



Ecology Assessment

Intrenchment Creek Park, DeKalb County, Georgia

DeKalb County, Georgia

Project No. 6166191085

Prepared for:

DeKalb County, Georgia (DRPCA)

1950 West Exchange Place, Tucker, GA 30084

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March 09, 2020

Mr. Vineet S. Nagarkar
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Department of Recreation, Parks and Cultural Affairs
DeKalb County, GA
1950 West Exchange Place
Tucker, GA 30084

Re: Ecology Assessment for Intrenchment Creek Park, DeKalb County, Georgia

Dear Mr. Nagarkar:

Wood Environment & Infrastructure Solutions, Inc. (Wood) is pleased to submit this updated Ecology Assessment for Intrenchment Creek Park for your review.

We appreciate this opportunity and your confidence in Wood to provide these important services to you. Please contact us if you have any question or would like to discuss this assessment.

Sincerely,

Wood Environment & Infrastructure Solutions, Inc.

Jonathan Bourdeau
Senior Scientist

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Table of Contents

1.0 INTRODUCTION 1

2.0 METHODS 2

2.1 GENERAL SITE INFORMATION 2

 2.1.1 Topography 2

 2.1.2 Geology 2

 2.1.3 Soils 2

2.2 TREE CANOPY 2

2.3 FLOODPLAINS/WETLANDS: WATER QUALITY AND QUANTITY 3

 2.3.1 Floodplain Review 3

 2.3.2 Wetlands and Streams 3

 2.3.3 Benthic Macroinvertebrates 4

2.4 HABITAT/ANIMALS 5

 2.4.1 Habitat and Species Occurrences 5

 2.4.2 Protected Species 5

 2.4.3 Invasive Species 5

3.0 RESULTS 6

3.1 GENERAL INFORMATION 6

 3.1.1 Topography 6

 3.1.2 Geology 6

 3.1.3 Soils 7

3.2 TREE CANOPY/HABITAT 7

 3.2.1 Tract 1 8

 3.2.2 Tract 3 10

 3.2.3 Tract 4 11

 3.2.4 Tract 5 12

3.3 FLOODPLAINS/WETLANDS: WATER QUALITY AND QUANTITY 13

 3.3.1 Floodplain Review 13

 3.3.2 Wetlands and Streams 13

 3.3.3 Benthic Macroinvertebrates 15

3.4 HABITAT/ANIMALS 16

 3.4.1 Habitat and Species Occurrences 16

 3.4.2 Animals 16

 3.4.3 Protected Species 19

 3.4.4 Invasive Species 20

4.0 RECOMMENDATIONS 22

4.1 GENERAL INFORMATION 22

4.2 TREE CANOPY 23



4.3 FLOODPLAINS/WETLANDS: WATER QUALITY AND QUANTITY24

4.4 PLANTS, ANIMALS, AND HABITAT24

5.0 SUMMARY AND CONCLUSION26

6.0 REFERENCES.....27

List of Tables

Table 1 USDA NRCS Soil Survey Information

Table 2 Vegetation Types

Table 3 FEMA Floodplain Information

Table 4 Benthic Macroinvertebrate Results

Table 5 Bird Count Results

Table 6 Summary of Protected Species

Table 7 Summary of Invasive Plant Species Observations

List of Figures

Figure 1 Site Location

Figure 2 Site Map/Aerial Photograph

Figure 3 USGS 7.5 Minute Topographic Map

Figure 4 DeKalb County Topography

Figure 5 USDA NRCS Soil Survey Map

Figure 6 Floodplain Map

Figure 7 National Wetland Inventory

Figure 8 Vegetation Map

Appendices

Appendix A Photographic Log

Appendix B NCDENR Stream Forms

Appendix C Songbird Point Count Data Maps

Appendix D Federal and State Protected Species Lists

Appendix E GEPPC List of Non-native Invasive Plants in Georgia



List of Acronyms and Abbreviations

AMSL	Above mean sea level
BMP	Best Management Practices
CFR	Code of Federal Regulations
CWA	Clean Water Act
DFIRM	Digital Flood Insurance Rate Map
DRPCA	DeKalb County Department of Recreation, Parks, and Cultural Affairs
DWR	Division of Water Resources
EPD	Georgia Environmental Protection Division
ESA	Endangered Species Act of 1973
FEMA	Federal Emergency Management Agency
GA DNR	Georgia Department of Natural Resources
GEPPC	Georgia Exotic Pest Plant Council
GI	Green Infrastructure
GIS	Geographic Information System
IPaC	Information, Planning, and Conservation System
LDP	Land Disturbance Permit
LIA	Local Issuing Authority
LID	Low Impact Development
NCDENR	North Carolina Department of Environment and Natural Resources
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NWI	National Wetland Inventory
OCSA	Official Code of Georgia Annotated
RFP	Request for Proposal
SOP	Standard Operating Procedures
The Act	The Georgia Erosion and Sedimentation Act of 1975, as amended
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service Map
USGS	U.S. Geologic Survey
Wood	Wood Environment & Infrastructure Solutions, Inc.



1.0 Introduction

Wood Environment & Infrastructure Solutions, Inc. (Wood) conducted an ecology assessment of four tracts in southwestern DeKalb County, Georgia for the DeKalb County Department of Recreation, Parks, and Cultural Affairs (DRPCA). The tracts are located within or adjacent to the existing Intrenchment Creek Park, located along Bouldercrest Road north of Constitution Road (Figure 1).

Wood understands that DRPCA is considering the exchange of a portion of Intrenchment Creek Park (Tract 1) for three other tracts on Bouldercrest Road currently owned by others (Tracts 3, 4, and 5). The remainder of Intrenchment Creek Park (Tract 2) would remain in DRPCA ownership. The purpose of this report is to provide a general comparative assessment of the tracts, considering several specific elements requested in DRPCA's Request for Proposal (RFP):

- General Site Information
- Tree Canopy
- Floodplains/Wetlands: Water Quality and Quantity
- Habitat/Animals

This report provides the methodologies used in the assessment, summaries from the desktop literature review, results from the field reconnaissance, recommendations, and conclusions.



2.0 Methods

2.1 General Site Information

DRPCA provided tract boundaries and aerial photography of the study area (Figure 2).

Table 2-1 – Tract Information

Tract	Address	Acreage
Tract 1	2109 Bouldercrest Road	55 acres (approximate)
Tract 2	2109 Bouldercrest Road	72 acres (approximate)
Tract 3	2055 Bouldercrest Road	23.68 acres
Tract 4	2058 Bouldercrest Road	6.97 acres
Tract 5	2098 Bouldercrest Road	20.25 acres

The project study area included Tracts 1, 3, 4, and 5. Tracts 1 and 2 comprise the existing Intrenchment Creek Park, owned by DeKalb County. For the purposes of this study, DRPCA requested that Wood only consider the portion of Intrenchment Creek Park that falls within Tract 1. Wood personnel conducted the site reconnaissance on March 4, 6, and 7, 2019. A brief followup visit was conducted on March 26, 2019, to collect photographs of the existing park amenities and photographs along Bouldercrest Road.

2.1.1 Topography

We reviewed and included in this report the United States Geologic Survey (USGS) 7.5' quadrangle topographic map (Southeast Atlanta, Georgia) (Figure 3) and topographic Geographic Information System (GIS) data provided by DRPCA (Figure 4).

2.1.2 Geology

We also reviewed the Geologic Map of the Atlanta 30' x 60' Quadrangle, Georgia (Geologic Investigations Series Map I-2602), prepared by USGS (Higgins, *et al* 2003).

2.1.3 Soils

When it comes to soils, our team reviewed and included in this report (Figure 5) the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Soil Survey Map for DeKalb County.

2.2 Tree Canopy

Wood conducted a reconnaissance of the four study tracts (1, 3, 4, and 5) to note forest cover types. Within each forest cover type, Wood conducted a vegetation survey within an approximate 30-foot radius, noting dominant overstory, shrub-scrub/saplings, herbaceous plants, and woody vines. We took photographs at the vegetation survey points (Appendix A). The field teams also noted vegetation occurrences while traversing the property during the site reconnaissance.



Estimated boundaries of vegetation types were compared to aerial photography provided by DRPCA (Figure 2). To assist in the tree canopy analysis, our team estimated tree ages on the tracts using an increment borer and estimated basal area using an optical wedge prism commonly used in forestry applications. Basal area is an estimate of the average cross-sectional area of tree stems in a forest, usually expressed in square feet per acre.

2.3 Floodplains/Wetlands: Water Quality and Quantity

2.3.1 Floodplain Review

We reviewed Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Maps (DFIRMs) to determine if any portion of the tracts are located within the regulatory 100-year floodplain or the corresponding floodway (Figure 6). The results are based on our review of FEMA DFIRM delineated flood boundaries.

2.3.2 Wetlands and Streams

Jurisdictional waters of the U.S., such as ponds, streams, and wetlands, are defined by 33 Code of Federal Regulations (CFR) Part 328.3(b) and are protected by Section 404 of the Clean Water Act (CWA, 33 United States Code [USC] § 1344). Impacts to regulated resources within the study area are administered and enforced by the U. S Army Corps of Engineers (USACE), Savannah District. Impacts to jurisdictional waters from the proposed project would be regulated under CWA Section 404.

The presence or absence of potential jurisdictional waters on the tracts was determined by evaluating sources of information as described in section 2.1 in combination with an on-site reconnaissance. We reviewed topographic maps (Figures 3 and 4), the USDA NRCS Soil Survey Map for DeKalb County (Figure 5), and the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Map (Figure 7). These maps and data were used to direct the on-site investigation and highlight areas having listed hydric soils or topographic configurations suggesting the presence of wetlands or streams.

After the review, Wood conducted a site reconnaissance for the presence of potentially jurisdictional surface waters within the study area. These on-site evaluations were performed on March 4, 6, and 7, 2019. Our scientists did not conduct a formal delineation of jurisdictional areas, but did document locations of these potential areas.

Potential streams were evaluated using the USACE Savannah District methodology, which utilizes North Carolina Department of Environment and Natural Resources (NCDENR) Division of Water Resources' (DWR) Methodology for Identification of Intermittent and Perennial Streams and Their



Origins¹ (Version 4.11), effective September 1, 2010. We completed the NCDENR DWR stream forms for streams observed during the field reconnaissance (Appendix B).

