C-111 PROJECT & CAPE SABLE SEASIDE SPARROW SUBPOPULATION D ANNUAL REPORT – 2015

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REPORT TO THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT
(WEST PALM BEACH, FL)

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conserving birds and their habitats through science, restoration, and outreach

Contents

1.0 Executive Summary

The main purpose of this report is to provide current data on Cape Sable seaside sparrows (CSSS or the "sparrow") breeding in small sparrow subpopulation D during implementation of the C-111 Spreader Canal Western Phase I Project (C-111 SC Project), which began operations in summer 2012. The C-111 SC Project was designed to restore the quantity, timing and distribution of water delivered to Florida Bay via Taylor Slough and to improve hydroperiod and hydropattern in the area south of the C-111 Canal known as the Southern Glades and Model Lands. The U.S. Fish and Wildlife Service (USFWS or the "Service") issued a Biological Opinion dated August 25, 2009 addressing concerns over potential effects of the C-111 SC Project on CSSS populations and designated sparrow critical habitat, including subpopulation D which is located in the eastern portion of the Everglades just east of Taylor Slough and west of the C-111 Canal. As part of the USFWS Biological Opinion, the South Florida Water Management District (SFWMD or the "District") is required to measure the impact of the C-111 SC Project on sparrows and habitat in subpopulation D. As a result, we were contracted by the District to monitor and provide expert advice regarding potential effects to sparrows breeding in CSSS subpopulation D.

This report is divided into two main sections. **Section 2.0** is an introduction to this report, providing a brief overview of the C-111 SC Project and outlining potential effects on breeding sparrows in CSSS subpopulation D. **Section 3.0** reports the results of field research on sparrow distribution and demography conducted during the 2015 sparrow breeding season. An overview of each of these sections is provided below. The final two sections of this report provide literature cited (**Section 4.0**) and appendices (**Section 5.0**).

Section 2.0

In the USFWS Biological Opinion dated August 29, 2009, the Service concurred with the determination by the U.S. Army Corps of Engineers (USACE or the "Corps") that the C-111 SC Project "may affect, and is likely to affect" the endangered CSSS, and that the project "will affect" designated CSSS critical habitat. Computer simulation modeling indicated that local conditions within CSSS subpopulation D critical habitat may be adversely affected by the C-111 SC Project resulting in an increased hydroperiod in the area. In recent years CSSS numbers have been extremely low in subpopulation D (<10 sparrows typically), and there has been concern over recent declines in all of the small, spatially isolated sparrow subpopulations. The recent declines across all small sparrow subpopulations (A, C, D and F) have been attributed to anthropogenic changes in water flows in the Everglades ecosystem. The federally endangered CSSS is restricted to short-hydroperiod marl prairies in the southern Everglades, and this habitat has been adversely affected by hydrologic changes ranging from too much water in some areas (e.g., subpopulations A and D) to too little water in other areas (e.g., subpopulations C and F). Further, high water levels have been associated with reduced occupancy of sites and reduced reproductive performance. Due to the restricted range of the CSSS and the limited number (and condition) of remaining subpopulations, the potential loss of any sparrow subpopulation increases the probability of extinction for the entire species. Thus, any potential anthropogenic changes to hydrologic conditions in subpopulation D that may adversely affect sparrow breeding habitat must be monitored closely.

Baseline data related to the condition of critical habitat, hydrologic conditions and the sparrow population breeding in CSSS subpopulation D before completion and operation of the C-111 SC Project were established in 2011. All major components of the C-111 SC Project were completed by March 2012, and operations began in summer 2012. The present report focuses on field data collected during 2015 in CSSS subpopulation D only, as part of a continuing study to examine possible effects of the C-111 SC Project on sparrows breeding in this important CSSS subpopulation.

Section 3.0

We observed a mixture of positive and negative trends in the Cape Sable seaside sparrow population in subpopulation D during the 2015 breeding season. The overall number of sparrows in 2015 was close to the number seen in 2014 with many of these birds showing site fidelity between seasons, and we observed the recruitment of a female originally banded as a nestling in subpopulation D in 2014, the second year in a row this has occurred. However, this was the only female detected in subpopulation D in 2015 and two of her three monitored nests failed, leading to very low overall productivity for the subpopulation. Still, it is promising that some successful breeding did occur in subpopulation D for the fourth year in a row, indicating that this ephemeral sparrow subpopulation is still persisting during the operational testing and monitoring stage of the C-111 SC Project.

The main problems facing CSSS subpopulation D continue to be the low population size and highly male-biased sex ratio. Ten of 11 males found in subpopulation D apparently remained unmated in 2015, continuing the trend seen in previous years. Three of the males observed in subpopulation D this year were returning birds that were members of the breeding population in the previous year; however, all of these males remained unmated in 2015. The overall return rate of sparrows in subpopulation D was improved in 2015, which is a positive trend for this subpopulation.

We continue to recommend that intensive ground surveys and nest monitoring be conducted annually to rapidly identify any negative changes that may be caused by future operations of the C-111 SC Project. Banding of sparrows should also be continued because the demographic information being obtained in this small sparrow subpopulation is invaluable. We also suggest that future research be focused on trying to understand causes for the male-biased sex ratio (e.g., radio-tracking females to better understand dispersal patterns) and possible ways to reduce the bias (e.g., perhaps through translocation of females, but only if habitat conditions in subpopulation D improve to the point that this is not detrimental to the overall sparrow population).

We also recommend that consideration be given to conducting additional surveys (e.g., ground surveys using line transects, or acoustic surveys using remote field recorders) in habitat restoration areas to document the recruitment of individuals into these areas enabling managers to assess the success of restoration efforts. Finally, we continue to recommend that monitoring be initiated in CSSS subpopulation C since components of the C-111 SC Project are predicted to have potential effects on designated critical habitat in this area, and as of now no monitoring of this small sparrow subpopulation is being conducted. An added benefit of conducting monitoring in subpopulation C is that we could better examine questions related to dispersal patterns since this is the nearest sparrow subpopulation to subpopulation D.

Acknowledgements

We would like to thank Martha Nungesser, Christina Stylianos, Brian Garrett, and Manny Porras from the South Florida Water Management District for their support and valuable input into the project. We also thank Richard Fike, Sandra Sneckenberger and Mary Peterson from the U.S. Fish and Wildlife Service for all of their help and input related to the CSSS project. We would like to thank many at Everglades National Park, but especially Tylan Dean and Mario Alvarado for providing valuable input and support for our sparrow research over the years. A special thanks to our 2015 field technician Irene Steves for all of her hard work. Finally, we would like to thank Dr. Rick Lathrop, John Bognar and Jim Trimble from the Grant F. Walton Center for Remote Sensing and Spatial Analysis at Rutgers University for their support and assistance with GIS analyses.

2.0 Introduction

2.1 Purpose

The Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*) is an endangered subspecies of the seaside sparrow that is restricted to short-hydroperiod marl prairies of the southern Everglades ecosystem. First listed under the Endangered Species Preservation Act in 1967, the Cape Sable seaside sparrow (hereafter CSSS or just "sparrow") has become an important indicator species for the Everglades and its restoration since the fate of the marl prairies, and thus the sparrow, is closely tied with the seasonal timing and spatial extent of water flows through the Everglades. Recent and past anthropogenic changes to water flows have negatively affected the entire Everglades ecosystem changing the vegetation in sparrow habitat dramatically. Over the past several decades the CSSS has experienced severe population declines due in large part to widespread degradation of the Everglades ecosystem (Pimm et al. 2002; Cassey et al. 2007). However, the sparrow may benefit from unprecedented large-scale habitat restoration efforts currently underway. The Comprehensive Everglades Restoration Plan (CERP) was authorized by the United States Congress as part of the 2000 Water Resources Development Act with a primary goal of restoring natural water flows to the Everglades (CERP 2010). Estimates for the total cost of CERP projects have reached $13.5 billion, with completion of all projects expected to take 50 years (Stern 2013). Since passage of CERP in 2000, the federal government has provided only $1 billion in funding through fiscal 2013 so substantial costs are yet to be incurred. Overall progress towards Everglades restoration is falling short of initial goals; however, the majority of the estimated 390,000 acres of land needed to accomplish CERP projects has already been acquired (Stern 2013). The main purpose of this report is to monitor potential effects on the CSSS by one of the first major CERP restoration projects to be completed and implemented: the C-111 Spreader Canal Western Phase I Project (C-111 SC Project).

