- **Winecup** – native; very small plant but with conspicuous red flowers; very attractive; plant by seed generously; reseeds.
- **Texas Bluebonnet** – native; small lupine with blue flowers; attracts butterflies; plant by seed generously; reseeds.
- **Sneezeweed** – native; small plant with bright golden sunflower heads; attracts butterflies, bees and hummingbirds; plant by seed generously; reseeds.
- **Common Sunflower** – native; medium sized plant with bright golden flowers; can tower over the grasses, so best to plant on edge of prairie so as not to block views; plant by seed; reseeds; attracts sparrows and finches; when it dies down in the fall, the dead vegetation attracts warblers.
- **Coneflower** – native; small plant with golden flowers; plant by seed generously; reseeds.
- **Dayflower** – native; small plant that may grow like a small vine; flowers are blue; attracts butterflies; plant on edge of prairie; plant by seed; reseeds
- **Texas Vervain** – native; medium sized perennial with tiny purple flowers; attracts butterflies; nice accent to the prairie; plant by seed; reseeds
- **Texas Paintbrush** – native; small plant with orange to red flowers; very attractive when abundant; plant by seed along trail edge; reseeds.

Hummingbird habitat

We also plan to establish a hummingbird habitat in the Northeastern Strip. While the primary goal of this plan is to attract hummingbirds, we also hope to establish some edge habitat for other birds, to create habitat that will attract butterflies. In particular, the hummingbird habitat will provide an attractive

entrance to the northern strip as one approaches from the parking lot. Establishing an inviting and attractive entrance to the northern strip is critical if one wants the community to visit the northern strip.

Unlike the shrub and prairie micro-habitats, for the hummingbird habitat, it is necessary to include some non-native plant species here to insure flowers are present at most times of the year. *This is especially critical in late fall and early winter because it has become apparent in the last decade or so that this is the seasonal window with the highest hummingbird diversity along the Gulf Coast.* All plants chosen have been proven to attract hummingbirds. With the exception of bottlebrush (Australia), all non-native plants chosen are from Mexico. Plants with a Mexican origin are still familiar to most of the migrating birds, as well as hummingbirds, because these plants are encountered along their migration paths. The bottlebrush is well-known to be one of the most attractive plants for hummingbirds, orioles, and even warblers. None of the selected non-native plants are invasive. All plants chosen are drought-tolerant.

Native plants

- **American Beautyberry** – deciduous plant for cover and food for sparrows, thrashers, and cardinals.
- **Buttonbrush** –deciduous bush; bright white showy flowers in spring; attracts butterflies; because of its white color, provides variety in a hummingbird habitat made up mostly of red flowers.
- **Firespike** - medium sized plant with green fleshy stems and leaves and bright red flower spikes; hummingbird magnet; flowers in late summer to late fall; can grow tall, so plant in the background; may die down during winter freezes, but will regrow in the spring.
- **Fringe Tree** –small deciduous trees with white flowers; attracts butterflies; provides cover.
- **Lantana, Texas** –evergreen vine or low-lying shrub; plant in background; attracts butterflies and hummingbirds.
- **Roughleaf Dogwood** –deciduous small tree or shrub; plant in background for cover.
- **Sunflower, Maximilian** –perennial sunflower; medium sized plant; plant in background; does not attract hummingbirds, but is good for butterflies and provides a yellow accent to the habitat.
- **Flame Acanthus** –deciduous small bush; small bright red flowers in summer and fall; very attractive to hummingbirds; plant in foreground.
- **Mexican Turk's Cap var. Drummondii** –perennial; small red flowers attracts hummingbirds; planted in groups and in sunlight for maximum effect.
- **Red Rocket Ruselia** –perennial; very much like the firecracker, but generate clusters of red tubular flowers; *this is one of the best hummingbird magnets*; small tubular flowers are especially attractive to Calliope Hummingbirds in the winter; plant in mid-ground.
- **Texas Star Hibiscus** – perennial, but dies down in winter; beautiful red showy flowers; is not particularly great for hummingbirds because flowering occurs in the summer; however, the flowers are so showy that they provide a nice summer accent in the landscape.
- **Tropical Milkweed** – perennial; small evergreen plant or bush; red-orange flowers; attracts Monarch butterflies.
- **Autumn Sage** –hardy semi-woody evergreen shrub with red tubular flowers in the spring and summer; good for hummingbirds.
- **Blue Mist Flower** –fast-growing perennial (may die down in winter) with abundant purple flowers; butterfly magnet; because it dies down in the winter and generates an ugly array of dead, brown leaves, best to plant in an inconspicuous area.
- **Brown-eyed Susan** –perennial; yellow flowers in spring; plant in foreground as accent; good for butterflies.
- **Cardinal Flower** –perennial but dies down in winter; generates beautiful red flower spikes in the summer and fall; best in shade or partial shade; attracts hummingbirds.
- **Indian Blanket** –annual; requires direct sunlight; great for butterflies; reseeds.

