ROCKY SHOALS SPIDER LILY REPORT

PARR HYDROELECTRIC PROJECT

FERC PROJECT NO. 1894

Prepared for:

South Carolina Electric & Gas Company
Cayce, South Carolina

Prepared by:

Kleinschmidt

Lexington, South Carolina
KleinschmidtGroup.com

November 2015

ROCKY SHOALS SPIDER LILY REPORT

PARR HYDROELECTRIC PROJECT
FERC PROJECT NO. 1894

Prepared for:

South Carolina Electric & Gas Company
Cayce, South Carolina

Prepared by:

Kleinschmidt

Lexington, South Carolina
KleinschmidtGroup.com

November 2015

ROCKY SHOALS SPIDER LILY REPORT

PARR HYDROELECTRIC PROJECT
FERC PROJECT NO. 1894

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOS

1.0 INTRODUCTION

The Parr Hydroelectric Project (FERC No. 1894) (Project), owned and operated by South Carolina Electric & Gas Company (SCE&G), is seeking a new license from the Federal Energy Regulatory Commission (FERC), as their current license is set to expire on June 30, 2020. The Parr Hydroelectric Project consists of two developments, Parr Shoals and Fairfield Pumped Storage, and is located on the Broad River in Fairfield and Newberry counties, South Carolina.

As part of relicensing, SCE&G has established a Rare, Threatened & Endangered Species Technical Working Committee (TWC) to address potential Project-related issues involving species that are of conservation concern. The TWC includes representatives from the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), South Carolina Department of Health and Environmental Control (SCDHEC) and South Carolina Department of Natural Resources (SCDNR), among others. During issues scoping, the TWC identified the rocky shoals spider lily (*Hymenocallis coronaria*) as occurring in the Broad River downstream of the Parr Shoals Dam (Parr Dam) and requested a survey to document its occurrence in the area of Project influence. Accordingly, the objective of this study was to assess the number and spatial distribution of RSSL occurring in the study area of the Broad River extending from Parr Dam through Frost Shoals, near Boatwright Island (Figure 1-1).