The C-111 SC Project is the first CERP project that will directly benefit Everglades National Park (ENP). The project was designed to restore the quantity, timing and distribution of water delivered to Florida Bay via Taylor Slough and to improve hydroperiod and hydropattern in the area south of the C-111 Canal known as the Southern Glades and Model Lands. The C-111 SC Project was designed to use a complex system of water detention areas, existing canals, canal plugs, levees, weirs and pump stations to reduce seepage losses from Taylor Slough, Southern Glades and Model Lands (**Figure 2.1**). The U.S. Army Corps of Engineers (USACE or the “Corps”) and the South Florida Water Management District (SFWMD or the “District”) are the parties responsible for the design, construction and implementation of the C-111 SC Project. The U.S Fish and Wildlife Service (USFWS) issued a Biological Opinion dated August 25, 2009 addressing concerns over potential effects of the C-111 SC Project on CSSS populations and designated sparrow critical habitat (USFWS 2009). In this opinion, USFWS concurred with the Corps’ determination that the proposed project “may affect, and is likely to affect” the endangered CSSS, and that the project “will affect” designated CSSS critical habitat. These effects are restricted to three of the six extant CSSS subpopulations (B, C and D; **Figure 2.2**). One of these CSSS subpopulations (D) is located directly in the area predicted to be affected by the C-111 SC Project, with the current distribution of this subpopulation centered in the northwestern-central portion of designated critical sparrow habitat located east of Taylor Slough and west of the C-111 Canal. Baseline data related to the condition of critical habitat, hydrologic conditions and the sparrow population breeding in CSSS subpopulation D before completion and operation of the C-111 SC Project were established in 2011 (Virzi et al. 2011a).

Major construction began on the C-111 SC Project during SFWMD water year 2011 (WY2011; 01-May 2010 – 30-Apr 2011). By the end of WY2011 most earthwork and major construction of all project components were completed. During WY2012, the C-111 SC Project was entirely completed (March 2012). During WY2013, operations commenced (summer 2012). Presently, the project is in the regular operational and monitoring stage. Hydrologic monitoring results are reported annually, and the first *Annual Permit Report for C-111 Spreader Canal Phase I (Western) Project* was completed in 2014 (SFWMD 2014).

Operations of the C-111 SC Project are in accordance with the Interim Operational Plan (IOP) for protection of the CSSS. As part of IOP requirements, pumping from project pump stations must cease when gages in certain water monitoring stations located within CSSS designated critical habitat exceed predetermined limits (10 cm) during the critical portion of the CSSS nesting season (15 Mar – 30 Jun) as identified by USFWS. There are 13 water monitoring stations covered in the hydrometeorologic monitoring plan (**Figure 2.3**). Two of the stations collect rainfall data (S-177 and S-18C), and the other stations measure flows and/or stages in the project area. The main water station being monitored in CSSS designated critical habitat is SWEVER4 which is located near the current sparrow subpopulation; three additional stations were installed by SFWMD in areas in closer proximity to known CSSS breeding locations (CSSSD1, CSSSD2 and CSSSD3).

Since the initial baseline report issued in 2011 (Virzi et al. 2011a), annual monitoring of breeding sparrows in CSSS subpopulation D has been conducted (Virzi and Davis 2012a, Virzi and Davis 2013a, Virzi and Davis 2014). The present report focuses on field data collected during the 2015 sparrow breeding season in CSSS subpopulation D only, as part of our continuing study to examine the potential effects of the C-111 SC Project on sparrows breeding in this important CSSS subpopulation.

2.2 Figures

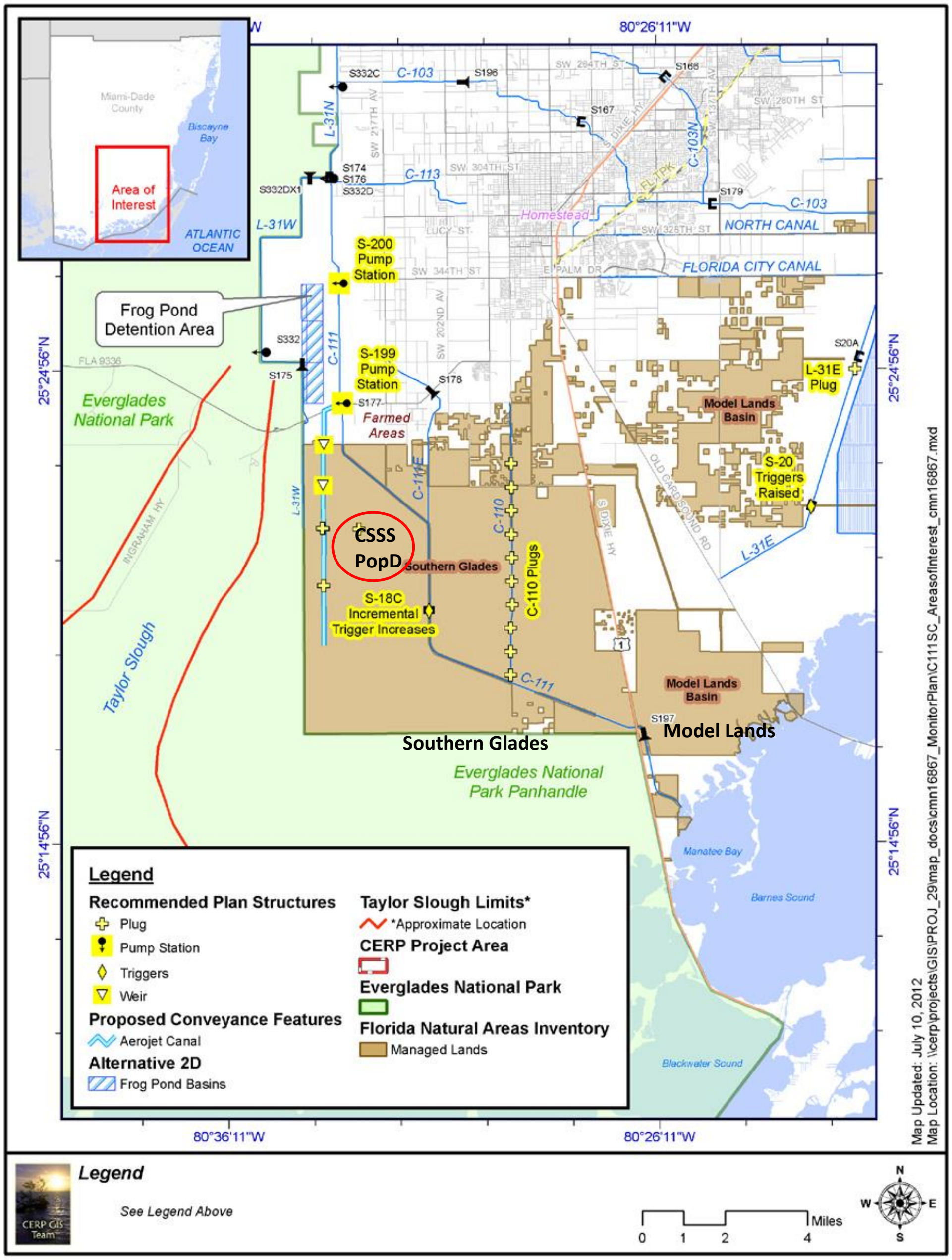


Figure 2.1: Map of C-111 SCW Project Features. Map taken from SFWMD *Annual Permit Report for C-111 Spreader Canal Phase I (Western) Project* (SFWMD 2014). Approximate location of Cape Sable seaside sparrow (CSSS) subpopulation D indicted by red circle (added to map).