The State of Georgia restricts land-disturbing activities within 25 feet of the banks of state waters, as measured from the point where vegetation has been wrested by normal stream flow. This provision is set forth in the Official Code of Georgia Annotated (O.C.G.A. 12-7-1 et. seq.) and is a component of the Georgia Erosion and Sedimentation Act of 1975 (the Act) (as amended through 1995). This provision falls under the jurisdiction of the Environmental Protection Division (EPD) of the Georgia Department of Natural Resources (GA DNR), but local municipalities and authorities are certified as Issuing Authorities pursuant to subsection (a) of Code Section 12-7-8 of the Act. These issuing authorities have enacted ordinances that meet or exceed the standards, requirements, and provisions set forth in the Act and are enforceable by such issuing authorities. Streams identified during the reconnaissance may also be state waters subject to the stream buffer provisions, as well as DeKalb County regulations. The DeKalb County defined stream buffer is 75 feet wide.

2.3.3 Benthic Macroinvertebrates

Wood collected benthic macroinvertebrate samples for intermittent/perennial streams located on the tracts. The benthic sampling following the EPD Standard Operating Procedures (SOP) described in *Macroinvertebrate Biological Assessment of Wadeable Streams in Georgia, Standard Operating Procedures, March 2007*. Benthic samples were sent to our Taxonomy Laboratory in Newberry, Florida. At the Wood laboratory, macroinvertebrates were sorted from debris, enumerated, and identified to the lowest practical taxonomic level using methods outlined in the EPD SOP.

In accordance with the EPD SOP, results of the taxonomic identification and enumeration were entered into the EPD Multi-Metric Index spreadsheet for the Piedmont Ecoregion Southern Outer Piedmont 45b. The multimetric index for the Piedmont Ecoregion, Southern Outer Piedmont 45b included the following metrics:

1. Coleoptera Taxa: increased Coleoptera taxa is an indication of diversity. Reductions in number of Coleoptera taxa have been positively associated with various environmental stressors (Barbour et al., 1996).
2. Percent Oligochaeta: increases with environmental stressors (Barbour et al., 1999).
3. Percent Plecoptera: decreases with environmental stressors (Barbour et al., 1999).
4. Shredder Taxa: decreases with environmental stressors (EPD SOP, 2007).
5. Scraper Taxa: decreases with environmental stressors (EPD SOP, 2007).
6. Swimmer Taxa: decreases with environmental stressors (Barbour et al., 1999).

¹ Division of Water Quality. 2010. "Methodology for Identification of Intermittent and Perennial Streams and their Origins, Version 4.11". North Carolina Department of Environment and Natural Resources, Division of Water Quality. Raleigh, NC.



2.4 Habitat/Animals

2.4.1 Habitat and Species Occurrences

Wood conducted a habitat assessment, consisting of pedestrian reconnaissance of the plant communities and surface waters within the study area to determine the likelihood of listed plant and animal species occurring. A general vegetation habitat map of each tract was prepared (Figure 8). Presence or absence of listed species was noted through direct observations or sign (sighting, tracks, scat, nests, dens, or call).

In conjunction with the pedestrian reconnaissance, our scientists also conducted bird surveys on each tract on March 7, 2019, to determine what species of birds are present. Point counts were conducted in each habitat that composed a substantial portion of the tracts. Point counts involve observation of an approximate 2-acre area in a shape of a circle from a fixed point for a period of 10 minutes. During that time, the observer records birds visually or audibly detected within a 50 meter (150 ft) radius. Birds are recorded on data forms with notes about bird movements to help prevent counting individuals more than once (Appendix C). Additionally, birds observed (visually or audibly) during a walk-through of each tract were recorded to supplement the point count observations. An effort was made to cover representative habitats on each tract, as site conditions allowed, to cover as much of the tract area as possible.

2.4.2 Protected Species

Certain plant and animal species are protected by federal regulations [Federal Endangered Species Act (ESA) of 1973 (16 USC 1531-1544, December 28, 1973, as amended 1976-1982, 1984, and 1988)]. Wood accessed the *USFWS Information, Planning, and Conservation System (IPaC) database* (available online at <http://ecos.fws.gov/ipac/>) and the Upper South River watershed list available on the USFWS Athens Georgia Ecological Services website (<https://www.fws.gov/athens/transportation/county/DeKalb.html>) to determine if federally listed threatened or endangered plant or animal species (including designated critical habitat) may be in the vicinity of the study area. We also obtained the GA DNR species list for the South River watershed. Our team then noted presence or absence of suitable habitats for each species as well as any protected species observed during the field reconnaissance. The federal and state species lists are included as Appendix D.

2.4.3 Invasive Species

Wood documented observations of non-native invasive plants in conjunction with the pedestrian reconnaissance. The current species list for Category 1, 2, or 3 exotic plants by the Georgia Exotic Pest Plant Council (GEPPC) was obtained (Appendix E). The GEPPC Invasive Plant List identifies and categorizes plants that pose threats to natural areas in Georgia. The list does not have regulatory authority, but it is intended to aid in land management decisions. Invasive species from the GEPPC list were recorded upon observation at vegetation survey points or when noted during the site reconnaissance.



3.0 RESULTS

3.1 General Information

3.1.1 Topography

The USGS topographic map (Figure 2) and the DeKalb County topographic information (Figure 3) indicate that the four tracts have similar minimum and maximum elevation profiles, from higher elevations along Bouldercrest Road, sloping down to lower elevations along floodplains associated with Intrinchment Creek or Sugar Creek.

Tract 1 varies in elevation from 864 feet above mean sea level (AMSL) north of the existing parking area to 790 feet AMSL near both the northwest and southwest corners in the Intrinchment Creek Floodplain (approximately 74 feet from highest to lowest elevation). Tract 1 contains several broad hilltops and drainage swales. The broadest hilltop is the location of the model airplane runway. The steepest slopes are located near the northwest and southwest tract corners, where the terrain slopes down to meet the Intrinchment Creek floodplain.

Tract 3 varies in elevation from 836 feet AMSL near the southeast corner along Bouldercrest Road to 784 feet AMSL near the southwest corner in the Intrinchment Creek Floodplain (approximately 52 feet from highest to lowest elevation). Tract 3 generally slopes downgradient to the west from Bouldercrest Road to the Intrinchment Creek floodplain in a series of several man-made terraces, with each terrace approximately ten feet lower than its adjacent upgradient terrace. The terraces were created during grading activity on the property in approximately year 2009 based on a review of historic aerial photography. A possible former detention pond is visible on the DeKalb County topography map near the Intrinchment Creek floodplain. A drainage swale is located along the southern tract boundary, running east to west to the detention pond area. The southwestern corner of the tract is within the Intrinchment Creek floodplain and is generally flat.

Tract 4 varies in elevation from 836 feet AMSL near the southwest tract corner along Bouldercrest Road to 784 feet AMSL near the southeast tract corner in the Sugar Creek Floodplain (approximately 52 feet from highest to lowest elevation). Tract 4 generally slopes downgradient to the east from Bouldercrest Road to the Sugar Creek floodplain. Most of the tract consists of moderate slopes, with more gradual slopes along the eastern portion where the tract enters the Sugar Creek Floodplain.

Tract 5 varies in elevation from 834 feet AMSL near the southwest tract corner along Bouldercrest Road to 780 feet AMSL near the southeast tract corner in the Sugar Creek Floodplain (approximately 54 feet from highest to lowest elevation). Similar to Tract 4, Tract 5 generally slopes downgradient to the east from Bouldercrest Road to the Sugar Creek floodplain. Much of the eastern portion of the tract is within the Sugar Creek floodplain and is generally flat.

3.1.2 Geology

Each tract is located within the Stonewall Gneiss geologic unit. As noted in Higgins *et al*, "the Stonewall Gneiss is one of the most widespread units in the Georgia Piedmont-Blue Ridge. It is a



unit of pegmatitic biotite-muscovite-quartz-potassium feldspar gneiss that commonly contains amphibolite and pods of metamorphosed ultramafic rocks" (2003).

Few notable geologic features or formations were noted on the tracts during the field investigation. Some cobble and boulder-sized rocks were observed on Tract 1 and Tract 3, especially in piles along former agricultural terraces (Photo 1). Some exposed bedrock was also observed in the maintained lawn area west of the model airport runway on Tract 1 (Photo 2). The extent of rock presence, if confirmed by geotechnical investigation, could impact the siting of any proposed development or grading, as rock occurrences could significantly affect site development costs. No exposed rock was observed on tracts 3, 4, and 5 during the site reconnaissance.

3.1.3 Soils

The USDA NRCS Soil Survey is shown on Figure 5, and soil acreages by tract are shown in Table 1. DRPCA indicated that Tract 1 was approximately 55 acres, but the GIS boundary for Tract 1 provided by DRPCA indicated an area of only 48.22 acres, as shown on Table 1 and subsequent tables. The acreages for Tracts 3, 4, and 5 as provided by DRPCA are also slightly different than the GIS-calculated acreages. The tract acreages shown on the report figures are those provided by DRPCA (to match the tax parcel information), while the acreages shown in the tables were calculated by the GIS software.

Madison sandy loams and sandy clay loams were the most common upland/hilltop soils on tracts 1, 3, 4, and 5. Tracts 3, 4, and 5 also contained areas of floodplain soils, while Tract 1 did not contain floodplain soils.

The USDA NRCS soil survey map also indicated an area of Wehadkee silt loams on the southern portion of Tract 5. Wehadkee soils are generally considered to be hydric soils, which are those soils that have a higher propensity to have wetland areas and water tables close to the surface.

3.2 Tree Canopy/Habitat

Our team prepared a general vegetation map after completing the field reconnaissance (Figure 8). A summary of the habitat types and acreages found on each of the tracts is included in Table 2. We consider the vegetation survey somewhat limited because of schedule requirements, the survey was completed in three days in early March, prior to most plants budding out or blooming for the year. Our natural resources specialists identified vegetation as best as possible with these limitations, so the vegetation survey contains only those species that were identifiable during the survey period. Tree species observed were common to the Piedmont region of Georgia, and our scientists did not observe "unique" species or "old growth" areas during the limited field investigation. We did observe a few "specimen" trees (trees greater than 30 inches in diameter) on Tracts 1, 4, and 5. The tracts were in fair to good health, but most contained areas of invasive species. A brief description of each forest habitat is presented below, followed by detailed descriptions of vegetation observed on each tract.