- **Lanceleaf Coreopsis** –perennial with bright yellow flowers; requires direct sunlight; great for butterflies; plant in foreground.
- **Purple Coneflower** –perennial; beautiful purple flowers in spring through fall; direct sunlight; plant in foreground; good for butterflies.
- **Sweet Gaura** –perennial; small white to pink flowers in spring to fall; direct sunlight; plant in foreground; good for butterflies and hummingbirds.
- **Tropical Sage** –perennial; small plant with red tubular flowers; great for hummingbirds; plant generously; reseeds.
- **Coral Honeysuckle** –perennial; vine with red tubular flowers that attract hummingbirds; plant as accent by various trees.
- **Passionflower** –perennial; vine with showy flowers that attract hummingbirds and butterflies.

Non-native plants

While we recognize and support the benefits of only native species, the following non-native species would be beneficial to the habitat because they attract hummingbirds and butterflies and have long flowering periods, thus providing ample food for the hummingbirds and butterflies throughout the year, especially in late fall and winter. These plants are also attractive, and we believe they will attract visitors and increase the use of Hogg Bird Sanctuary. It is important to note that the plants described below are proven hummingbird magnets and are well represented in the Houston Arboretum, Houston Audubon's Edith L. Moore Sanctuary, the Nature Discovery Center in Bellaire, and at the Texas Ornithological Society's Boy Scout Woods in High Island.

- **Azalea** –medium sized evergreen bushes with bright showy flowers in the early spring; plant in small groups to provide an effective landscape accent; understory of azaleas is ideal for thrushes and skulking warblers. There are native and non-native varieties.
- **Bottlebrush** –small evergreen tree; bright red nectar-producing flowers; flowers almost all year round in Texas; amazing magnet for hummingbirds, orioles, and warblers; plant a few in a cluster; this is often considered an essential tree for any hummingbird habitat
- **Buddleja** –bush to small tree; bright purple flowers in spring and summer; attracts hummingbirds and butterflies; plant near bottlebrush trees to provide a lower understory accent.
- **Belize Sage** – perennial, evergreen sage; bright red flowers in spring through late fall; plant in background; attracts hummingbirds.
- **Firecracker** –perennial; evergreen; bright red tubular flowers in spring through fall; attracts hummingbirds; plant in foreground.
- **Mexican Cigar Plant** –perennial; evergreen bush; small orange tubular flowers in spring through fall; attracts hummingbirds; plant in mid-ground.
- **Mexican Sage** –perennial, but may die down in the winter; grayish green leaves provides nice landscape accent; bright purple flowers are visually attractive and appealing to hummingbirds; flowers in spring through fall; plant in groups to enhance visual attraction.
- **Mexican Turk's Cap** –perennial; large red tubular flowers attract hummingbirds; the Mexican variety is best planted in partial shade.
- **Mystic Spires Sage** –perennial but dies down in winter; dark green leaves with purple flower spikes; attracts hummingbirds; provides nice accent to landscape.
- **Shrimp Plant** –perennial bush; extremely drought-tolerant and low maintenance; hummingbird magnet; flowers from spring into early winter.