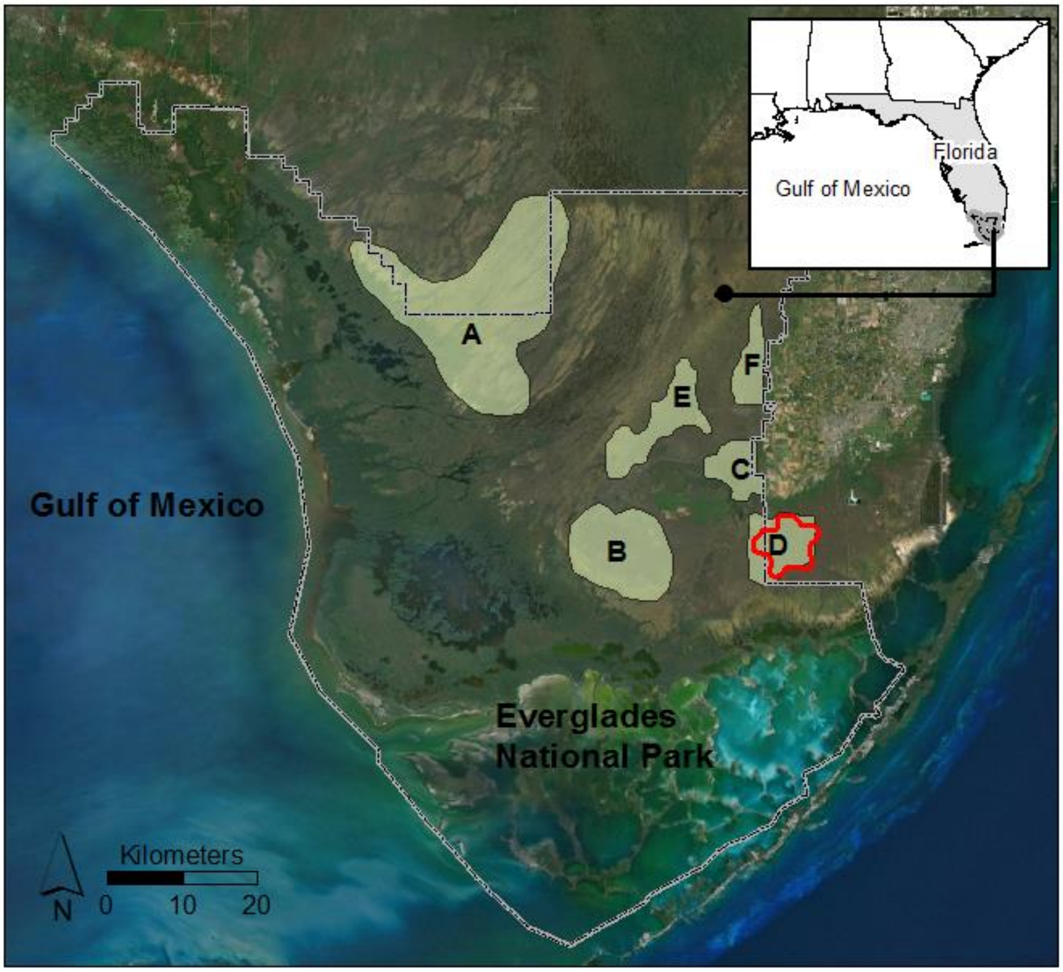


Figure 2.2: Cape Sable seaside sparrow (CSSS) distribution in the Florida Everglades. Green-shaded areas represent historic extent of CSSS habitat (2000 data) by sparrow subpopulation (A through F). Red line indicates current (2007) CSSS critical habitat boundary in sparrow subpopulation D. Dashed line indicates boundary of Everglades National Park.

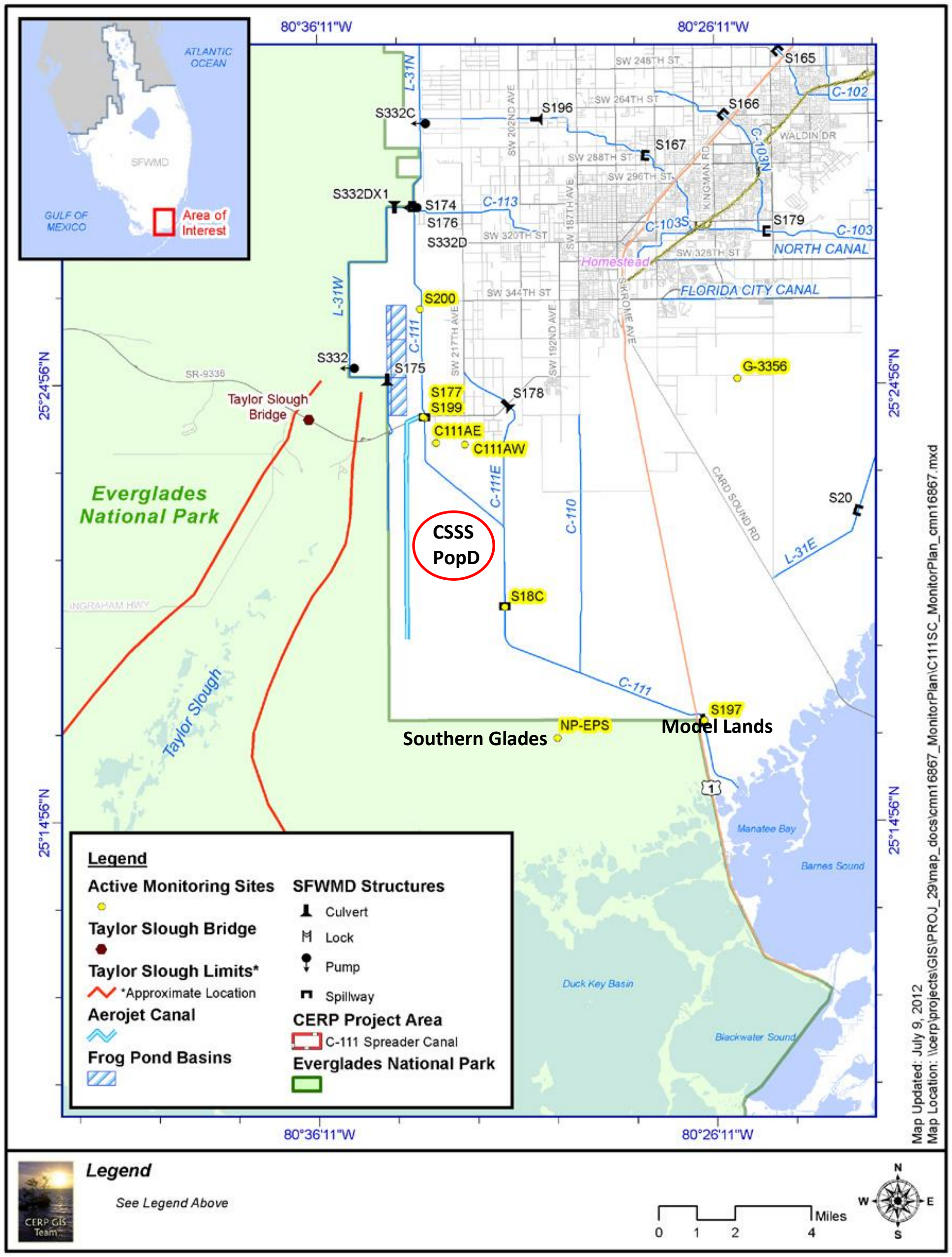


Figure 2.3: Map of C-111 SCW Project Monitoring Stations. Map taken from SFWMD *Annual Permit Report for C-111 Spreader Canal Phase I (Western) Project* (SFWMD 2014). Approximate location of Cape Sable seaside sparrow (CSSS) subpopulation D indicted by red circle (added to map). Monitoring stations located in CSSS designated critical habitat (SWEVER4, CSSSD1, CSSSD2, and CSSSD3) not included on map; stations are located within red circle added to map.

3.0 Cape Sable Seaside Sparrow Distribution and Demography in Subpopulation D

3.1 Background

Early field research on Cape Sable seaside sparrows breeding in subpopulation D began in 1981 when Everglades National Park (ENP) conducted the first rangewide surveys for sparrows in all suitable habitat found in all sparrow subpopulations identified (A through F; see **Figure 2.2** above). These surveys, conducted annually since 1992, have provided valuable information about trends in the status and distribution of sparrows in subpopulation D and elsewhere over the past three decades. More intensive field research in small sparrow subpopulations was started by Rutgers University in 2006 providing the first information on the breeding success and dispersal of sparrows in subpopulation D. This research, funded by ENP and the U.S. Fish and Wildlife Service (USFWS), was conducted annually until 2010 providing a wealth of demographic data about the sparrows recently attempting to breed in subpopulation D (USFWS 2009, Lockwood et al. 2010). During 2011-2014 additional sparrow research in CSSS subpopulation D was funded by the South Florida Water Management District (SFWMD or the "District") to gather baseline data about sparrows breeding in this subpopulation and to study potential effects caused by hydrologic changes that are anticipated to occur in this CSSS subpopulation as a result of the C-111 SC Project, which could have detrimental effects on sparrow habitat in this area (Virzi et al. 2011a, Virzi and Davis 2012a, Virzi and Davis 2013a, Virzi and Davis 2014). During 2015, Ecostudies Institute was contracted by the District to conduct additional field research during the sparrow breeding season in an ongoing effort to study the effects of the C-111 SC Project during the regular operational and monitoring period. Our main objective of the current study was to gather distributional and demographic data on sparrows breeding in CSSS subpopulation D.