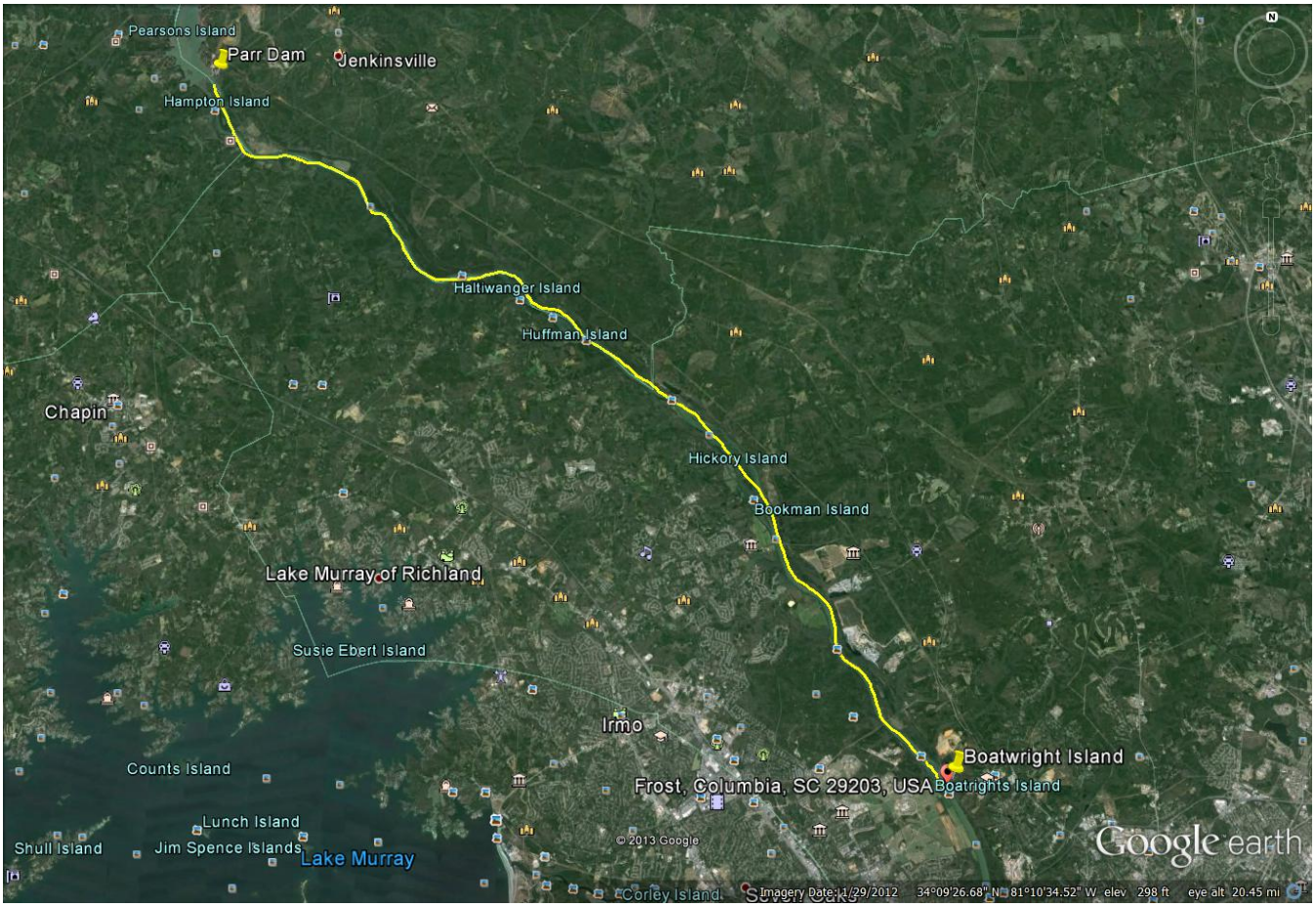


FIGURE 1-1 ROCKY SHOALS SPIDER LILY SURVEY REACH

1.1 RELEVANT LIFE HISTORY INFORMATION

Rocky shoals spider lily (RSSL), also referred to as Cahaba lily, is an aquatic perennial limited to large streams and rivers at or above the fall line in Georgia, South Carolina and Alabama (Davenport 1996). It is typically found on bedrock outcroppings or in large cobble or boulder substrates, which provide anchor points for the RSSL's roots and bulbs (Patrick et al. 1995). RSSL grows best in direct sunlight, with constantly flowing water, relatively low sediment loads, and water depths (to bulb) of 4 to 12 inches (Aulbach-Smith 1998). Blooming for this species occurs annually from late-April through mid-June, during which it is easily identified by it large white flowers (Photo 1-1). The decline of RSSL has historically been attributed to loss of shoals habitat due to construction of impoundments and other channel modifications (Davenport 1996).

While not state or federally listed as threatened or endangered, the RSSL is considered rare by the SCDNR and is among the species tracked by the agency's Heritage Trust Program (Julie Holling, SCDNR, Pers. Comm., April 14, 2014).

PHOTO 1-1 ROCKY SHOALS SPIDER LILY *HYMENOCALLIS CORONARIA* (A. CABE, 2004)