VII. Detailed planting guide

Below, we provide a detailed planting guide. The planting guide is divided into the Northern Strip and the Northeastern Strip. We have not been commissioned to re-vegetate the southern bottomlands. For

each section, we provide a table of the plant species (Table 3), relevant information, and the number of individual plants we envision. We then present a map (Figures 1 and 2), which shows where we wish to situate certain plants. For annuals, grasses, and small herbaceous plants, we do not designate their planting locations on the map for clarity. These small plants should be planted as mixed species stands in any case.

Northern Strip

The Northern Strip (Figure 1) consists of the shrub and native prairie micro-habitats. We assume that the current trail will remain.

Here, we will preserve the central thicket (green oval area in the map), which is currently made up of dogwood, elderberry, boxelder and various vines. This thicket provides ideal cover for nesting and wintering birds. However, because these bushes are deciduous, the thicket opens up in the winter. Winter cover in this thicket can be enhanced by planting a few yaupon and wax myrtles. The wax myrtles can be planted on the north side of the thicket, which will also help define the park borders. The yaupon can be planted inside and on the edge of the thicket.

East of the thicket currently lies a relatively open area. This is the area where we wish to establish the native prairie. One of the challenges is how to discourage residents to the north from encroaching. We thus propose to plant a few small bushes along the northern sanctuary boundary. These bushes will include a few wax myrtles, separated by sunflowers and baccharis, so as not to obstruct visibility. Just south of these bushes will lie an extensive stand of bluestem and indian grass. Annuals can be seeded throughout. A few baccharis bushes can be placed in the prairie. At the boundary between the central thicket and the prairie, two Coral Beans should be planted. These provide additional cover, but also provide red flowers for hummingbirds. Near the coral beans should be a thick stand of Drummond's Turk's cap. These will also attract hummingbirds, but also provide a colorful accent to the trail in the spring through fall.

Much of the area west of the central thicket is heavily vegetated, mostly with Cherry Laurel. We do not intend to plant any more cherry laurel because it is already abundant. There is currently an Eastern Red Cedar in this area. We can enhance the dense cover by planting a cluster of 3 cedars nearby. Along with these cedars should be planted two American Hollies. Viburnums can be planted at the extreme western end of the trail to enhance plant species diversity. We note that Mexican Honeysuckle, Mexican Firebush, Mexican Turk's Cap, and Passionflower are already growing west of the central thicket. These should be preserved.

South of the central thicket (south of the trail), we wish to enhance the vegetational structure by planting more dogwoods, yaupons, and possumhaws. Planting two Pecan trees will provide more bird habitat for spring-migrating songbirds. In the winter, the pecans will lose their leaves and so will not block sunlight on the native prairie. Mulberries are also proposed in this same general area.

East of the prairie lies the corridor to the east entrance. Much of this area is partially shaded. Here, we choose to plant viburnums, dogwoods, Mexican Turk's Cap, and Parsley Hawthorne.

Finally, we strongly recommend that a low fence be built along the perimeter where the Northern Strip meets the residential homes. In some cases it is unclear where the Sanctuary ends and the residential homes begin, and this fence will keep residents from encroaching on the Sanctuary and visa versa.

Northeastern Strip

The northeastern strip is designated here to both attract hummingbirds and butterflies, and to be a visually pleasing entrance as visitors enter the parking lot. The habitat is designed so that bushes define the background, providing a gradual transition into the forested bottomland. This transition, made up of understory plants like azaleas, buttonbush, dogwoods, and beautyberries will enhance the habitat for thrushes, understory warblers, and sparrows.

At the northeastern corner of the sanctuary, there is a man-made drain that appears to have a small puddle of water year-round. This provides attractive habitat for birds (for bathing and drinking), and we have integrated this water feature into our designs. This water feature is in the shade for most of the

day. It is shaded from the east and above by a large ash tree and from the west by sycamores and hackberries. Around this water feature should be planted dogwoods, Mexican Turk's cap and viburnums (for viburnums see the Northern Strip map).