3.2 Methods

3.2.1 Ground Surveys

During 2015, we conducted intensive ground surveys in subpopulation D throughout the CSSS breeding season. Ground surveys began on 19 Mar and continued until 8 Jul. Our field season was extended until early July due to prolonged dry field conditions as a result of an area-wide drought in South Florida. Thus, our field season in 2015 was initiated earlier and ran longer than most other years.

Surveys were conducted two days per week on average, typically by two researchers (range 2-4). Researchers walked into the core area in sparrow subpopulation D east of Aerojet Road and south of the East-West Road, intensely surveying the area between the following ENP helicopter survey sites: rprse-22 to 24 and rprse-31 to 33 (**Figure 3.1**). Our ground surveys were focused on this core area since this is where sparrows nested in subpopulation D in recent years (2006-2014) and where intensive monitoring was conducted to obtain baseline data on sparrows and vegetation in 2011 (Virzi et al. 2011a, Virzi and Davis 2012a, Virzi and Davis 2013a, Virzi and Davis 2014). Further, we expected sparrows to establish territories in 2015 in the same area where males held territories in 2014 due to strong philopatry and the influence of conspecific attraction on territory establishment of any returning or new male sparrows in the subpopulation this year (Virzi et al. 2012).

During ground surveys researchers recorded the location of any sparrows observed and documented behavior. Locations were recorded with a handheld GPS device (Garmin GPSmap 76CSx) for later analysis in a geographic information system including territory mapping. During surveys, singing male sparrows typically are observed first since they are more conspicuous. Females are more difficult to locate. As such, any time a male sparrow was encountered additional time was spent in that area in an attempt to document the presence of a female on the territory (typically 1-2 hrs, often over several occasions). If a female was observed on a particular territory additional time was spent in an attempt to document breeding. Often, an entire morning may be spent trying to locate a single nest if breeding behavior is observed.

In addition to our intensive ground surveys and nest monitoring in CSSS subpopulation D, we also obtained and reviewed real-time data from the ENP rangewide helicopter surveys conducted in the subpopulation during 2015. If any sparrows were detected in areas in subpopulation D that were outside our study plot we planned to conduct intensive ground surveys in those areas, if feasible, in order to determine if sparrows were breeding since the ENP rangewide helicopter surveys only detect presence/absence of sparrows and do not confirm breeding.

During 2015 we modified our survey technique somewhat to ensure complete coverage of our study plot in subpopulation D. In previous years, we conducted ground surveys by exploring the area described above without systematically tracking the extent of our coverage of our study plot. While we feel that we adequately surveyed the entire subpopulation in the past due to the intensity and duration of our surveys, we decided to modify our survey method in 2015 to systematically survey a fixed area using line transects (**Figure 3.2**). This was implemented for two reasons: (1) to ensure that we surveyed the entire area contained within our main study plot with consistent effort throughout the entire sparrow breeding season, and (2) we were interested in examining the feasibility of using distance sampling along line transects to obtain a precise density estimate for sparrows breeding on our study plot. The distance data collected in CSSS subpopulation D during 2015 are not analyzed in this report. Rather, these data are included in an analysis that is currently being conducted as part of a larger study for the USFWS comparing CSSS density estimates derived using distance sampling with estimates based on the ENP rangewide helicopter surveys (Virzi et al. 2015, In Prep).

3.2.2 Nest Monitoring

We monitored all nests found in subpopulation D until completion of the nesting attempt (fledging or failing). After nests were found the locations were recorded with a handheld GPS device and marked with flagging tape tied to vegetation in order to facilitate relocation of the nests for monitoring. Nests were visited multiple times (1 day per week on average) during the incubation and brooding periods (approximately 12 and 9 days, respectively) in order to determine their fate. Dataloggers (DS1921G-F5 Thermochron iButtons) were also used to help determine the fate of monitored nests; these are placed in the bottom of the nest cup underneath the eggs or nestlings and record the temperature at 15 minute intervals. The iButtons enabled us to reduce the frequency (and related disturbance) of physical nest checks while recording precise data on the timing of nest failures, which provides useful information aiding in the determination of the final fate of nests.

Researchers recorded the fate of nests as successful (fledged at least one nestling) or failed (loss of entire brood) and documented any evidence of probable cause of failure. We report apparent productivity measures (e.g., hatch rate, fledge rate, nestlings per successful pair, clutch size) rather than more sophisticated daily nest survival rates (e.g., using logistic models in Program MARK) due to the small sample size expected in subpopulation D. Hatch rate is the proportion of nests found that hatch; fledge rate is the proportion of broods (i.e., hatched nests) that fledge at least one nestling; nestlings per successful pair is the total number of nestlings fledged in the subpopulation divided by the total number of "successful" breeding pairs; clutch size is the mean number of eggs laid per nest attempt.

3.2.3 Mark-Recapture Data

In order to study demographic patterns in subpopulation D we continued to color-band individual sparrows and resight previously color-banded individuals to gain information for a long-term mark-recapture study of the CSSS. Sparrows were captured on breeding territories using mist-nets, following well-established protocols. Leg bands were applied to all sparrows captured to enable later identification of individuals. We placed a metal USFWS band and three plastic color bands on each sparrow's legs; the combination of which identifies an individual. Our ground surveys included resighting previously color-banded individuals which could be done with binoculars or a spotting scope rather than recapturing individuals thus limiting handling.

3.3 Results and Discussion

3.3.1 Current Status and Distribution

Subpopulation D had experienced a continual decline since its 1981 estimate of 400 sparrows. Since 2000, habitat in this area appeared to have suffered from high water levels. Consequently, sawgrass continues to dominate the area with only small drier patches of muhly grass acting as island refuges for breeding sparrows. These patches of suitable habitat may have increased moderately in recent years, due in part to prolonged drought conditions that prevailed in recent years in South Florida (Virzi et al. 2011a). It is possible that the sparrow population has responded favorably in recent years as a result of these recent habitat changes, and we did observe some additional positive trends during the 2012 and 2013 breeding seasons (Virzi and Davis 2012a, Virzi and Davis 2013a), and in particular 2014 (Virzi and Davis 2014).

Despite continuing to hold very few Cape Sable seaside sparrows, 2015 was a somewhat encouraging year for subpopulation D. For the fourth consecutive year sparrows nested successfully in subpopulation D. The total number of males (11-12) was similar to 2014; however, there was only one female present in the subpopulation, a decrease from the three observed in 2014. While it is too soon after commencement of operations of the C-111 SC Project to evaluate the success of the project, our data clearly indicates that sparrows are still able to use habitat in subpopulation D and breed successfully after initial implementation and operation of the project. One important caveat, however, is that in 2015 meteorological conditions were very favorable for an extended sparrow breeding season so our data should not be used as an indication that the C-111 SC Project is currently improving sparrow habitat in subpopulation D. Still, we are encouraged by our data and SFWMD is also encouraged by the observed hydrologic patterns in Taylor Slough so far, indicating that the project has operated smoothly and as expected (SFWMD 2015a).

Intensive ground surveys were conducted in subpopulation D over a 16-week period during the 2015 sparrow breeding season. All sparrows detected in our ground surveys in subpopulation D during 2015 were located between Aerojet Road and the C-111 Canal, all on SFWMD land

(**Figure 3.3** and **Appendix 2**). The core CSSS population was located in the same area where sparrows occurred in subpopulation D in the previous four years. We walked into our study plot from Aerojet Road to the ENP helicopter survey site “rprse-22” along the former dirt road created by SFWMD to a new water monitoring station (CSSSD1) that was constructed in 2011, which is still marginally visible on the landscape. We intensively surveyed the area extending from “rprse-22” east to “rprse-24”, then south to “rprse-33” and west to “rprse-31”. A defined study plot boundary was established in 2015 corresponding to this area and including most of the sparrow territories from 2014 (**Figure 3.3**).