2.0 METHODS

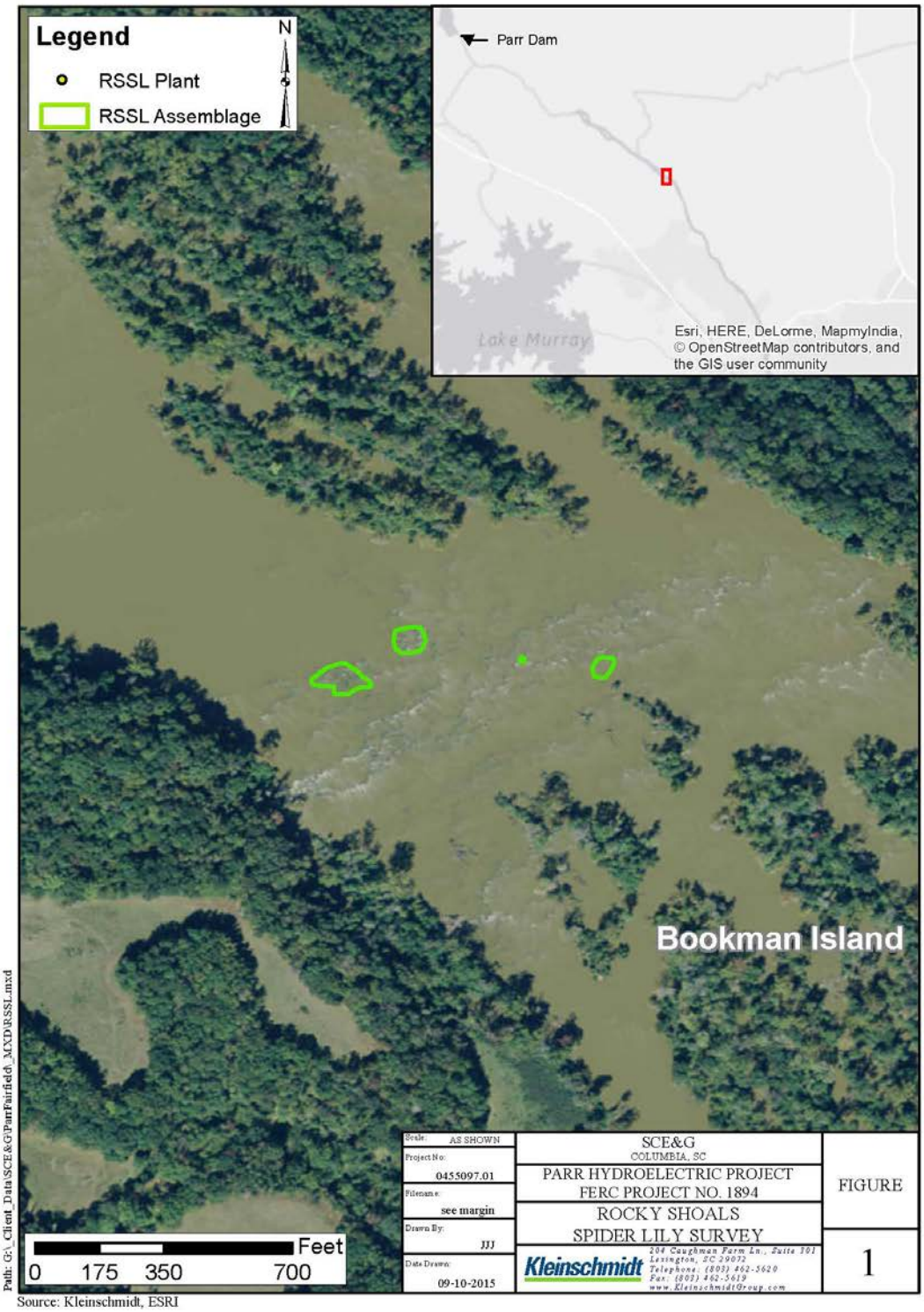
The entirety of the study area was surveyed via boat by two to three crews during the peak flowering season in 2015 (May 26-27). Each team was led by a Kleinschmidt scientist with experience in conducting RSSL surveys. Each RSSL encountered was documented using a handheld Global Positioning System (GPS) and photographed. Surveyors also recorded length and width of each plant or cluster (to allow for calculation of basal area) and noted whether plants were blooming and if there were any visible signs of herbivory. Based on the length and width measurement collected in the field, basal area was calculated using the formula:
$A = \pi (l/2 * w/2)$.