Mesic Hardwood Forests – deciduous hardwood trees along drainage swales, lower slopes, and other mesic sites. This is a common forest type throughout the Piedmont region and provides suitable habitat for generalist wildlife species. Forest stand ages range from 20 to 100 years old in the study area. American beech (*Fagus grandifolia*), which is a common climax species in this forest type, is lacking from the study area. Small beech trees were seen around the tracts, but not the larger, older beech trees commonly found in mesic climax forests. Edwards *et al* note these concerns about this habitat type: “Mesic forests require little active management except when non-native invasive species, particularly Chinese privet, Japanese honeysuckle, Chinese wisteria, English ivy, and autumn-olive invade and transform the diverse and beautiful ground layer to a monotonous one” (2013). Also, soils can be highly erodible, so care should be taken in providing recreational access to these areas (bicycles, hiking trails).

Oak-Pine-Hickory Forests – These areas occur on drier sites near the top of ridges. This forest type is the most common across the Piedmont region and provides generalist habitat for many of Georgia’s common faunal species. Non-native invasive species are a serious threat to this community in urban areas, and control of invasive species can be difficult.

Successional Pine Forests - These areas vary in age from 10 years to 50 years within the study area. Like the Oak-Pine-Hickory component, these areas provide generalist habitat for wildlife species, but their habitat quality is lower than similar areas that contain more diverse vegetation.

Floodplains, Bottomlands, and Riparian Zones – forests that are commonly found along low-lying areas adjacent to creeks and rivers. The floodplains located in the study area are associated with Intrenchment Creek and Sugar Creek. These areas can provide unique habitats for wildlife, but the floodplain areas on Tracts 3, 4 and 5 have all been highly disturbed and currently have younger tree species, as well as lack of vegetation diversity.

3.2.1 Tract 1

Tract 1 consists of four general canopy types and one non-forested area without a defined canopy:

1. Oak-Pine Hickory Forest – Vegetation in this cover type was generally 30 to 50 years old, with a basal area of 70 to 130 square feet per acre (sq ft/acre). The areas contained overstory species of loblolly pine (*Pinus taeda*), sweetgum (*Liquidambar styraciflua*), tulip poplar (*Liriodendron tulipifera*), boxelder (*Acer negundo*), water oak (*Quercus nigra*), red maple (*Acer rubrum*), hawthorn (*Crataegus* sp.), black cherry (*Prunus serotina*), dogwood (*Cornus florida*), and southern magnolia (*Magnolia grandiflora*). Canopy cover in the forested areas was generally 80 to 100%, with a fully developed forest canopy. Most of this area was pastureland/agricultural in the 1970s before it was allowed to return to forest cover. This forest cover type totals approximately 18.85 acres on Tract 1.

Sub-canopy and shrub layer species included saplings of overstory species, Chinese privet (*Ligustrum sinense*), thorny olive (*Elaeagnus pungens*), willow oak (*Quercus phellos*), and American holly (*Ilex opaca*). Chinese privet was evident throughout this cover type and was very dense in some areas. Herbaceous and woody vine species included sprouting privet, Christmas fern (*Polystichum acrostichoides*), dandelion (*Taraxacum officinale*), wild garlic (*Allium vineale*), mock strawberry (*Duchesnea indica*), cranefly orchid (*Tipularia discolor*), common chickweed (*Stellaria media*), goldenrod (*Solidago* sp.), Japanese honeysuckle (*Lonicera japonica*), blackberry (*Rubus*



argutus), greenbrier (*Smilax rotundifolia*), muscadine (*Vitis rotundifolia*), multiflora rose (*Rosa multiflora*), and poison ivy (*Toxicodendron radicans*).

2. Mesic Hardwood Forest - Vegetation in this cover type was generally 30 to 50 years old, with a basal area of 130 to 150 sq ft/acre. These areas were similar to the Oak-Pine-Hickory Forest, but they occur on slightly more mesic (moist) areas and do not contain loblolly pine as a dominant tree. The areas contained overstory species of tulip poplar, water oak, northern red oak (*Quercus rubra*), black cherry, sweetgum, and boxelder. Canopy cover in these areas was generally 80 to 100%, with a fully developed forest canopy. Most of this area was pastureland/agricultural in the 1970s before it was allowed to return to forest cover. This forest cover type totals approximately 8.08 acres on Tract 1.

Sub-canopy and shrub layer species included saplings of overstory species, Chinese privet, and thorny olive. Chinese privet was again evident throughout this cover type and was very dense in some areas. Herbaceous and woody vine species included sprouting privet, wild garlic, mock strawberry, henbit (*Lamium amplexicaule*), Christmas fern, Japanese honeysuckle, thick poison ivy, wisteria vine (*Wisteria sinensis*), multiflora rose, and blackberry. Elderberry (*Sambucus canadensis*), giant cane (*Arundinaria gigantea*), and sedges (*Carex* sp.) were also observed along the drainage swale near the northwestern study area limits.

3. Mature Mesic Hardwood Forest - Vegetation and basal areas in this cover type are generally the same as in the Mesic Hardwood Forest, but this area contains some older trees (80-100 years). Canopy cover in this area was generally 80 to 100%, with a fully developed forest canopy. This area likely was in forest cover during the 1970s, while the area surrounding was being used as pasture. As with the other areas on Tract 1, this area has a number of invasives present, including areas of thick Chinese privet (Photo 5). This forest cover type totals approximately 2.12 acres on Tract 1.

4. Successional Pine - Vegetation in this cover type was generally 30 to 50 years old, with a basal area of 110 to 130 sq ft/acre, with a high measured value of 240 years old within the dense pine located along the northern study area boundary. The areas contained overstory species of very thick loblolly pine, with a few scattered hawthorns, sweetgums, black cherry, tulip poplar, and water oaks. Canopy cover in these areas was close to 100%, with a fully developed forest canopy consisting of dense pine trees. Most of this area was pastureland/agricultural in the 1970s before it was allowed to return to forest cover. This forest cover type totals approximately 4.75 acres on Tract 1.

Sub-canopy and shrub layer species included saplings of overstory species, Chinese privet, red maple, southern red oak (*Quercus falcata*), hackberry (*Celtis occidentalis*), dogwood, willow oak, and American beech. Herbaceous and woody vine species included sprouting privet, Japanese honeysuckle, thorny olive, blackberry, henbit, crane fly orchid, Christmas fern, pipsissewa (*Chimaphila umbellata*), muscadine, English ivy (*Hedera helix*), wild garlic, and poison ivy.

5. Maintained Areas - Areas without a tree canopy on Tract 1 included maintained park including the model airplane field (Photos 35-38 in Appendix A), an underground gas pipeline easement, the trailhead parking area on Bouldercrest Road (Photo 33 in Appendix A), and the South River Trail corridor (Photos 34 and 39 in Appendix A). These areas included planted ornamental trees, maintained fescue grass (*Festuca* sp.), dandelion, panic grass (*Panicum* sp.), overstory sapling



species and Bradford pears (*Pyrus calleryana*) along the perimeters. These areas total approximately 14.41 acres on Tract 1.

3.2.2 Tract 3

Tract 3 consists of four general canopy types and one non-forested area without a defined canopy:

1. Successional Pine – Vegetation in this cover type was approximately 10 years old. This area was a dense loblolly pine monoculture established after massive grading of the property around 2009. The vegetation density did not allow for a prism-based basal area measurement. This area would be an appropriate area for additional tree species plantings to provide a more diverse habitat. This forest cover type totals approximately 1.23 acres on Tract 3.

2. Oak-Pine Hickory Forest – Vegetation in this cover type was generally 60 to 80 years old, with a basal area of 100 sq ft/acre. The areas contained overstory species of loblolly pine, sweetgum, tulip poplar, American beech, and water oak. Canopy cover in the forested areas was generally 80 to 100%, with a fully developed forest canopy. These areas are narrow strips of forested area that remained after the clearing activities in approximately 2009. This forest cover type totals approximately 1.93 acres on Tract 3.

Sub-canopy and shrub layer species included saplings of overstory species, Chinese privet, dogwood, hawthorn, northern red oak, and thorny olive. Herbaceous and woody vine species included sprouting privet, Christmas fern, wild garlic, Japanese honeysuckle, multiflora rose, mock strawberry, broomsedge (*Andropogon virginicus*), purple vetch (*Vicia americana*), blackberry, greenbrier, and poison ivy.

3. Mesic Hardwood Forest - Vegetation in this cover type was generally 20 to 60 years old, with a basal area of 40 to 90 sq ft/acre. This area may have been formerly an orchard located in the Intrenchment Creek floodplain based on reviews of aerial photography. The areas contained overstory species of boxelder, red maple, and possibly pecan (*Carya illinoensis*). Canopy cover in these areas was generally 60 to 80%. This forest cover type totals approximately 1.52 acres on Tract 3.

Sub-canopy and shrub layer species included saplings of overstory species, Chinese privet, and hawthorn. Chinese privet was very dense in some areas. Herbaceous and woody vine species included Japanese stiltgrass (*Microstegium vimineum*), Christmas fern, blackberry, wild garlic, and greenbrier. Soft rush (*Juncus effusus*) and sedges were also observed in low-lying areas containing pockets of standing water.

4. Floodplain Forest - Vegetation in this cover type was generally 20 to 30 years old, with a basal area of 160 sq ft/acre. This area is located in the Intrenchment Creek floodplain and was pasture/agricultural land in the 1980s based on reviews of aerial photography. The area contained overstory species of very thick boxelder, red maple, and tulip poplar. Canopy cover in this area was generally 80 to 100%, with a young but dense boxelder canopy. This area would be an appropriate area for additional tree species plantings to provide a more diverse habitat. This forest cover type totals approximately 3.38 acres on Tract 3.



Sub-canopy and shrub layer species included saplings of overstory species, thick Chinese privet, and a few American holly shrubs. The herbaceous and woody vine layer is subject to wash events from Intrenchment Creek, and there was not much herbaceous growth observed except for some soft rush in the wetter areas.

Areas without a tree canopy on Tract 3 included a significant portion of the tract that was graded around 2009 and currently has scrub and herbaceous ground cover. A few larger oaks remain along Bouldercrest Road, but the majority of this area does not have overstory trees. Scrub vegetation includes loblolly pine, red maple, privet, Bradford pear, and hawthorn. Herbaceous and woody vine species included dogfennel (*Eupatorium capillifolium*), broomsedge, blackberry, greenbrier, multiflora rose, and goldenrod. Areas in and around the stormwater detention pond also included black willow (*Salix nigra*), soft rush, sedges, woolgrass (*Scirpus cyperinus*), Japanese stiltgrass, and cattails (*Typha latifolia*). This area totals approximately 16.32 acres within Tract 3.