The overall number of territorial males (11-12) in subpopulation D in 2015 was similar to that observed in 2014, but more previously color-banded males (7) were resighted in 2015 than in any other season. The eleven male sparrows observed in our study plot in subpopulation D in 2015 tied with the previous high observed in 2014 and is the highest number of males observed in any year subpopulation D has been monitored (since 2006). However, only six of these males held stable territories throughout the season and only one male was paired. Three male sparrows were also detected by ENP during their rangewide helicopter surveys in areas separate from our study plot (39 survey sites were visited in subpopulation D during 2015; M. Alvarado, personal communication). It is unknown whether these are additional individuals as several territory holders in the NW corner of the study plot had disappeared by the time of the ENP rangewide helicopter surveys in subpopulation D. Thus, the total number of male sparrows detected in all areas of subpopulation D in 2015 ranged from 11 to 15 individuals. We were unable to locate any other sparrows during additional ground surveys conducted in June (when core area sparrows were still readily singing) in restored habitat north of the East-West road or at the ENP survey points that had sparrow detections west of Aerojet road (rprse-38) and east of the C-111 and C-111E junction (rprse-17).

Seven of the male sparrows detected in our study plot in 2015 were returning males that were also present in subpopulation D in 2014 (see **Section 3.3.3** below); however, only one of these males was mated in 2015. Six of these returning males held stable territories in similar locations to where they were in 2014 while the seventh returning male roamed around the site in both years. Three new males were banded in 2015; two disappeared shortly after banding and the third new male held a stable territory throughout the later part of the season. A male that was present to the NW of our study plot boundary was not banded, and another male observed in the center of the plot did not stay in one location long enough to be banded. These sightings did not overlap in time so it is unknown whether they represent the same or different individuals. Territory mapping was more intensive in 2015 than in previous years beginning on 19 Mar and ending on 2 Jul (territory polygons shown in **Figure 3.3** reflect an average of 43.6 GPS points per individual tracked). The more intensive territory mapping was due to increased sampling effort along line transects implemented in 2015 as part of another study conducted for the USFWS (Virzi et al. 2015, In Prep).

Only one female sparrow was observed in subpopulation D during the 2015 breeding season, marking a reversal of the trend seen in recent years of two to three breeding females. Thus, 10 of the 11 male sparrows observed in subpopulation D (91%) apparently remained unmated. This resulted in a highly male-biased sex ratio of 0.92 in 2015, which is substantially higher than the rate reported in subpopulation D in 2014 (0.79; Virzi and Davis 2014) and represents the highest sex ratio imbalance observed in any CSSS subpopulation since 2008 (T. Virzi, personal observation). Highly male-biased sex ratios are often observed in small sparrow subpopulations in general (Virzi et al. 2011b, Virzi and Davis 2012b, Virzi and Davis 2013b, Slater et al. 2014); however, the current highly-skewed sex ratio in subpopulation D is alarming. The lone female observed in subpopulation D was a newly-recruiting sparrow in the breeding population that was originally banded as a nestling in subpopulation D in 2014. This is the third recruitment event we have observed in subpopulation D since 2014 and the second involving a female (see **Section 3.3.3** below).

3.3.2 Nest Monitoring Results

We located three sparrow nests in subpopulation D in 2015 (**Figure 3.3** and **Appendix 1**), documenting breeding in this subpopulation for the fourth consecutive breeding season. The three nests were all from the single breeding pair present during the 2015 season. The male (ORBL_ORAL) was a returning male that was banded as an adult in subpopulation D in 2014, who did not breed that year. The female (PUWK_ORAL) was banded as a nestling in subpopulation D in 2014; this is her first breeding season. The three males that bred in 2014 (RDDP_ORAL; PUYL_ORAL; WKWH_ORAL) were all seen in 2015, but none of these had mates (see **Section 3.3.3** below).

One of the three nest attempts documented in subpopulation D in 2015 was an early-season nest (i.e., nests that hatched before 1 Jun), which typically have higher nest survival rates than late-season nests (Baiser et al. 2008). This was the only successful nest attempt by the lone breeding pair in subpopulation D for the entire season. This nest (DS-15-08A) was found on 1 May with the young already hatched. The activity of the adults feeding young at the nest alerted us to the presence of the pair; earlier in the season we had only seen the male (and thought he was single) since incubating females can be very discreet. The nest contained three young but one was found dead on the ground under the nest of unknown causes on 4 May. The other two nestlings were still alive at the time and later fledged on 6 May.

The second two nest attempts by this pair had similar outcomes. Both were considered late-season nests: the second nest (DS-15-08B) was found on 22 May and hatched on 4 Jun, while the third nest (DS-15-08C) was found on 25 Jun and hatched on 29 Jun. Both nests failed during the brooding period due to depredation, with evidence suggesting predation by a large avian predator such as a crow. The second nest was completely destroyed by the predator, and the iButtons were carried away and lost in both events. Rodents generally drop iButtons under the nest after chewing on them, where they can be recovered. Further, crows were often seen in the hammocks within 600 m of the sparrow territory and likely were breeding there. The activity of the parents feeding the young during brooding makes this an especially vulnerable time for detection by diurnal visual predators.

The mean clutch size for the three nests found and monitored in subpopulation D was 3.7 eggs per nest (SD = 0.6). All of the nests found hatched (100% hatch rate), and one of the three nests monitored fledged two nestlings in 2015 (33% fledge rate). Only two nestlings in total fledged from subpopulation D in 2015. This equates to an average 2.0 chicks/breeding pair, which is actually higher than the rate reported in large sparrow subpopulation B in 2015 (Virzi et al.

2015, In Prep). This is the third year in a row that we reported stronger than average productivity for subpopulation D compared to other CSSS subpopulations under study in ENP. However, overall productivity for all subpopulations under study in 2015 was lower than during the previous two seasons (Virzi et al. 2015, In Prep).

While annual productivity (per pair) in subpopulation D was above that observed in other subpopulations in 2015, total recruitment remains extremely low due to the small population size and lack of breeding females. Although small sample size limits comparative analyses, the average clutch size, apparent hatch and fledge rates, and productivity per pair compare favorably to similar rates observed in other CSSS subpopulations and provides evidence that successful breeding can still occur in subpopulation D as the C-111 SC Project entered its operational testing and monitoring phase (Baiser et al. 2008, Lockwood et al. 2010, Boulton et al. 2011, Virzi et al. 2011b, Gilroy et al. 2012a, Virzi and Davis 2012b, Virzi and Davis 2013b, Slater et al. 2014).

3.3.3 Mark-Recapture Data

During 2015, seven male sparrows that were color-banded in previous years were observed in subpopulation D, more than twice the previous high count of three returning males in 2014. One of these male sparrows (RDDP_ORAL) was originally color-banded as an adult in subpopulation D in 2012, making 2015 the fourth consecutive year that this individual was present in the breeding population. This male was a successful breeder in 2014, but his mate did not return this season and he remained unpaired throughout 2015. This is the first ever observation of a male sparrow remaining in subpopulation D for four consecutive years.

The other six returning males were originally color-banded as adults in subpopulation D in 2014. Two of these males were paired and bred in 2014, but remained unpaired throughout the 2015 breeding season. They all held consistent territories in the core area during the 2015 season, with the exception of WKWH_ORAL, who was prone to wandering in in both 2014 and 2015.

None of the color-banded females that attempted to breed in subpopulation D in 2014 were seen in 2015. We suspect that two of those females likely had died or emigrated during the 2014 season, but the third successful female (RDBK_ORAL) was still present at the end of the field season in late June. The only female present in subpopulation D in 2015 was a daughter (PUWK_ORAL) that had fledged from the second of three nest attempts from the 2014 successful breeding pair in the subpopulation. This resight represents the third recruitment event observed into subpopulation D, and the second event involving a female that fledged from subpopulation D.

In total, during 2015 we resighted seven of the 13 color-banded adult sparrows (seven of 11 males and zero of two females) that were present in the breeding population in 2014. Thus, we observed a return rate of 0.62 for adult sparrows, which is in line with the rate expected (~0.60) based on previous CSSS research (Boulton et al. 2009, Gilroy et al. 2012b). We banded the remaining unbanded male sparrows observed in our study plot in subpopulation D in 2015. This brought the total color-banded sparrow population to 11 adult sparrows by the end of the 2015 field season (**Table 3.1**). One male sparrow without a well-defined territory remained unbanded at the end of the 2015 field season.