3.0 RESULTS AND DISCUSSION

A total of 81 RSSL plants or clumps of plants were documented during the survey. RSSL occurrences were limited to two primary areas: the Bookman Shoals complex and Frost Shoals, located just upstream of Boatwright Island (Figure 1-1). The majority of RSSL documented within the Bookman Shoals complex were located along a large bedrock ledge just upstream of Hickory Island, approximately 13 miles downstream of Parr Shoals Dam (Figure 3-1; Photo 3-1). Scattered additional RSSL were located in the braided channels downstream of the primary ledge in the Bookman Shoals complex (Figure 3-2). At Frost Shoals, RSSL occurrence was limited to the bedrock ledge located approximately 300 ft upstream of Boatwright Island and approximately 20 miles downstream of Parr Shoals Dam (Figure 3-3; Photo 3-2). RSSL occurrences ranged from single plants to assemblages of several hundred plants, and accordingly, basal area ranged from 0.05 m^2 to more than 20,000 m^2 within the study area (Table 3-1 and Table 3-2). Herbivory was noted at only 2 clusters observed during the survey. Plants were documented at water depths ranging from zero to 30 inches. Essentially all of the plants observed were extremely vigorous, with 96% (78 of 81) in full bloom at the time of the survey.

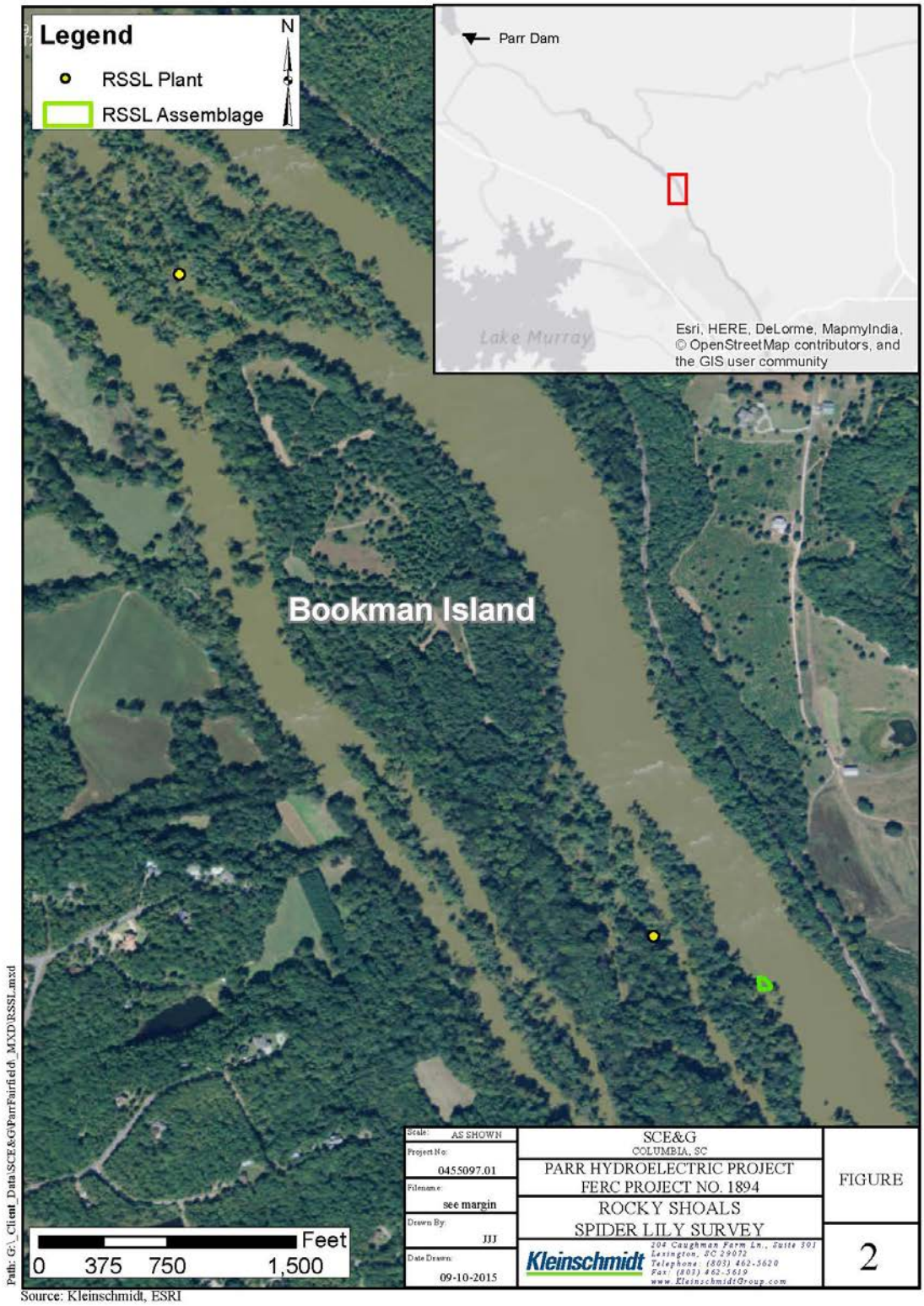
PHOTO 3-1 ROCKY SHOALS SPIDER LILY ASSEMBLAGE AT BOOKMAN SHOALS

PHOTO 3-2 LARGE ROCKY SHOALS SPIDER LILY ASSEMBLAGE AT FROST SHOALS



Source: Kleinschmidt, ESRI

FIGURE 3-1 ROCKY SHOALS SPIDER LILIES – UPPER BOOKMAN SHOALS



Source: Kleinschmidt, ESRI

FIGURE 3-2 ROCKY SHOALS SPIDER LILIES – LOWER BOOKMAN SHOALS

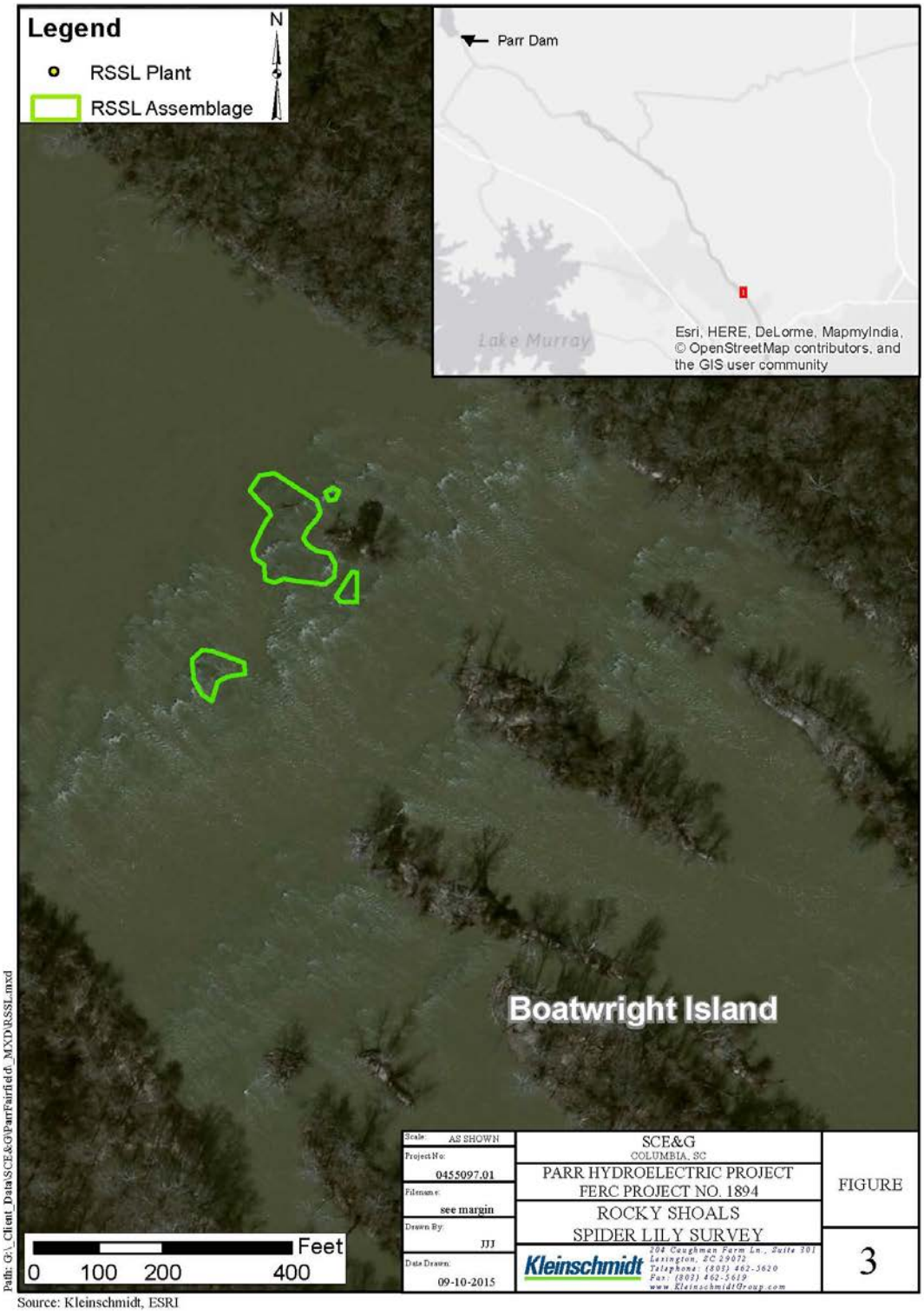


FIGURE 3-1 ROCKY SHOALS SPIDER LILIES – BOATWRIGHT ISLAND

TABLE 3-1 ROCKY SHOALS SPIDER LILY DATA – BOOKMAN SHOALS

ID	Length (cm)	Width (cm)	Basal Area (m^2)	Blooming (y/n)	Herbivory (y/n)	Water Depth (cm)
T1-1	68.58	27.94	15.05	y	y	5.1
T1-2	162.56	119.38	15.24	y	n	25.4
T1-3	81.28	81.28	51.88	y	n	30.5
T1-4	129.54	129.54	131.79	y	n	17.8
T1-5	121.92	96.52	92.42	y	n	27.9
T1-6	15.24	22.86	2.73	y	n	15.2
T1-7	111.76	45.72	40.13	y	n	22.9
T1-8	205.74	114.30	184.69	y	n	7.6
T1-9	68.58	66.04	35.57	y	n	5.1
T1-10	20574	91.44	147.75	y	n	12.7
T1-11	83.82	55.88	36.78	y	n	5.1
T1-12	165.10	111.76	144.91	y	n	12.7
T1-13	368.30	271.78	786.15	y	n	33.0