3.2.3 Tract 4

Tract 4 consists of two general canopy types and one non-forested area without a defined canopy:

1. Mesic Hardwood Forest – Vegetation in this cover type was generally 60 to 80 years old, with a basal area of 100 sq ft/acre. The areas contained overstory species of northern red oak, sweetgum, tulip poplar, and black cherry. Canopy cover in the forested areas was generally 80 to 100%, with a fully developed forest canopy. The portion of the tract close to Bouldercrest Road formerly had houses, and the trees around the area were likely located within maintained privately owned yards. This forest cover type totals approximately 4.50 acres on Tract 4.

Sub-canopy and shrub layer species included saplings of overstory species, Chinese privet, water oak, boxelder, and thorny olive. Herbaceous and woody vine species included sprouting privet, Japanese stiltgrass, bigleaf periwinkle (*Vinca major*), English ivy, Japanese honeysuckle, greenbrier, and blackberry.

2. Floodplain Forest - Vegetation in this cover type was generally 10 to 15 years old, with a basal area of 140 sq ft/acre. This area is located in the Sugar Creek floodplain and was cleared in the past 10-15 years based on reviews of aerial photography. The area contained overstory species of very thick boxelder, black willow, and cottonwood (*Populus deltoides*). Canopy cover in this area was generally 80 to 100%, with a young but dense boxelder and black willow canopy. This area would be an appropriate area for additional tree species plantings to provide a more diverse habitat. This forest cover type totals approximately 2.06 acres on Tract 4.

Sub-canopy and shrub layer species included saplings of overstory species, thick Chinese privet, loblolly pine, and hawthorn. The herbaceous and woody vine layer is subject to storm runoff (i.e., wash events from Sugar Creek), and there was not much herbaceous growth observed except for sprouting privet, multiflora rose, mock strawberry, and henbit.

Areas without a tree canopy on Tract 4 included a disturbed area adjacent to the South River Trail that contains herbaceous and scrub/shrub vegetation. This area would be an appropriate area for additional tree species plantings to provide a more diverse habitat. This area totals approximately 0.98 acre on Tract 4.



3.2.4 Tract 5

Tract 5 consists of four general canopy types and two non-forested areas without a defined canopy:

1. Mesic Hardwood Forest – Vegetation in this cover type was generally 60 to 80 years old, with a basal area of 100 sq ft/acre. The areas contained overstory species of northern red oak, southern red oak, southern magnolia, and black cherry. Canopy cover in the forested areas was generally 60 to 80%. The portion of the tract close to Bouldercrest Road formerly had houses, and the trees around the area were likely located within maintained yards. This forest cover type totals approximately 6.01 acres on Tract 5.

Sub-canopy and shrub layer species included saplings of overstory species, Chinese privet, mimosa (*Albizia julibrissin*), and pokeweed (*Phytolacca americana*). Herbaceous and woody vine species included sprouting privet, henbit, goldenrod, wisteria vine, poison ivy, bigleaf periwinkle, and kudzu (*Pueraria lobata*).

2. Oak-Pine Hickory Forest – Vegetation in this cover type was generally 40 to 60 years old, with a basal area of 120 sq ft/acre. The areas contained overstory species of loblolly pine, sweetgum, tulip poplar, dogwood, and black cherry. Canopy cover in the forested areas was generally 80 to 100%, with a fully developed forest canopy. The portion of the tract close to Bouldercrest Road formerly had houses, and the trees around the area were likely located within maintained yards. This forest cover type totals approximately 1.59 acres on Tract 5.

Sub-canopy and shrub layer species included saplings of overstory species, Chinese privet, sweetgum, and dogwood. Herbaceous and woody vine species included sprouting privet, goldenrod, fescue grass, aster (*Aster* sp.), blackberry, soft rush, muscadine, greenbrier, and kudzu.

3. Floodplain Forest - Vegetation in this cover type was generally 10 to 15 years old, with a basal area of 140 to 150 sq ft/acre. This area is located in the Sugar Creek floodplain and was cleared in the past 15 years based on reviews of aerial photography. The area contained overstory species of very thick boxelder and black willow, with some cottonwood, sweetgum, slash pine (*Pinus elliotii*), river birch (*Betula nigra*), and sycamore (*Platanus occidentalis*). Canopy cover in this area was generally 80 to 100%. This area would be an appropriate area for additional tree species plantings to provide a more diverse habitat. This forest cover type totals approximately 10.57 acres on Tract 5.

Sub-canopy and shrub layer species included saplings of overstory species, thick Chinese privet, and black locust (*Robinia pseudoacacia*). The herbaceous and woody vine layer is subject to wash events from Sugar Creek, and there was not much herbaceous growth observed except for sprouting privet, sedges, meadow rue (*Thalictrum* sp.), goldenrod, chickweed, soft rush, dollarweed (*Hydrocotyle* sp.), Japanese honeysuckle, blackberry, muscadine, English ivy, multiflora rose, and muscadine.

4. Successional Pine – Vegetation in this cover type was approximately 10 years old. This area was basically a dense loblolly pine monoculture established after grading activities on the property around 2009. The vegetation density did not allow for a prism-based basal area measurement.



This area would be an appropriate area for additional tree species plantings to provide a more diverse habitat. This forest cover type totals approximately 0.56 acre on Tract 5.

Areas without a tree canopy on Tract 5 included the maintained South River Trail corridor (1.42 acres) and a disturbed area outside the Sugar Creek floodplain that contained herbaceous and scrub/shrub vegetation, including a significant area of kudzu (approximately 0.96 acre).

3.3 Floodplains/Wetlands: Water Quality and Quantity

3.3.1 Floodplain Review

The FEMA 100-year floodplains and designated floodways for the tracts are shown on Figure 6, and floodplain/floodway acreages by tract are shown in Table 3. Tract 1 as currently proposed does not contain any designated floodplain or floodway areas. If Tract 1 is to be developed, the proposed development plan would be approved through the permitting process with DeKalb County as a Local Issuing Authority (LIA). At minimum, site development will be regulated by National Pollutant Discharge Elimination System (NPDES) stormwater discharge permits associated with construction for stand-alone construction projects to obtain a land disturbance permit (LDP).

The remaining portions of Intrenchment Creek Park (Tract 2) as well as Tracts 3, 4 and 5 retain the floodplain and floodway areas. If any construction is proposed for the portion of Tracts 2, 3, 4 and 5 located in floodplains, extensive permitting to satisfy floodplain and/or stream buffer variance regulations, as applicable, will be required. DeKalb County allows for limited conditional development in the 100-year floodplain, but there are strict guidelines to ensure that the activity does not create flooding problems upstream or downstream (DeKalb County Code of Ordinances §14-442). On the other hand, development in the floodway is greatly restricted. DeKalb County ordinances indicate that *"All encroachments are prohibited, including earthen fill, new construction, substantial improvement, and any other new development within the regulatory floodway, except for activities specifically allowed"*, such as bridges, culverts, roadways, and utilities (DeKalb County Code of Ordinances §14-442). Some improvements in the floodplain (passive recreation fields, multi-use trails, boardwalks) could be constructed subject to the required permitting.

As far as the potential for increased flooding or erosion issues based on purposed use, as requested in section 2c and 2e of the RFP Objectives, any improvements/construction will follow the State and DeKalb County stormwater management regulations (ex. stormwater detention ponds) and as such should not cause any increase in flooding or erosion. As a more sustainable alternative to the detention ponds, Green Infrastructure (GI) and Low Impact Development (LID) best management practices (BMPs) such as bioretention and/or rain gardens are recommended for the storm runoff management. Likewise, flooding reduction is not expected in the study area because there are no existing impervious surfaces that could be converted into pervious surfaces, thus reducing stormwater runoff.

3.3.2 Wetlands and Streams

The USGS topographic map (Figure 3) does not indicate blue-line streams on the tracts. Both the USGS topographic map (Figure 3) and the DeKalb County topography map (Figure 4) indicate the presence of drainage swales on Tract 1 and Tract 3. The topographic maps do not indicate



prominent drainage swales on Tracts 4 and 5. The NWI map (Figure 7) indicate the potential for forested and emergent wetland areas in the southern portion of Tract 5, in the area of hydric soils previously noted. Additionally, large, flat floodplain areas are shown on the topographic maps on Tracts 3, 4, and 5. These flat areas frequently contain poorly-drained soils and have the potential to contain wetland areas.

The tracts have the potential to impact water quality if proper erosion and sedimentation control are not followed. Tracts 1 and 3 drain to Intrenchment Creek, and Tracts 4 and 5 drain to Sugar Creek.

Field reconnaissance results from each of the tracts are provided below. The south Atlanta area received over 4 inches of rainfall in the two weeks prior to the fieldwork, including 1.13" of rainfall on March 3, 2019, the day prior to the first site visit.

Tract 1

Most of Tract 1 consists of upland ridges and gentle slopes. A drainage swale is located in the northwest corner of the tract. Wood observed some pooled surface water drainage through this area, which has formed two slight channels. The northern channel scored 4 points on the NCDWQ stream forms, and the southern channel scored 7 points (Photo 9). These scores are well below the NCDWQ intermittent stream score of 19. These channels are not continuous within the drainage swale, and they did not show continuous flow even after rain during the previous day. Downstream of the confluence of these areas, approximately 250 feet west of the current study boundary within Tract 2, the channel was flowing and scored 21 points on the NCDWQ form (within the range of an intermittent stream). The intermittent stream was 5 to 6 feet wide within an approximately 8 foot wide channel, deeply incised to approximately 4 feet, and had water depths of 6 to 12 inches. The substrate (stream bottom) consisted of silty sand and clay. The stream was flowing during the field reconnaissance, and the water was turbid from recent rainfall. The area drains west towards Intrenchment Creek, located approximately 1,000 feet west of the study area. We collected a benthic macroinvertebrate sample at this location.

Also, a potential jurisdictional wetland was located near the western study area boundary within this drainage swale (Photo 8). Our field team observed hydrophytic vegetation and wetland hydrology within the area, but a cursory examination of soils did not indicate strong hydric soil indicators, which would be required for the area to be considered a jurisdictional wetland under USACE guidance.