East of the water feature, we propose planting a cluster of bottle brush and buddleja (butterfly bush), which will be highly attractive to hummingbirds. These bushes will provide a colorful accent to the sanctuary's edge. Towards the parking lot, we have designated plants that provide color and structural variety. Only the larger plants are explicitly shown on the map. Small herbaceous plants can be planted anywhere in this stretch.

Table 3. Planting guide for Hogg Bird Sanctuary (N = numbers of plants).

Plants for Northern Strip										Flowering				sun/shade	Fruit	N
										W	Sp	Su	Fa			
Shrub micro-habitat																
Rusty Blackhaw Viburnum	<i>Viburnum rufidulum</i>													partial shade	■	8
Eastern Red Cedar	<i>Juniperus virginiana</i>															5
Possumhaw	<i>Ilex decidua</i>													partial shade		3
Yaupon	<i>Ilex vomitoria</i>													sun or shade	■	15
Baccharis	<i>Baccharis halimifolia</i>													sun		10
Coral bean	<i>Erythrina herbacea</i>													sun	■	3
Red Mulberry	<i>Morus rubra</i>													sun		2
Box Elder	<i>Acer negundo</i>													partial shade		*
Wax Myrtle	<i>Myrica cerifera</i>													sun	■	3
Texas Redbud	<i>Cercis canadensis var. texensis</i>													partial shade		2
American Basswood	<i>Tilia americana</i>													sun		2
American Holly	<i>Ilex opaca</i>													sun	■	2
Roughleaf Dogwood	<i>Cornus drummondii</i>													partial shade		10
Mexican Turk's Cap	<i>Malvaviscus arboreus var. mexicanus</i>													partial shade	■	10
Drummond's Turk's Cap	<i>Malvaviscus arboreus var. drummondii</i>													sun or shade		10
Parsley Hawthorne	<i>Crataegus marshallii</i>													partial shade		3
Pecan	<i>Carya illinoensis</i>													sun		2
American Beautyberry	<i>Callicarpa dichotoma</i>													sun or shade	■	10
Red Bay	<i>Persea borbonia</i>													sun or shade	■	4
Coral Honeysuckle	<i>Lonicera sempervirens</i>													sun		3
Native prairie micro-habitat																
Sunflower, Maximilian	<i>Helianthus maximiliani</i>	Perennial	herb											sun	■	3
Goldenrod	<i>Solidago sp.</i>	Perennial	herb											sun		5
Big Bluestem	<i>Andropogon gerardii</i>	Perennial	grass											sun		40
Indiangrass	<i>Sorghastrum nutans</i>	Perennial	grass											sun		20
Little Bluestem	<i>Schizachyrium scoparium</i>	Perennial	grass											sun		20
Aster	<i>Aster subulatus</i>	annual	herb											sun		seed
Tropical Sage	<i>Salvia coccinea</i>	Perennial	herb											sun		seed
Mexican Hat	<i>Ratibida columnaris</i>	Annual	herb											sun		seed
Lemon Beebalm	<i>Monarda citriodora</i>	annual	herb											sun		seed
Pink Evening Primrose	<i>Oenothera speciosa</i>	annual	herb											sun		seed
Gaura	<i>Gaura lindheimeri</i>	annual	herb											sun		seed
Butterfly weed	<i>Asclepias tuberosa</i>	Perennial	herb											sun		seed
Gayfeather/Blazing star	<i>Liatris mucronata</i>	Perennial	herb											sun		seed
Winecup	<i>Callirhoe involucrata</i>	annual	herb											sun		seed
Texas Bluebonnet	<i>Lupinus texensis</i>	annual	herb											sun		seed
Sneezeweed	<i>Helenium amarum</i>	annual	herb											sun		seed
Common Sunflower	<i>Helianthus annuus</i>	annual	herb											sun		seed
Coneflower	<i>Rudbeckia hirta</i>	annual	herb											sun		seed
Dayflower	<i>Commelina elegans</i>	annual	herb											sun		seed
Texas Vervain	<i>Verbena officinalis</i>	annual	herb											sun		seed
Texas Paintbrush	<i>Castilleja indivisa</i>	annual	herb											sun		seed