The recruitment of the female sparrow into subpopulation D described above was the only return of a previously color-banded nestling that was banded in the subpopulation in the previous year. In total, 12 nestlings were banded in subpopulation D in 2014; so the return of a single individual in this cohort equates to a 0.08 return rate, which is very low. However, only six of those banded nestlings are known to have fledged equating to an adjusted 0.17 return rate, which is more in line with expectations for juvenile sparrows (Boulton et al. 2009, Gilroy et al. 2012a). No nestlings, fledglings or free-flying juveniles were color-banded in subpopulation D in 2015.

3.3.4 Hydrologic Data

For the second year in a row South Florida experienced very dry conditions, particularly in Miami-Dade County, Everglades National Park and the Southern Glades areas. Dry conditions prevailed during the periods prior to the 2015 CSSS breeding season, including the 2014 CSSS breeding season and winter 2014-2015. According to the SFWMD, water year 2014 (WY2014; May 1, 2013 – April 30, 2014) had moderately above average rainfall overall (55.1 inches compared to the historical average of 52.8 inches), but ENP and the Southern Glades had below average rainfall during the period. The transition from neutral El Niño conditions to the development of a more intense and ongoing El Niño event led to inactive hurricane seasons over the past two years and contributed towards the severely dry conditions in South Florida. WY2015 (May 1, 2014 – April 30, 2015) was moderately drier than average (51.1 inches), but again conditions in ENP and Miami-Dade County were much drier than areas further north (e.g., ENP reported a -10.5 inch rainfall deficit). Thus, the period leading up to and including the 2015 CSSS breeding season was much drier than normal as we observed in the field this year.

A brief analysis of 2015 hydrologic data shows the extent of the dry conditions in CSSS subpopulation D this year. Rainfall data from the SFWMD DBHYDRO database at the nearest meteorological monitoring station to CSSS subpopulation D (S-18C) was reviewed for the period immediately prior to (Jan – Feb) and including (Mar – Jul) the 2015 sparrow breeding season (**Figure 3.4**; SFWMD 2015b). These data clearly show that overall the 2015 sparrow breeding season was much drier than the previous year. In fact, the U.S. Drought Monitor indicated that the lower east coast of Florida saw some of the driest conditions in the region, with severe drought conditions in Miami-Dade County. Meteorological conditions were dry overall during the 2015 CSSS breeding season, but there was some within-season variability that we review below (information provided by SFWMD 2015c).

The dry season in South Florida typically runs from mid-October to mid-May, with these two months being considered transition months. Average rainfall during the dry season is 18 inches which represents only one-third of the total annual rainfall. Cape Sable seaside sparrows time their breeding season with the peak of the dry season; March, April and May have the lowest rainfall totals historically. March 2015 was much drier than average (38% below average throughout the 16 counties within the SFWMD). April 2015 actually reported above average rainfall (171% above average in all 16 counties), and Miami-Dade county was among the wettest areas. However, much of the rainfall in the area surrounding CSSS subpopulation D occurred during a single extreme weather event on 29-30 Apr (**Figure 3.4**). During this rainfall event water levels rose substantially (**Table 3.2**; **Figure 3.5**) and we observed a high rate of nest failure in all CSSS subpopulations being monitored in 2015 following this rain event (Virzi et al. 2015, In Prep). Fortunately for the sparrow, May 2015 ended up being a very dry month with rainfall below average in all counties (51% of average). SFWMD meteorologist believe the strong El Niño conditions that prevailed helped to inhibit the normal sea-breeze cycle in May which reduced rainfall overall.

The month of May typically transitions into the rainy season in South Florida. Average rainfall during the rainy season is 35 inches (two-thirds of annual rainfall). June is historically the wettest month in South Florida. Rainfall during the remainder of rainy season is more variable, and is affected more by tropical activity. June 2015 reported below-average rainfall (74% of average), and again the lower east coast of Florida saw the driest conditions (ranging from abnormally dry to severe drought conditions according to the U.S. Drought Monitor). Thus, we observed a dry down of sparrow habitat in subpopulation D (and elsewhere) in May and June which led to improved breeding conditions for the sparrow. The dry conditions continued into July 2015 with rainfall 84% below average for the wet season to date by the end of the month. Rainfall did pick up in late-July, however, areas were still experiencing multi-month rainfall deficits due to the severe drought conditions that prevailed during the dry season. Overall, the CSSS breeding season was extended in 2015 due to the severely dry conditions, but the effect of the drought on annual breeding success remains a question.

Similar to 2014, the favorable current year hydrologic/meteorologic conditions likely led to more favorable breeding conditions across a larger area of habitat in subpopulation D than is typical in an average year. It is possible that the dry conditions that have prevailed in South Florida over the past two years, and particularly in the area surrounding CSSS subpopulation D, may have contributed towards the recent observed increase in sparrow density in this subpopulation. However, the increased sparrow density should not be interpreted to suggest that habitat conditions have improved in subpopulation D. This is unlikely because hydrologic conditions in the subpopulation have not improved to the point that would create more favorable CSSS habitat conditions (J. Sah, personal communication). Further, most CSSS activity including the only sparrows to actually nest in subpopulation D this year remained in the area of higher ground where sparrows have nested successfully in recent years. This could be an indication that habitat in this area is still more favorable for breeding, but it could also be due to strong site fidelity or the influence of conspecific attraction, both of which are known to occur in the CSSS (Virzi et al. 2012).

3.3.5 Conclusions

Once again, our research in CSSS subpopulation D in 2015 continued to show some encouraging trends for this small, ephemeral sparrow subpopulation. Perhaps most encouraging is the fact that for the fourth consecutive year sparrows nested successfully in subpopulation D. It is also encouraging that we observed a similar number of territorial male sparrows in the subpopulation in 2015 compared to 2014 with 11 to 12 males detected over the course of the breeding season. However, on a negative note there was a highly imbalanced sex ratio in subpopulation D as we observed only one female there in 2015. The sole breeding pair in the subpopulation did raise one successful brood (in three nest attempts) in 2015. Overall productivity for this subpopulation, however, remains extremely low due to the very small population size and a severe lack of female sparrows. It remains unknown as to why we continue to observe so few females in subpopulation D despite the presence of so many male sparrows for the second consecutive year. While total productivity in subpopulation D remains extremely low, the data collected this year offers evidence that this subpopulation continues to persist during the normal operational and monitoring phase of the C-111 SC Project.

For the second year in a row, the overall return rate of sparrows in subpopulation D was much improved compared to past years; another positive trend for the subpopulation. In fact, during 2015 we observed a record number of returning males (7) that were color-banded in previous years. Unfortunately, neither of the two color-banded females from 2014 returned to breed in subpopulation D in 2015. The fate of these individuals is unknown at this time, and our current understanding of sex-related dispersal patterns for the CSSS remains limited. The only female sparrow present in subpopulation D in 2015 was an individual that fledged from one of the successful nests in the subpopulation in the previous year. While it is encouraging that we continue to observe recruitment events in the subpopulation (this is the third such event documented), recruitment remains quite low due to the overall low annual productivity in this small sparrow subpopulation.

Although there are once again encouraging signs that CSSS subpopulation D is persisting, we continue to offer some words of caution regarding this small sparrow subpopulation. It should be stressed that this subpopulation remains well below the size predicted to be necessary for a healthy CSSS subpopulation (20 pairs) and thus is still subject to extreme risk of local extinction. We hypothesize that the high number of males being detected in subpopulation D over the past two years may be more a function of the extremely dry conditions in South Florida than improving habitat conditions in the area. We suspect that if meteorological conditions return to more normal conditions we could see another rapid decline in the number of males in this subpopulation as individuals disperse to other areas with more suitable habitat. Further, until more females disperse into subpopulation D the longer-term persistence of this ephemeral subpopulation remains in question. Thus, intensive monitoring of CSSS subpopulation D is recommended in order to detect any rapid changes in demographic parameters or population declines. We also suggest that more research be conducted on possible causes for the highly-skewed sex ratio observed in the subpopulation (e.g., by radio-tracking females to better understand dispersal patterns), and explore possible solutions (e.g., translocation of females into subpopulation D).