Tract 3

Drainage features on Tract 3 include a stormwater detention area near the southern property boundary (near DK3-1). A drainage swale flows north from this area, eventually creating an ephemeral/intermittent stream that flows off the tract to the west (DK3-2 on Figure 8). The stream scored 17.5 points on the NCDWQ worksheet, slightly below the NCDWQ intermittent stream criteria of 19. The intermittent stream was about 2 feet wide within an approximately 6 foot wide channel, deeply incised to approximately 5 feet, and had water depths of 1 to 12 inches. The substrate (stream bottom) consisted of sandy clay with some areas with pebbles. The stream was flowing during the field reconnaissance, and the water was turbid from recent rainfall. The area



drains west towards Intrenchment Creek, located approximately 400 feet west. Wood collected a benthic macroinvertebrate sample at this location.

We observed potential wetland areas on Tract 3, including the former stormwater detention pond, areas adjacent to the swale draining north from the detention pond area, and within the Intrenchment Creek floodplain. These areas were observed to have hydrophytic vegetation and wetland hydrology, but a cursory examination of soils did not indicate strong hydric soil indicators, which would be required for the area to be considered a jurisdictional wetland under USACE guidance. The floodplain area is frequently flooded from Intrenchment Creek.

Tract 4

Wood did not observe any defined drainage features on Tract 4. Runoff from Tract 4 generally drains to the east, towards Sugar Creek (located approximately 600 feet to the northeast).

We observed potential wetland areas on Tract 4 in low-lying areas within the Sugar Creek floodplain. These areas were observed to have hydrophytic vegetation and wetland hydrology, but a cursory examination of soils did not indicate strong hydric soil indicators, which would be required for the area to be considered a jurisdictional wetland under USACE guidance.

Tract 5

We observed man-made ditching on Tract 5 that forms a grid pattern associated with former sod planting on the tract. Runoff from Tract 5 generally drains to the east, towards Sugar Creek (located approximately 600 feet to the northeast).

Our field team observed potential wetland areas on Tract 5 in low-lying areas within the Sugar Creek floodplain. The wetland areas are shown on the NWI map, but site disturbance and sod planting have affected the vegetation and drainage pattern in the area. These areas were observed to have hydrophytic vegetation and wetland hydrology, but a cursory examination of soils did not indicate strong hydric soil indicators, which would be required for the area to be considered a jurisdictional wetland under USACE guidance.

3.3.3 Benthic Macroinvertebrates

Our scientists collected two benthic macroinvertebrate samples in the two intermittent streams described above in accordance with the EPD SOP (2007). The samples were collected on March 4 and March 6, 2019. The samples were shipped to our Florida laboratory for identification and enumeration. Table 4 summarizes the benthic macroinvertebrate results. It should be noted, in reference to the results and scoring, that both streams are small intermittent streams and were sampled outside of the EPD Index Period for benthic macroinvertebrate collection, which runs from mid-September through February (EPD SOP, 2007).

The benthic macroinvertebrate communities of stream DK1-5 on Tract 2 (downstream from Tract 1) and stream DK3-2 on Tract 3 had EPD SOP index scores of 29 and 32, respectively. Both scores represent a stream ranking of 3 that corresponds to a stream rating of "fair." Rankings range from 1 ("very good") to 5 ("very poor") (Gore *et al* 2006). Streams DK1-5 and DK3-2 also had similar



diversity, 10 taxa and 11 taxa, respectively, and were both dominated by small freshwater clams (*Pisidium* spp.). However, DK1-5 had a total of 1,240 macroinvertebrates in its sample, while DK3-2 had a total of 382. As a result, DK3-2 has a Shannon's Diversity Index score of 1.26, compared with a score of 0.54 for DK1-5. This scoring indicates that at a given community density, DK3-2 would be expected to have higher community diversity.

3.4 Habitat/Animals

3.4.1 Habitat and Species Occurrences

Wood prepared a general vegetation map of the tracts (Figure 8). Habitat descriptions and specific species occurring in each tract were previously described in the Tree Canopy/Habitat section above. As previously indicated, a limitation of the vegetation survey is that because of schedule requirements, the survey was completed in three days in early March, prior to most plants budding out or blooming for the year. We identified vegetation as best as possible with these limitations, so the vegetation survey contains only those species that were identifiable during the survey period.

The study area is within Southern Outer Piedmont ecoregion (Edwards et al 2013). The forest habitat types observed are those commonly found in Georgia. No unique wildlife/wildlife habitat was identified within the study area. No perennial streams were located within the study area, so no unique fish/fish habitat was identified.

3.4.2 Animals

Tract 1

The mix of vegetation types on Tract 1 provides fair to good habitat for a variety of generalist animal species. The forest habitat is not unique to the area, but it does provide a variety of habitat types within a contiguous property. There is no perennial water source on the property; Intrenchment Creek is located to the west. Wood observed deer and squirrels using this tract. We also observed a frog just downstream from the northwest property corner at the location of the benthic macroinvertebrate sample. Conflicts with wildlife use would include human activities, such as parking, multi-use trails, maintenance activities (mowing), use of the model airplane field, and invasive plants that compete with native vegetation. Tract 1 is adjacent to Tract 2, connecting to the larger wildlife corridor along Intrenchment Creek. Also, vehicular traffic along Bouldercrest Road and Constitution Road can cause disturbances to wildlife.

Two bird point counts were conducted on this tract; one in the northwest drainage swale and one in the pine upland (Appendix C). The point count in the northwest drainage swale (BS1-1) yielded 5 species while the pine upland (BS1-2) yielded 4 species. Additionally, an approximately 1.2-mile walk-through of the tract was conducted and supplemented the list of observed species. In total, 21 species were observed on or over Tract 1. Tract 1 has a varied mix of habitats (bottomland hardwoods, forest edge habitat, and pine forest) which can support a diverse group of bird species. The habitat is contiguous with the surrounding area of undeveloped properties (Tract 2) to form a larger acreage of available habitat. Tract 1 provides valuable habitat to certain sparrow species, particularly those that use forest edges and woodland understory, observed on this tract (song



sparrow, fox sparrow, chipping sparrow, and eastern towhee). Invasives on this tract limit the quality of bird habitat but could be managed to enhance the habitat.

Tract 3

The mix of vegetation types on Tract 3 provides poor to fair habitat for a variety of generalist animal species. There is no perennial water source on the property, but an intermittent drainage channel provides water at some points during the year, and Intrenchment Creek is located to the west. We observed deer and opossum using this tract as well as tadpoles within the stormwater detention area. Tract 3 is adjacent to Tract 2, connecting to the larger wildlife corridor along Intrenchment Creek. Conflicts with wildlife use include habitat alteration (grading and poor quality vegetation), human activities (dumping of debris, multi-use trails), and invasive plants that compete with native vegetation. Vehicular traffic along Bouldercrest Road can also cause disturbances to wildlife.

Two bird point counts were conducted on this tract; one in the open grassland and one in the wooded floodplain (Appendix C). The open grassland point count (BS3-1) yielded 5 species while the wooded floodplain (BS3-2) yielded 7 species. Additionally, an approximately 0.7-mile walk-through was conducted and supplemented the list of observed species. In total, 17 species were observed on or over Tract 3. Tract 3 has a varied mix of habitats (grasslands, forest edge habitat, bottomland hardwoods) which can support a diverse group of bird species. Tract 3 is contiguous with Tract 2 and so if maintained as an undeveloped property, it could form a larger acreage of available habitat which could support a diverse group of bird species. The grassland habitat in Tract 3, if not maintained with mowing, provides valuable habitat to sparrow species, as evidenced by the number of sparrow species, including those that prefer overgrown fields and saplings in weedy habitats, observed on this tract (field sparrow, swamp sparrow, song sparrow, and eastern towhee). Any grading and/or disposal of rubble found on this tract should minimize the impact to the grassland habitat that is beneficial to sparrows that is found on this tract.

Tract 4

The mix of vegetation types on Tract 4 provides poor to fair habitat for a variety of generalist animal species. There is no perennial water source on the property; Sugar Creek is located to the east. Tract 4 is adjacent to the Sugar Creek floodplain, providing access to a larger wildlife corridor along Sugar Creek. Conflicts with wildlife use include habitat alteration, poor quality vegetation, human activities (multi-use trails), and invasive plants that compete with native vegetation. Vehicular traffic along Bouldercrest Road can also cause disturbances to wildlife.

One bird point count was conducted overlapping the upland and floodplain portions of this tract (Appendix C). Only one point count was conducted because of the size of the tract. The point count (BS4-1) yielded 8 species. Additionally, an approximately 0.2-mile walk-through was conducted and supplemented the list of observed species. In total, 11 species were observed on or over Tract 4. Tract 4 has a limited mix of habitats (upland forest and floodplain) which can support a diverse group of species. The tract is limited in size (~7 acres) so by itself, this tract is limited in supporting as diverse of a bird community as some of the other tracts. On the other hand, Tract 4 is contiguous with Tract 5 and with the Gresham Park areas to the east. If Tracts 4 and 5 are



maintained as undeveloped properties, the combination could form a larger acreage of available habitat which could support a diverse group of bird species.

Tract 5

The mix of vegetation types on Tract 5 provides poor to fair habitat for a variety of generalist animal species. There is no perennial water source on the property; Sugar Creek is located to the east. Tract 5 is adjacent to the Sugar Creek floodplain, providing access to a larger wildlife corridor along Sugar Creek. Conflicts with wildlife use would include habitat alteration, poor quality vegetation, human activities (multi-use trails), and invasive plants that compete with native vegetation. Vehicular traffic along Bouldercrest Road can also cause disturbances to wildlife.

Two point counts were conducted on this tract; one in the floodplain saplings area and one in the open woodland (Appendix C). The point count in the floodplain saplings area (BS5-1) yielded 2 species while the open woodland (BS5-2) yielded 4 species. Additionally, an approximately 0.8-mile walk-through was conducted and supplemented the list of observed species. In total, 15 species were observed on or over Tract 5. Tract 5 has a varied mix of open woodland and floodplain habitats. The habitat is contiguous with undeveloped properties (Gresham expansion areas) and forms a larger acreage of available habitat which could support a diverse group of bird species. Invasives on this tract limit the quality of bird habitat, but could be managed to enhance the habitat.