T1-14	33.02	33.02	8.56	y	n	33.0
T1-15	27.94	30.48	6.68	y	n	22.9
T1-16	304.80	129.54	310.10	y	n	35.6
T1-17	58.42	35.56	16.31	y	n	33.0
T1-18	30.48	38.10	9.12	y	n	27.9
T1-19	35.56	33.02	9.22	y	n	17.8
T1-20	200.66	144.78	228.17	y	n	15.2
T1-21	312.42	360.68	885.01	y	n	15.2
T1-22	114.30	121.92	109.44	y	n	22.9
T2-1	33.02	60.96	15.80	y	n	0.0
T2-2	58.42	15.24	6.99	y	n	0.0
T2-3	86.36	60.96	41.34	y	n	3.8
T2-4	96.52	66.04	50.06	y	n	12.7
T2-5	25.40	20.32	4.05	y	n	20.3
T2-6	78.74	66.04	40.84	y	n	10.2
T2-7	45.72	30.48	10.94	y	n	10.2
T2-8	10.16	7.62	60.80	n	n	2.5
T2-9	2.54	2.54	0.05	n	n	2.5
T2-10	53.34	38.10	15.96	y	n	76.2
T2-11	10.16	15.24	1.22	y	n	0.0
T2-12	43.18	38.10	12.92	y	n	0.0
T3-1	172.72	401.32	544.41	y	n	10.2
T3-2	157.48	350.52	433.54	y	n	20.3
T3-3	281.94	127.00	281.22	y	n	10.2
T3-3b	261.62	106.68	219.20	y	n	10.2
T3-4	116.84	109.22	100.23	y	n	15.2
T3-5	50.80	93.98	37.50	y	n	25.4
T3-6	284.48	264.16	590.21	y	n	35.6
T3-7	914.40	350.52	2517.32	y	n	0.0
T3-8	574.04	396.24	1786.45	y	n	0.0
T3-9	25.40	10.16	2.03	y	n	7.6
T3-9b	15.24	5.08	0.61	y	n	10.2
T3-10	35.56	10.16	2.84	y	n	2.5
T3-11	60.96	335.28	160.52	y	n	2.5
T3-12	213.36	662.94	1110.91	y	n	7.6