Plants for Northeastern Strip - Hummingbird Garden				Flowering				
				W	Sp	Su	Fa	N
American Beautyberry	<i>Callicarpa americana</i>	Shrub	background		■			10
Azalea	<i>Rhododendron sp.</i>	Shrub	background		■			12
Bottlebrush	<i>Callistemon rigidus</i>	Shrub	background		■	■		3
Buddleja	<i>Buddleja davidii</i>	Shrub	background		■			3
Buttonbrush	<i>Cephalanthus occidentalis</i>	Shrub	background		■			2
Firespike	<i>Odontonema longifolium</i>	Shrub	background	■			■	5
Fringe Tree	<i>Chionanthus virginica</i>	Shrub	background		■			1
Lantana, Texas	<i>Lantana horrida</i>	herb	background		■			5
Roughleaf Dogwood	<i>Cornus drummondii</i>	Shrub	background			■		5
Sunflower, Maxmillian	<i>Helianthus maximiliani</i>	herb	background					5
Flame Acanthus	<i>Anisacanthus quadrifidus</i>	herb	background		■			7
Belize Sage	<i>Salvia miniata</i>	herb	midground		■			20
Firecracker	<i>Russelia equisetiformis</i>	herb	midground		■			6
Mexican Cigar Plant	<i>Cuphea ignea</i>	shrub	midground		■			5
Mexican Sage	<i>Salvia leucantha</i>	herb	midground		■			12
Mexican Turk's Cap	<i>Malvaviscus arboreus var. mexicanus</i>	herb	midground		■			8
Mexican Turk's Cap	<i>Malvaviscus arboreus var. drummondii</i>	herb	midground		■			15
Red Rocket Ruselia	<i>Russelia sarmentosa</i>	herb	midground		■			5
Mystic Spires Sage	<i>Salvia "Mystic Spires"</i>	herb	midground		■			9
Shrimp Plant	<i>Justicia brandageeana</i>	herb	midground		■			8
Texas Star Hibiscus	<i>Hibiscus coccineus</i>	herb	midground				■	5
Tropical Milkweed	<i>Asclepias curassavica</i>	herb	midground		■			10
Aster	<i>Aster sp.</i>	herb	foreground				■	10
Autumn Sage	<i>Salvia greggii</i>	herb	foreground		■			10
Blue Mist Flower	<i>Eupatorium coelestinum</i>	herb	foreground		■			10
Brown-eyed Susan	<i>Rudbeckia hirta</i>	herb	foreground		■		■	15
Cardinal Flower	<i>Lobelia cardinalis</i>	herb	foreground		■			10
Indian Blanket	<i>Gaillardia pulchella</i>	herb	foreground		■			30
Lanceleaf Coreopsis	<i>Coreopsis lanceolata</i>	herb	foreground		■			15
Purple Coneflower	<i>Echinacea purpurea</i>	herb	foreground		■			15
Sweet Guara	<i>Gaura drummondii</i>	herb	foreground		■			20
Tropical Sage	<i>Salvia coccinea</i>	herb	foreground		■			30
Coral Honeysuckle	<i>Lonicera sempervirens</i>	vine					■	5
Passionflower	<i>Passiflora incarnata</i>	vine					■	5

Figure 1. Detailed planting plan for the Northern Strip of Hogg Bird Sanctuary.