3.4 Tables and Figures

Table 3.1: Color-banded adult Cape Sable seaside sparrows resighted or newly-banded in subpopulation D in 2015. Three adult sparrows were newly-banded in 2015 (all male). One male sparrow was originally color-banded in 2012 (in subpopulation D). Two sparrows were returning breeders from 2014 and four others were returning non-breeding adults from 2014; only one of these males bred in 2015. The only female was originally banded as a nestling in 2014 (as indicated below). Colors: AL = aluminum, BK = black, BL=blue, DP=dark pink, GR = green, LG = light green, OR = orange, PU = purple, RD = red, RW = red-white, WH=white, WK = white-black, YL = yellow.

USFWS Band #	Banding_Date	Color_Left	Color_Right	Sex	Notes
2291-49530	05/11/12	RDDP	ORAL	M	Returning breeder from Pop D; did not breed in 2015
2291-49630	04/04/14	WKWH	ORAL	M	Returning breeder from Pop D; did not breed in 2015
2291-49631	04/04/14	PUYL	ORAL	M	Returning breeder from Pop D; did not breed in 2015
2291-49632	04/11/14	LGRW	ORAL	M	Returning adult from Pop D
2291-49636	04/23/14	WKRD	ORAL	M	Returning adult from Pop D
2291-49655	5/7/2014	PUWK	ORAL	F	Originally banded as nestling in Pop D; breeding 2015
2291-49660	05/12/14	ORBL	ORAL	M	Returning adult from Pop D; breeding in 2015
2291-49663	05/23/14	YLDP	ORAL	M	Returning adult from Pop D
2291-49727	04/03/15	BLBK	ORAL	M	Newly banded adult
2291-49734	05/04/15	RWBL	ORAL	M	Newly banded adult
2291-49737	05/19/15	DPBK	ORAL	M	Newly banded adult

Table 3.2: Mean and maximum monthly water depths (WD) at South Florida Water Management District (SFWMD) water monitoring station CSSSD1 in Cape Sable seaside sparrow subpopulation D in 2014 and 2015. Data provided by the SFWMD DBHYDRO Database (SFWMD 2015b).

	Mean WD			**Max WD**	
Month	**2014**	**2015**		**2014**	**2015**
Jan	0.04	0.02		0.26	0.25
Feb	0.07	0.04		1.15	0.50
Mar	0.06	0.04		0.66	0.44
Apr	0.03	0.28		0.55	5.78
May	0.05	0.05		0.87	1.38
Jun	0.36	0.15		2.14	1.38
Jul	0.30	0.12		2.98	0.96

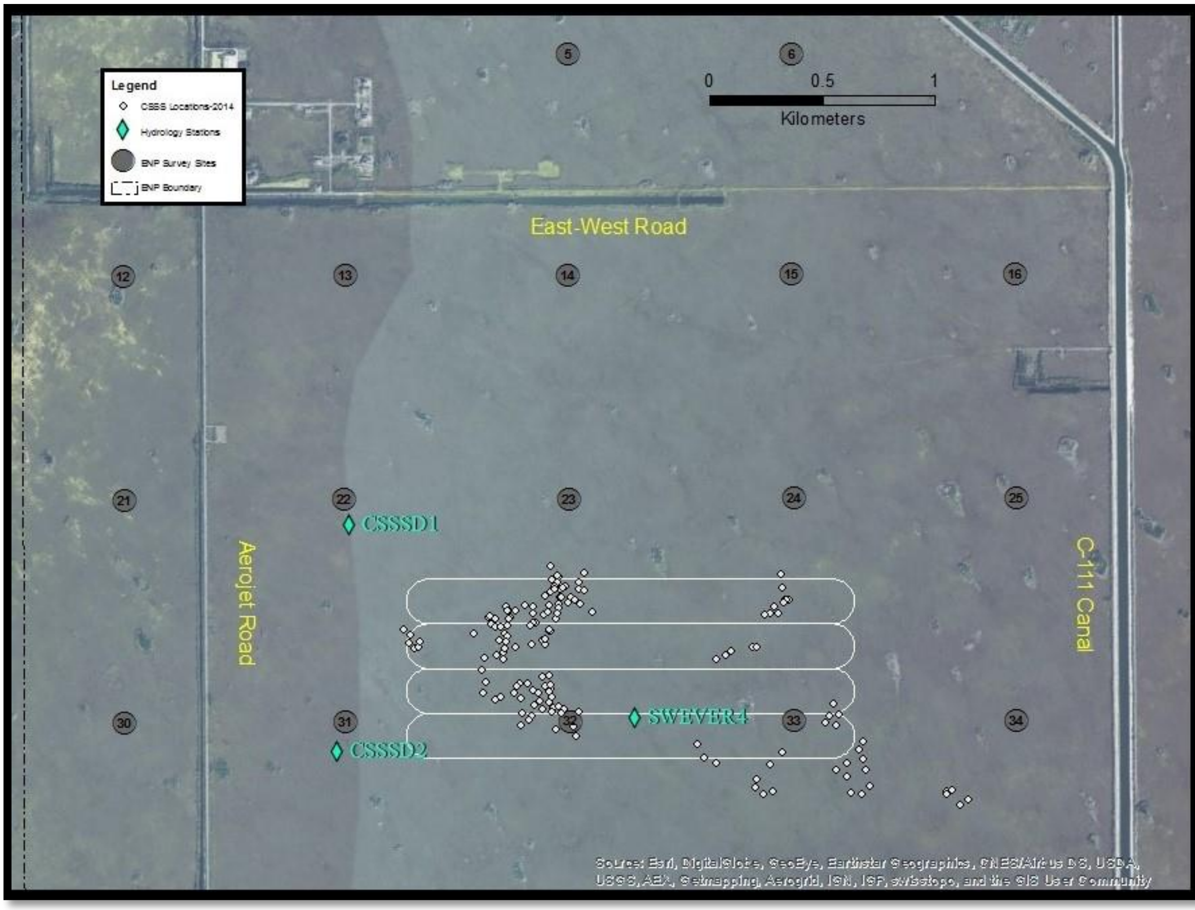


Figure 3.1: Map of 2015 study area in Cape Sable seaside sparrow (CSSS) subpopulation D. CSSS ground surveys were conducted in all areas east of Aerojet Road and west of the C-111 Canal where sparrows were located during the 2014 field season (small grey circles). Survey effort was focused on the white-outlined transect grid between Everglades National Park (ENP) helicopter survey sites (large, numbered grey circles) rprse-22 to 24 and rprse-31 to 33. However, surveys were also conducted in areas north, east and west of the main study area, including north of the East-West Road in the habitat restoration area where a controlled burn was conducted in 2010 and where woody vegetation removal was conducted in 2012, and near two points (rprse-17 and rprse-38, not shown here) where the ENP helicopter survey detected sparrows outside of the core area.