A total of 31 bird species were observed across all four tracts on a one-day visit of the site (Table 5). In general, floodplain/swale areas on Tracts 1 and 3 and upland woodlands on Tracts 4 and 5 tended to have more species observed. The floodplain area on Tract 5 and pine upland of Tract 1 had the fewest number of species observed. Seventeen species were observed on multiple tracts. Fourteen species were observed only on one tract, but most of these species are anticipated to use the other tracts. Species such as pine warbler, fox sparrow, pileated woodpecker, or swamp sparrow were observed only on one tract in habitats that were only found on that tract.

Species such as pine warbler and fox sparrow, which were observed only on Tract 1, occupy habitats that were limited or did not exist on other tracts. If the plan to swap land for Tract 1 is agreed to, habitat restoration should include plans to develop habitats that support the above-identified species. Fox sparrows typically inhabit dense woodland understory or thickets, often with evergreen cover. Planting native shrubs and/or evergreen species on one of the tracts would provide habitat for this species. Pine warblers typically inhabit middle aged to mature pine forests, including open and residential pinewoods. Planting native pines or managing existing stands to promote this type of habitat would benefit pine warblers that could be displaced during the land swap.

As plans to develop Tracts 3, 4, and 5 are considered, grassy, open, unmowed habitat should be maintained for species such as swamp sparrow, field sparrow, and others that use this type of habitat. Additionally, species such as pileated woodpecker prefer large dead or dying trees (snags) in which to nest and forage. Snags should be retained on the tracts where possible, as long as no immediate safety concerns for human users is identified.



3.4.3 Protected Species

Pedestrian surveys were completed in the project area for protected species and potential habitats for protected species. USFWS and GA DNR list ten species with the potential to occur in the project area (via the IPaC and local watershed lists). Table 5 summarizes the protected species potentially found in the project area. The protected species listed in Table 5 were not observed on the four tracts during the site reconnaissance. Additionally, the species have a low potential of occurrence based on their respective preferred habitats when compared to the habitat types present within the project area:

- The Altamaha shiner (*Cyprinella xaenura*) prefers small tributary streams and rivers with sandy to rocky substrates. No perennial streams were observed.
- Bachman's sparrow (*Peucaea aestivalis*) prefers mature, open, pine forest or dense grass or palmetto scrub groundcover in the understory. Observed canopies were generally closed, and dense grass or palmetto scrub groundcover habitats were not observed.
- Little amphianthus (*Amphianthus pusillus*) occurs in vernal pools and solution pits on granite outcrops. The observed exposed rock within the model airplane field did not contain vernal pools or solution pits.
- Pink ladyslipper (*Cypripedium acaule*) occurs in upland pine and mixed pine-hardwood forests with acidic soils. These habitat types do occur within all four tracts, but with the abundance of Japanese honeysuckle and lack of prescribed fire (both listed as primary threats to pink ladyslipper conservation), the potential for occurrence is low.
- Dwarf hatpins (*Eriocaulon koernickianum*) occur in seepage areas and wet depressions on granite outcrops. The limited exposed rock within the model airplane field did not contain seepage areas or wet depressions.
- Black spored quillwort (*Isoetes melanospora*) occurs in vernal pools and solution pits on granite outcrops. The observed exposed rock within the model airplane field did not contain vernal pools or solution pits.
- Dwarf sumac (*Rhus michauxii*) prefer dry, open, rocky and/or sandy woodlands over mafic bedrock with high levels of calcium, magnesium, or iron on ridges and river bluffs. Limited wooded areas that meet the requirements for this species were noted along forest edges and cleared areas, but the species was not observed during the site reconnaissance.
- Bay star-vine (*Schisandra glabra*) occurs in moist, deciduous hardwood forests, often with beech, usually on lower slopes along stream terraces and floodplains. Though floodplains habitats occur in the study area, the notable abundance of Japanese honeysuckle and previous disturbance (both listed as primary threats to bay star-vine conservation), the potential for occurrence is low.



- Granite stonecrop (*Sedum pusillum*) occurs on granite outcrops, typically in mats of moss below cedar trees. The limited exposed rock within the model airplane field did not contain mats of moss or cedar trees, and the species was not observed.
- Georgia aster (*Symphyotrichum georgianum*) prefers edges and openings in rocky, upland oak-hickory-pine forests, and rights-of-way through these habitats. Though openings and rights-of-way are present within the project area, no rocky soils were observed, so the potential of occurrence is low.

The protected species listed in Table 6 were not observed and have a low potential of occurrence based on the species' respective preferred habitats, as described above.

3.4.4 Invasive Species

Pedestrian surveys completed in the project area included a review for invasive plant species according to the GEPPC List of Non-native Invasive Plants in Georgia (Appendix E). A summary of the plant species observations is described below and provided in Table 7, and results are summarized by tract below. Additionally, our scientists observed imported fire ant (*Solenopsis invicta*) mounds at various locations throughout the study area. Coyote (*Canis latrans*), also an invasive species, likely forage on the tracts; however, they were not observed during the field reconnaissance.

Tract 1

The most prevalent invasive species observed throughout this tract was Chinese privet, commonly the dominant mid- and understory species, particularly within the hardwood and mixed hardwood communities. Japanese honeysuckle is also common throughout this tract and was often the dominant herbaceous species. Some of the invasive plants, such as multiflora rose, thorny olive, Bradford pear, and English ivy, were observed in a scattered distribution, typically consisting of a few plants or a small area of growth dispersed across the tract.

Tract 3

The most prevalent invasive species observed was Chinese privet, commonly the dominant mid- and understory species within wooded areas. Japanese stiltgrass was notable in bottomland hardwood communities near streams, and along floodplains and wet areas. Other invasive plants, such as multiflora rose, thorny olive, Bradford pear, and Japanese honeysuckle, were observed in a scattered distribution, typically consisting of a few plants or a small area of growth.

Tract 4

The most prevalent invasive species observed was Chinese privet, commonly the dominant mid- and understory species within the upland area along Bouldercrest Road and areas sloping down to the floodplain. English ivy and Japanese honeysuckle were common along Bouldercrest Road, likely affiliated with former homesites. Other remaining invasive plants, such as thorny olive, Japanese stiltgrass, bigleaf periwinkle, and multiflora rose, were observed in a scattered distribution, typically consisting of a few plants or a small area of growth.



Tract 5

Similar to Tract 4, the most prevalent invasive species was Chinese privet, commonly dominant within the upland area along Bouldercrest Road and areas sloping down to the floodplain. English ivy and Chinese wisteria were common along Bouldercrest Road, likely affiliated with former homesites. Bigleaf periwinkle was observed on the tract. A prominent area of kudzu is located on this tract, along the central portion of the slope leading down to the floodplain. This area is nearly a monoculture of kudzu, and appears to be spreading and overtopping the trees in adjacent areas (the Disturbed/Invasive area within Tract 5 as shown on Figure 8). A small area of mimosa was noted on the corner of the tract, near the intersection of the South River Trail and Bouldercrest Road.



4.0 RECOMMENDATIONS

4.1 General Information

Future development on the tracts should adhere to DeKalb County land disturbance requirements, especially when related to water quality. The four tracts have potentially erodible soils and slope to river floodplain; erosion and sediment control will be key to maintain water quality in Intrenchment Creek and Sugar Creek.

The DRCPA's goal is to create opportunities for a better quality of life for the communities of DeKalb County. From an ecological and existing park perspective, passive recreation is the predominant use of the park and the primary service of the existing facilities.

Additional observations include:

- The multi-use trail from Tract 1 will be relocated to Tract 2. If properly designed (sinuosity, topography and grades), the proposed trail on Tract 2 would provide similar aesthetics to the existing trail on Tract 1. The relocated trail would require clearing approximately 1.1 acres within Tract 2 (2,400 feet long by approximately 20 feet wide corridor). An additional trail access point along the Constitution Road has been recommended and would provide for connectivity with future community trails.
- The existing amenities (model air plane runaway, gravel lots, small structures, benches, receptacles) currently located on Tract 1 are not extensive and could be relocated to Tract 3 without substantial difficulty. We understand that additional amenities (additional trails, sidewalks and picnic shelter) would be developed for Tract 3 as a part of a property transfer.
- Tract 3 is adjacent to residential neighborhoods, and proposed trailhead access on this tract will allow for more convenient community access to recreational facilities from these surrounding communities. Additional tree plantings (of unspecified densities, depending on the community selection) are recommended for the northern section of Tract 3 to provide visitors with shaded activity areas. Most of the southern section of Tract 3 will remain open for parking and the model airplane field. Other enhancements could include pavilions, grilling areas, a playground, and bathroom facilities that could serve the airplane field, activities area, and trailhead/South River Trail.
- Enhancements could be made for recreation, such as hiking/mount biking trail improvements (e.g., directional signage, blazing, etc.) or opportunity improvements (e.g., bird houses along trails).
- Tracts 4 and 5 provide opportunities based on their proximity to the adjacent neighborhoods and to the Gresham Park to the east. We recommend developing a wetland restoration plan for these areas to enhance the current floodplain/wetland area, as well as creation of an educational interpretive area for both wetlands and floodplains.



- A master plan is recommended to address the overall recreational improvements within the proposed Intrenchment Creek Park area.

4.2 Tree Canopy

- Tract 1 has approximately 33.8 acres of forested vegetation. Any proposed development or clearing activity need to be consistent with DeKalb County land disturbance requirements. Tree replacement requirements, as applicable, should be conducted in conjunction with development of Tracts 3, 4, and 5 as necessary. Plantings of the later tracts would provide appropriate native vegetation communities, along with an opportunity to establish rare plant species and plant species that provide forage and habitat for wildlife. Similar plantings could improve Tract 1 if it remains in DeKalb County ownership.
- Tract 3 currently has approximately the same amount of cleared areas as Tract 1. This cleared area is not currently being maintained. Moving Tract 1 park amenities to Tract 3 (i.e., parking area, trailhead, and model airplane field) would likely not require much additional clearing on Tract 3, as the area is already cleared and graded. An appropriate tree planting plan should be incorporated into any new development on Tract 3. There is some available space on this tract to allow for additional tree planting or tree compensation related to development on Tract 1, both in the currently cleared areas as well as in the floodplain forest, which does not currently have very diverse forest vegetation.
- Tracts 4 and 5 have areas of upland forest canopies, but the floodplain of these tracts comprise a young, early successional, low diversity vegetative community. There is some available space on these tracts to allow for additional tree planting or tree compensation related to development on Tract 1, specifically in the floodplain forest, which does not currently have very diverse forest vegetation.
- A planting plan, in a coordinated effort with invasive species removal and wetland/floodplain restoration could provide transformative community improvements.
- DRPCA was also interested in pollinator host plant species occurring within the study area. Wood observed several plant species listed in pollinator references as good pollinator host species for the project area (Braman, *et al* 2017; Ley, *et al* 2019). These plant species include tulip poplar (found on all tracts), dogwood, red maple, black cherry, black locust, American holly, elderberry, goldenrod, and asters. These species were most abundant on Tract 1, but all tracts contained some of these species. As DRPCA is interested in enhancing pollinators, it would be recommended that the species lists provided in the two pollinator references be used to help develop future planting plans by providing additional pollinator species.