TABLE 3-2 ROCKY SHOALS SPIDER LILY DATA – BOATWRIGHT ISLAND

ID	Length (cm)	Width (cm)	Basal Area (m^2)	Blooming (y/n)	Herbivory (y/n)	Water Depth (cm)
T1-23	81.28	73.66	47.02	y	n	43.2
T1-24	93.98	91.44	67.49	y	n	17.8
T1-25	27.94	25.40	5.57	y	n	27.9
T1-26	149.86	421.64	496.27	y	n	15.2
T1-27	292.10	279.40	640.98	y	n	30.5
T1-28	35.56	22.86	6.38	y	n	35.6
T1-29	99.06	111.76	86.95	y	n	35.6
T1-30	269.24	167.64	354.49	y	n	30.5
T1-31	2377.44	1082.04	20204.25	y	n	22.9
T2-20	22.86	20.32	3.65	y	n	3.8
T2-21	48.26	17.78	6.74	y	n	5.1
T2-22	25.40	27.94	5.57	y	n	15.2
T2-23	81.28	81.28	51.89	y	n	25.4
T2-24	109.22	111.76	95.87	y	n	22.9
T2-25	586.74	215.90	994.92	y	n	15.2
T2-26	104.14	66.04	54.02	y	n	5.1
T2-27	104.14	86.36	70.64	y	n	25.4
T2-29	299.72	151.13	22624.89	y	n	12.7
T2-30	114.30	101.60	355.76	y	n	45.7
T2-31	63.50	53.34	91.21	y	n	30.5
T2-32	20.32	17.78	26.60	n	n	40.6
T2-33	55.88	60.96	2.84	y	n	12.7
T3-14	731.52	271.78	26.75	y	n	38.1
T3-15	1097.28	762.00	1561.47	y	n	25.4
T3-16	50.80	38.10	6566.93	y	n	33.0
T3-17	187.96	116.84	15.20	y	n	30.5
T3-18	121.92	101.60	172.48	y	n	43.2
T3-19	304.80	200.66	97.29	y	n	25.4
T3-20	1371.60	967.74	480.36	y	n	22.9
T3-21	53.34	60.96	10425.00	y	n	15.2
T3-22	325.12	127.00	25.54	y	n	10.2
T3-23	213.36	40.64	324.29	y	n	0.0
T3-24	86.36	50.80	68.10	y	n	7.6

4.0 REFERENCES

Aulbach-Smith, Cynthia. 1998. *Hymenocallis coronaria*, The rocky shoals spider lily Broad River at Lockhart, SC. Botanical Services of South Carolina, Lexington, South Carolina. 99 pp.

Davenport, L.J. 1996. The Cahaba lily: its distribution and status in Alabama. Journal of the Alabama Academy of Science 67:222–233.

Patrick, Thomas S., J. R. Allison, and G. A. Krakow. 1995. Protected plants of Georgia. Georgia Department of Natural Resources, Social Circle, GA. 246 pp.