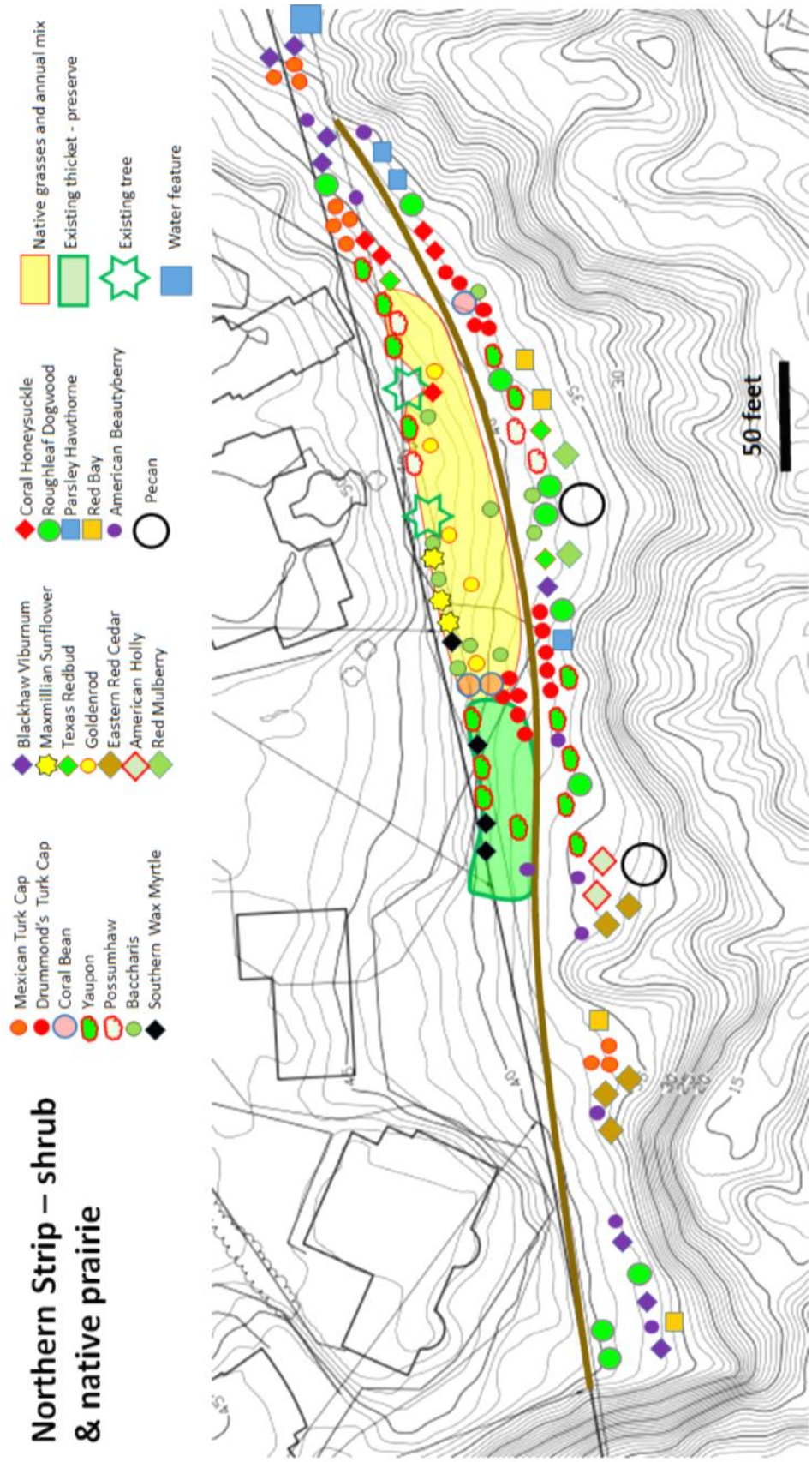
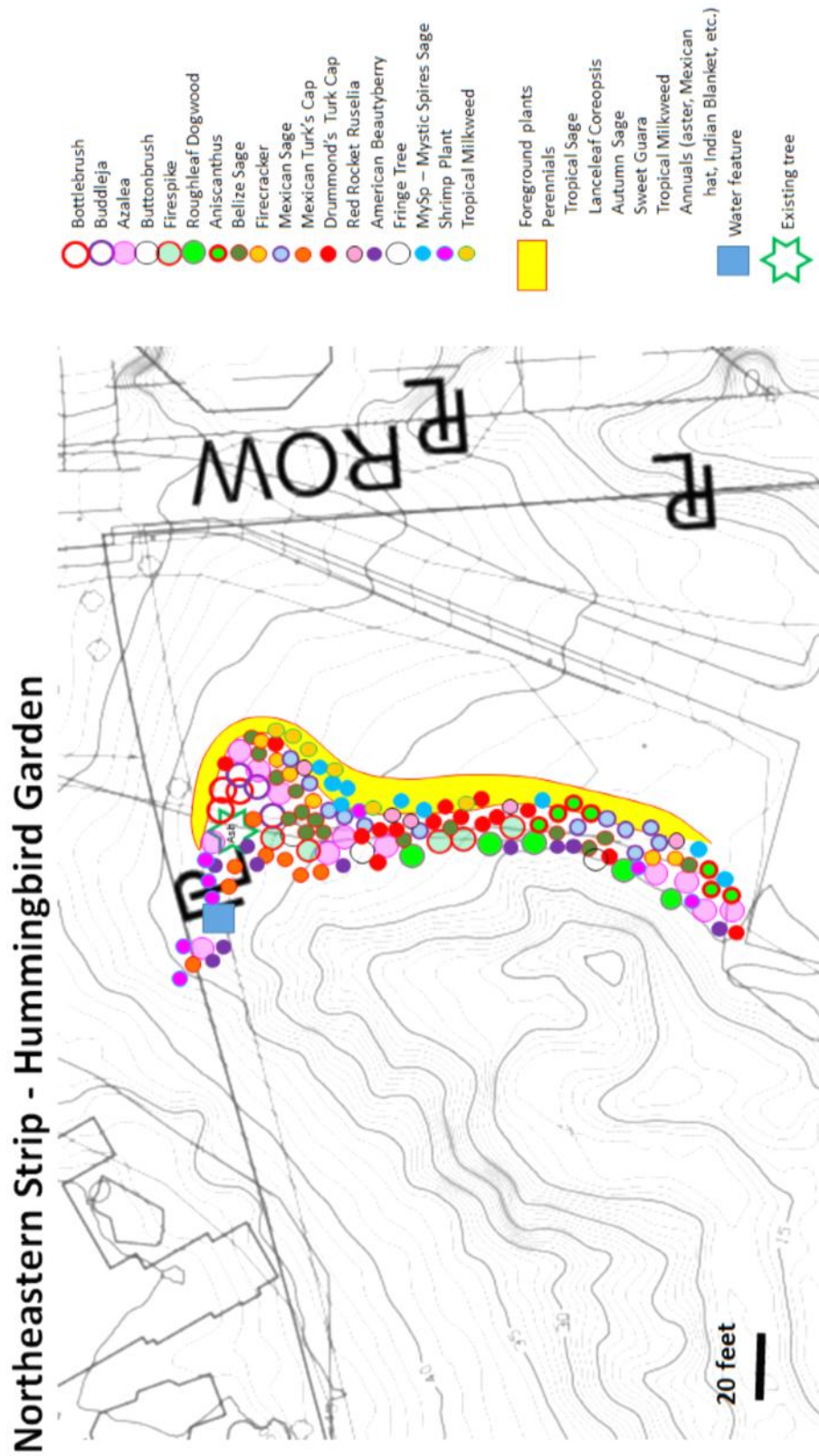




Figure 2. Detailed planting plan for the Northeastern Strip of Hogg Bird Sanctuary





Invasive removal and preservation of existing plants

Much of the area already has a relatively healthy mix of plants at varying stages of maturity. We would prefer not to disturb these trees. Planting should be integrated with the existing vegetation, except for some non-natives which we discuss below. Key plants that are already in existence include hackberries, mulberry saplings, cherry laurel, eastern red cedar, green ash, sycamore, dogwood, lantana, shrimp plant, Mexican firebush, Mexican honeysuckle, Mexican turk's cap, althea, baccharis, beautyberry, elderberry, yaupon, and box elder. In some cases, plants in abundance like cherry laurel can be thinned out to make room for new trees.

Every attempt should be made to eliminate invasives. These are the ligustrums, golden rain trees, Chinese tallows, elephant's ears, and cannas. The only exception is in the western ravine where removal of golden rain trees would likely destabilize the steep slopes.