4.3 Floodplains/Wetlands: Water Quality and Quantity

Tract 1 as currently presented does not contain any floodplain or floodway areas. Tracts 3, 4, and 5 all contain floodplains and/or designated floodways.

- Current water quality on Tracts 1 and 3 is scored as “fair” based on the results of the benthic macroinvertebrate samples. Future development on these tracts should be designed to prevent additional degradation of water quality, and ideally would promote improved water quality through the use of GI, BMPs, and other techniques.
- Tracts 4 and 5 provide the greatest opportunity for water quality improvements, as the floodplain areas appear to have been channelized in a gridded pattern, and an early successional, low diversity vegetative community is currently established. Restoration of these areas could provide the opportunity for water quality and habitat improvements, along with potential educational and recreational components (e.g., boardwalks, interpretive signage, etc., in conjunction with the existing South River Trail). A restoration plan for these areas could include invasive species removal, creating openings in the thick vegetation, regrading (e.g., filling channels to restore natural topography and flow gradients), and replanting desirable native species to establish diverse emergent and bottomland communities, increasing the wetlands’ natural capacity to maintain and improve water quality.

4.4 Plants, Animals, and Habitat

From a wildlife habitat perspective, there are benefits and constraints for each tract depending on its intended use. Tract 1 currently has the highest ecological value to wildlife, based on its current forest cover. The forest cover on Tract 1 is not unique to the area, but it does provide a variety of habitats. Tract 2, which would remain in DRCPA ownership, provides similar habitat types as well as significant floodplain areas and Intrenchment Creek.

- If Tracts 3, 4 and 5 are transferred to DRPCA ownership, significant improvements for wildlife habitat could be made. Improvements include invasive species control, removal of debris, and restoring and revegetating formerly cleared areas. In addition, the provision of shelter (e.g., bat houses, song bird houses, duck boxes, etc.) and inclusion of forage species (e.g., American beech, southern hackberry, American crabapple, elderberry, serviceberry, etc.) in native plantings could provide additional habitat on the tracts.
- Any proposed development of Tracts 3, 4 and 5 might result in fragmentation of forest areas on both sides of Bouldercrest Road. Creating a wide park-owned corridor from Gresham Park to the west, across Bouldercrest Road, and then south along Intrenchment Creek, would provide some continuity of the forested areas. DRPCA ownership of these tracts would prevent such fragmentation. In addition, DRPCA ownership of floodplain areas and wildlife habitat could be a long-term benefit.



- No protected species were observed, and those listed for the project area have a low potential of occurrence based on the species' respective preferred habitats. As a result, changes to the tracts are not expected to significantly affect (i.e., impact or improve) conditions for protected species. However, disturbance and invasive species, such as Japanese honeysuckle, are listed as primary threats to protected species conservation.
- Conservation planning for redeveloping the habitats for these species would include the same elements utilized in general habitat improvements for the tracts, such as invasive species control, native plantings, wetland restoration, and prescribed controlled burnings.
- If Tract 1 remains in DRPCA ownership, the wildlife habitat could be improved by implementing an invasive species control plan. Invasive species control would be an initial removal (e.g., cutting, spraying, injecting, etc.) tract-wide, followed by a long-term annual maintenance program that could include invasives removal and other treatment methods, including prescribed burning.
- Similarly, if Tracts 3, 4, and 5 are transferred to DRPCA ownership, invasive species control would be a key element to improving the wildlife habitat on these parcels. It should be noted that invasive control would be an important component to the success of plantings/establishment and for subsequent habitat and community improvements.



5.0 SUMMARY AND CONCLUSION

Wood conducted an ecological assessment of four tracts associated with or adjacent to Intrenchment Creek Park in DeKalb County, Georgia. Tract 1 currently has the highest ecological value, based on its current forest cover. Tracts 3, 4, and 5 could provide similar recreational and ecological value to Tract 1 if park amenities are relocated and restoration activities are conducted. Significant planning, design and future maintenance would be required to assure that the desired ecological and recreational values are achieved if the property exchange occurs.



In February 2020, a decision was made to retain 9 acres of land from Tract 1 in DeKalb County ownership. The proposed boundary is depicted in red on the adjacent figure. The 9 acres to be retained consists mostly of mesic hardwood vegetation located north and west of the model airplane field, with some areas of oak-pine-hickory forest and successional pine. The area to be retained by DeKalb County also includes an area of mature mesic hardwood forest, which contains some of the older trees (80-100 years) observed during the field assessment of the Intrenchment Creek Park study area (Tract 1).



6.0 REFERENCES

- Barbour, M.T., J. Gerritsen, G.E. Griffith, R. Frydenborg, E. McCarron, J.S. White, and M.L. Bastian. 1996. A framework for biological criteria for Florida streams using benthic macroinvertebrates. *Journal of the North American Benthological Society* 15: Natural Resources, Atlanta, Georgia. 185-211.
- Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish*, Second Edition. U.S. Environmental Protection Agency; Office of Water: Washington, D.C. EPA 841-B-99-002.
- Braman, Kris, Bodie Pennisi, Elizabeth Benton, and Kim Toal. 2017. *Selecting Trees and Shrubs as Resources for Pollinators*. UGA Cooperative Extension Bulletin 1483, December 2017. Available at: https://secure.caes.uga.edu/extension/publications/files/pdf/B%201483_1.PDF. Accessed March 18, 2019.
- Edwards, L., J. Ambrose, and L. K. Kirkman. 2013. *The Natural Communities of Georgia*. University of Georgia Press, Athens, Georgia.
- Georgia Department of Natural Resources (GA DNR). 2007. *Macroinvertebrate Biological Assessment of Wadeable Streams in Georgia, Standard Operating Procedures*, March.
- Georgia Exotic Pest Plant Council (GEPPC). 2019. *List of Non-native Invasive Plants in Georgia*. <https://www.gaeppc.org/list/>. Accessed March 11, 2019.
- Gore, James A., Middleton, Amanda, Hughes, Duncan L., Rai, K Uttam K. and Brossett, P. Michele. (DRAFT) 2006. *A Numerical Index of Health of Wadeable Streams in Georgia Using A Multimetric Index for Benthic Macroinvertebrates: Ecoregion Reference Site Project- Phase III Final Report*. Georgia Department of Natural Resources, Atlanta, Georgia.
- Higgins, M.W, T.J. Crawford, R.L. Atkins, and R.F. Crawford. 2003. *Geologic Map of the Atlanta 30' x 60' Quadrangle, Georgia*. Scientific Investigations Map 2602, U.S. Geologic Survey.
- Ley, Elizabeth L., Stephen Buchmann, Larry Stritch, and Gil Soltz. 2019. *Selecting Plants for Pollinators in the Ecological Region of the Southeast Mixed Forest Province*. The Pollinator Partnership/North American Pollinator Protection Campaign. Available at: <http://www.pollinator.org/PDFs/Guides/SoutheastMixedForestrx5FINAL.pdf>. Accessed February 15, 2019.
- North Carolina Department of Environment and Natural Resources (NCDENR) Division of Water Resources (DWR). 2010. *Methodology for Identification of Intermittent and Perennial Streams and Their Origins (Version 4.11)*, effective September 1, 2010.



TABLES



Table 1. USDA NRCS Soil Survey Information

Soil Series	Soil Description	Tract 1		Tract 3		Tract 4		Tract 5	
		Area (acres)	Percent of tract						
Ca	Cartecay silt loam, frequently flooded			6.84	28.1%			4.75	22.5%
GeB	Gwinnett sandy loam, 2 to 6 percent slopes	1.23	2.5%						
GeC	Gwinnett sandy loam, 6 to 10 percent slopes	3.86	8.0%						
MdB	Madison sandy loam, 2 to 6 percent slopes	1.24	2.6%					0.79	3.7%
MdC	Madison sandy loam, 6 to 10 percent slopes	4.27	8.9%						
MdD	Madison sandy loam, 10 to 15 percent slopes	5.24	10.9%						
MdE	Madison sandy loam, 15 to 30 percent slopes	0.19	0.4%					1.05	5.0%
MfC2	Madison sandy clay loam, 2 to 10 percent slopes, eroded	17.14	35.5%	4.53	18.6%			1.03	4.9%
MfD2	Madison sandy clay loam, 10 to 15 percent slopes, moderately eroded	10.18	21.1%	10.03	41.2%	4.36	57.9%	5.71	27.1%
PfC	Pacolet sandy loam, 2 to 10 percent slopes	0.05	0.1%	2.31	9.5%	1.72	22.9%	1.15	5.4%
PfD	Pacolet sandy loam, 10 to 15 percent slopes	0.04	0.1%						
Tf	Toccoa sandy loam, 0 to 2 percent slopes, frequently flooded			0.66	2.7%	1.15	15.2%	0.05	0.2%
To	Toccoa sandy loam, high	2.44	5.1%					0.01	0.0%
Ud	Urban land	2.34	4.9%			0.30	4.0%		
Wf	Wehadkee silt loam, frequently flooded							6.57	31.1%
Total Area (acres)		48.22		24.38		7.53		21.10	

Prepared by: JAB 03/08/2019
 Checked by: KPH 03/11/2019



Table 2 – Vegetation Types

Vegetation	Tract 1		Tract 3		Tract 4		Tract 5		Total Type Area (acres)
	Area (acres)	Percent of tract							
Disturbed/Invasive			16.32	67%	0.98	13%	0.96	5%	18.26
Floodplain Forest			3.38	14%	2.06	27%	10.57	50%	16.00
Maintained	14.41	30%					1.42	7%	15.83
Mesic Forest	8.08	17%	1.52	6%	4.50	60%	6.01	28%	20.11
Mesic Forest (mature)	2.12	4%							2.12
Oak-Pine-Hickory	18.85	39%	1.93	8%			1.59	8%	22.37
Successional Pine	4.75	10%	1.23	5%			0.56	3%	6.54
Total Tract Area (acres)	48.22		24.38		7.53		21.10		

Prepared by: JAB 03/25/2019
 Checked by: KPH 03/25/2019



Table 3 – FEMA Floodplain Information

FEMA Flood Designation	Tract 1		Tract 3		Tract 4		Tract 5	
	Area (acres)	Percent of tract						
100-Year Floodplain (Zone AE, includes floodway)			7.13	29.2%	0.69	9.2%	11.91	56.4%
Floodway			1.50	6.2%	0.48	6.4%	11.66	55.3%
Not in Floodplain (Zone X)	48.22	100.0%	17.25	70.8%	6.84	90.8%	9.19	43.6%
Total Tract Area (acres)	48.22		24.38		7.53		21.10	

Prepared by: JAB 03/08/2019
 Checked by: KPH 03/11/2019



Table 4. Benthic Macroinvertebrate Results

Phylum	Class	Order	Family	Taxa	Feeding Group ¹	Life Habit ²	Specimens Collected	
							DK1-5	DK3-2
Annelida	Clitellata			Oligochaeta spp.	UN	UN	2	2
Mollusca	Gastropoda	Hygrophila	Physidae	Physidae spp.	SC	UN		20
Mollusca	Gastropoda	Hygrophila	Planorbidae	Planorbidae spp.	SC	UN	1	3
Mollusca	Gastropoda	Hygrophila	Lymnaeidae	<i>Fossaria spp.</i>	SC	UN		1
Mollusca	Bivalvia	Veneroida	Sphaeriidae	<i>Pisidium spp.</i>	CF	UN	179	132
Arthropoda	Malacostraca	Amphipoda	Gammaridae	<i>Gammarus spp.</i>	OM	UN	2	10
Arthropoda	Insecta	Coleoptera	Curculionidae	Curculionidae spp.	SH	CN		2
Arthropoda	Insecta	Coleoptera	Dytiscidae	<i>Neoporus spp.</i>	PR	SW	2	
Arthropoda	Insecta	Coleoptera	Dytiscidae	<i>Copelatus spp.</i>	PR	SW		1
Arthropoda	Insecta	Diptera	Chironomidae	Chironomidae spp.	CG	BU	1	18
Arthropoda	Insecta	Diptera	Ceratopogonidae	Ceratopogonidae spp.	PR	SP	1	
Arthropoda	Insecta	Diptera	Culicidae	Culicidae spp.	CG	SW	7	
Arthropoda	Insecta	Diptera	Psychodidae	<i>Psychoda spp.</i>	CG	BU	2	
Arthropoda	Insecta	Diptera	Canaceidae	<i>Canaceoides spp.</i>	UN	UN	3	1
Arthropoda	Collembola			Collembola spp.	CG	UN	2	11
Total Individuals in Subsample							200	201
Total Individuals in Sample							1240	382
Total Taxa							10	11
Shannon's Diversity Index							0.54	1.26
EPD SOP Metric Index Score							29	32

¹Feeding Group

CF = collector-filterer
 CG = collector-gatherer
 PR = predator
 SC = scraper
 SH = shredder
 UN = unidentified

²Life Habit

BU = burrower
 CN = clinger
 CB = climber
 SP = sprawler
 SW = swimmer
 UN = unidentified

Prepared By: KPH 03/25/2019
 Checked By: JAB 03/25/2019



wood.



Table 5. Bird Count Results

Species		Observations				Notes
Scientific Name	Common Name	Tract 1	Tract 3	Tract 4	Tract 5	
American Robin	<i>Turdus migratorius</i>		X	X	X	
Blue Jay	<i>Cyanocitta cristata</i>	X		X		
Brown Thrasher	<i>Toxostoma rufum</i>	X		X	X	
Carolina Chickadee	<i>Poecile carolinensis</i>	X			X	
Carolina Wren	<i>Thryothorus ludovicianus</i>	X	X	X	X	
Chipping Sparrow	<i>Spizella passerina</i>	X				
Cooper's Hawk	<i>Accipiter cooperii</i>	X		X	X	
Downy Woodpecker	<i>Dryobates pubescens</i>	X	X			
Eastern Phoebe	<i>Sayornis phoebe</i>		X			
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	X	X	X	X	
Field Sparrow	<i>Spizella pusilla</i>		X			
Fox Sparrow	<i>Passerella iliaca</i>	X				
Golden-crowned Kinglet	<i>Regulus satrapa</i>	X			X	
Hermit Thrush	<i>Catharus guttatus</i>	X				
Northern Cardinal	<i>Cardinalis</i>	X	X	X	X	
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	X		X	X	
Red-shouldered Hawk	<i>Buteo lineatus</i>	X		X	X	
Ruby-crowned Kinglet	<i>Regulus calendula</i>	X				
Song Sparrow	<i>Melospiza melodia</i>	X	X		X	
Swamp Sparrow	<i>Melospiza georgiana</i>		X			
Tufted Titmouse	<i>Baeolophus bicolor</i>	X	X		X	
Turkey Vulture	<i>Cathartes aura</i>	X	X	X	X	
White-breasted Nuthatch	<i>Sitta carolinensis</i>				X	
White-throated Sparrow	<i>Zonotrichia albicollis</i>			X	X	
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>		X			
American Crow	<i>Corvus brachyrhynchos</i>		X			Heard only
Brown-headed Nuthatch	<i>Sitta pusilla</i>	X	X			Heard only
Fish Crow	<i>Corvus ossifragus</i>	X				Heard only
Northern Mockingbird	<i>Mimus polyglottos</i>		X			Heard only
Pileated Woodpecker	<i>Dryocopus pileatus</i>		X			Heard only
Pine Warbler	<i>Setophaga pinus</i>	X				Heard only

Prepared By: LHV 03/18/2019

Checked By: JAB 03/19/2019



**Table 6. Summary of Protected Species
Protected Species Listed for DeKalb County and the Upper South River Watershed (HUC 0307010301)**

Scientific Name	Common Name	Federal Status ¹	State Status ²	General Habitat	Potential ³
Animals					
<i>Cyprinella xaenura</i>	Altamaha Shiner	NFS	T	small tributaries/rivers, with rocky to sandy substrates	L
<i>Peucaea aestivalis</i>	Bachman's Sparrow	NFS	R	open forests with dense grasses or palmetto scrub	L
Plants					
<i>Amphianthus pusillus</i>	Little Amphianthus	T	T	vernal pools on granite outcrops	L
<i>Cypripedium acaule</i>	Pink Ladyslipper	NFS	U	upland mixed forest with acidic soils	L
<i>Eriocaulon koernickianum</i>	Dwarf Hatpins	PET	E	seeps and wet depressions on granite flatrocks	L
<i>Isoetes melanospora</i>	Black Spored Quillwort	E	E	vernal pools on granite outcrops	L
<i>Rhus michauxii</i>	Dwarf (Michaux's) Sumac	E	E	dry, open, rocky/sandy areas over mafic bedrock	L
<i>Schisandra glabra</i>	Bay Star-vine	NFS	T	moist, deciduous hardwood forest	L
<i>Sedum pusillum</i>	Granite Stonecrop	NFS	T	Piedmont granite outcrops	L
<i>Symphotrichum georgianum</i>	Georgia Aster	CCA	T	rocky, upland oak-hickory-pine forest	L

Notes:

Source: GADNR, 2019; USFWS, 2019.

¹Federal Status

E = Endangered
T = Threatened
C = Candidate Species

CCA = Candidate Conservation Species
PT = Proposed Threatened
PE = Proposed Endangered
PET = Petitioned
NFS = No Federal Status

²State Status

E = Endangered
T = Threatened
R = Rare

U = Unusual

³Potential Occurrence

L = Low, no further surveys recommended
M = Moderate, additional surveys are recommended
H = High, additional surveys are recommended, consultation may be necessary

Prepared By: KPH 03/08/2019

Checked By: JAB 03/11/2019

Table 7. Summary of Invasive Plant Species Observations

Non-native Invasive Plants		Plant Category ¹	Observations			
Scientific Name	Common Name		Tract 1	Tract 3	Tract 4	Tract 5
<i>Allium vineale</i>	Wild garlic	4	X	X		
<i>Albizia julibrissin</i>	Mimosa	1				X
<i>Elaeagnus pungens</i>	Thorny olive	2	X	X	X	
<i>Hedera helix</i>	English ivy	1	X		X	X
<i>Ligustrum sinense</i>	Chinese privet	1	X	X	X	X
<i>Lonicera japonica</i>	Japanese honeysuckle	1	X	X	X	X
<i>Microstegium vimineum</i>	Japanese stiltgrass	1		X	X	
<i>Pueraria montana var. lobata</i>	Kudzu	1				X
<i>Pyrus calleryana</i>	Callery pear (Bradford pear)	3	X	X		
<i>Rosa multiflora</i>	Multiflora rose	1	X	X	X	X
<i>Vinca major</i>	Bigleaf periwinkle	2			X	X
<i>Wisteria sinensis</i>	Chinese wisteria	1	X			X

¹Category (GEPPC, 2019; provided in Appendix E)

- 1 Exotic plant that is a serious problem in Georgia natural areas by extensively invading native plant communities and displacing native species.
- 1 Alert Exotic plant that is a not yet a serious problem in Georgia natural areas, but that has significant potential to become a serious problem.
- 2 Exotic plant that is a moderate problem in Georgia natural areas through invading native plant communities and displacing native species, but to a lesser degree than Category 1 species.
- 3 Exotic plant that is a minor problem in Georgia natural areas or is not yet known to be a problem in Georgia but is known to be a problem in adjacent states.
- 4 Exotic plant that is naturalized in Georgia but generally does not pose a problem in Georgia natural areas or a potentially invasive plant in need of additional information to determine its true status.

Prepared By: KPH 03/18/19

Checked By: RRP 03/20/19

Figures

Appendix A
Photographic Log

Appendix B
NCDENR Stream Forms

Appendix C
Songbird Point Count Data Maps

Appendix D
Federal and State Protected Species Lists

Appendix E
GEPPC List of Non-Native Invasive Plants in Georgia