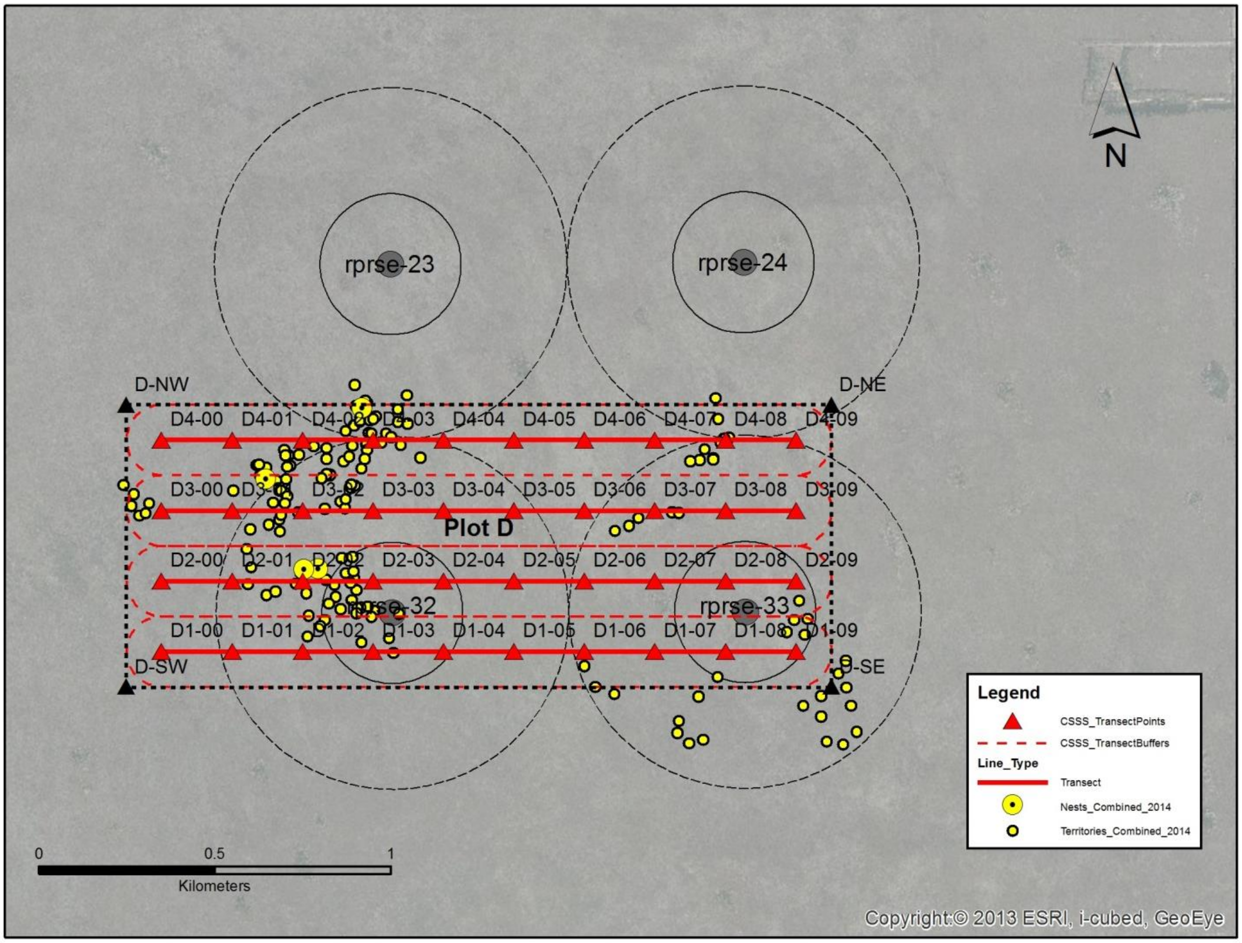


Figure 3.2: Study design for line transect surveys conducted in Cape Sable seaside sparrow (CSSS) subpopulation D during the 2015 breeding season. Grey circles correspond to Everglades National Park (ENP) helicopter survey sites (labeled with site name). ENP survey sites buffered by 200 m (solid line) and 500 m (dashed line) to show potential distances where CSSS may be detected during point counts. Yellow circles correspond to locations of CSSS nests found during 2014 and yellow dots represent 2014 territory points, which were used to select the location of transects in 2015. Solid red lines represent line transects, dashed red lines are 100 m buffers surrounding line transects, and triangles represent transect survey points. The dark black dashed line represents the study plot boundary for demographic monitoring; however, observers also monitored sparrows that moved off-plot in 2015.

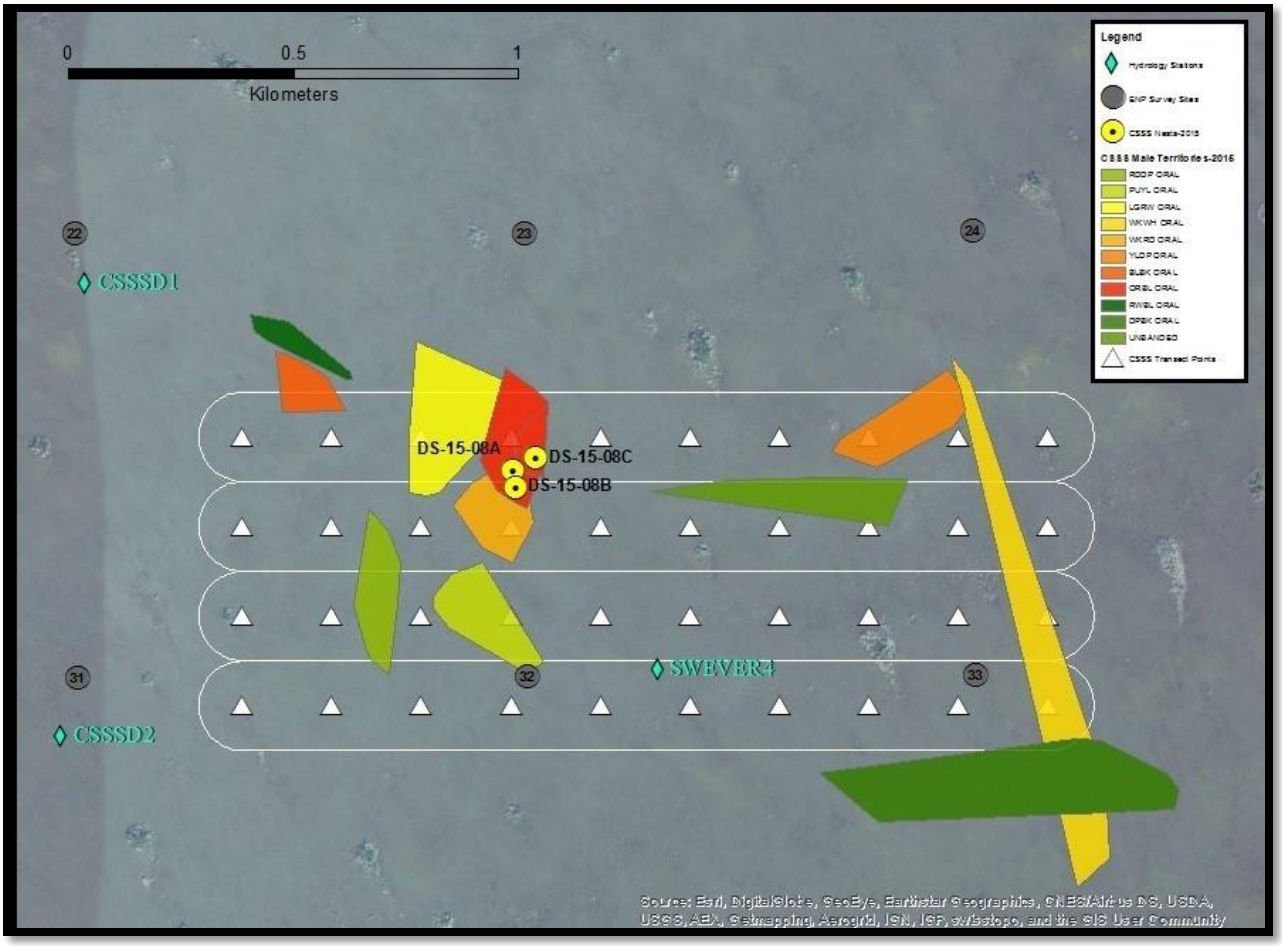
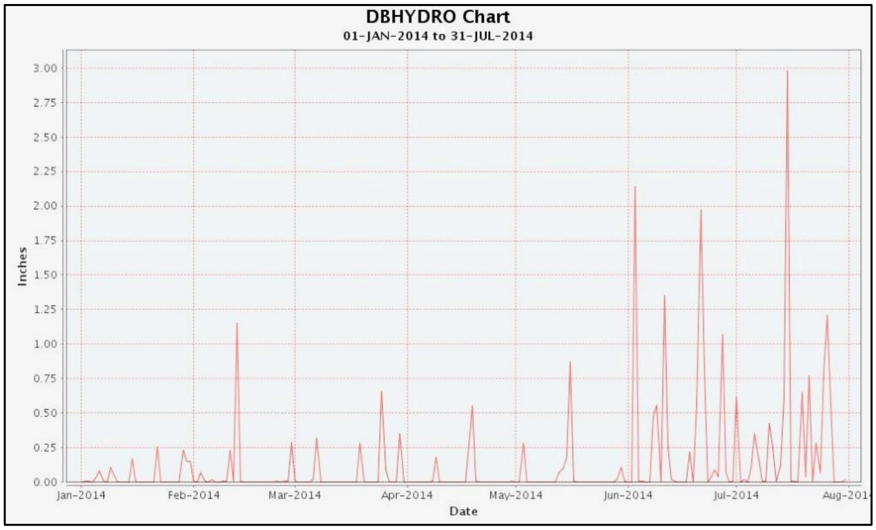
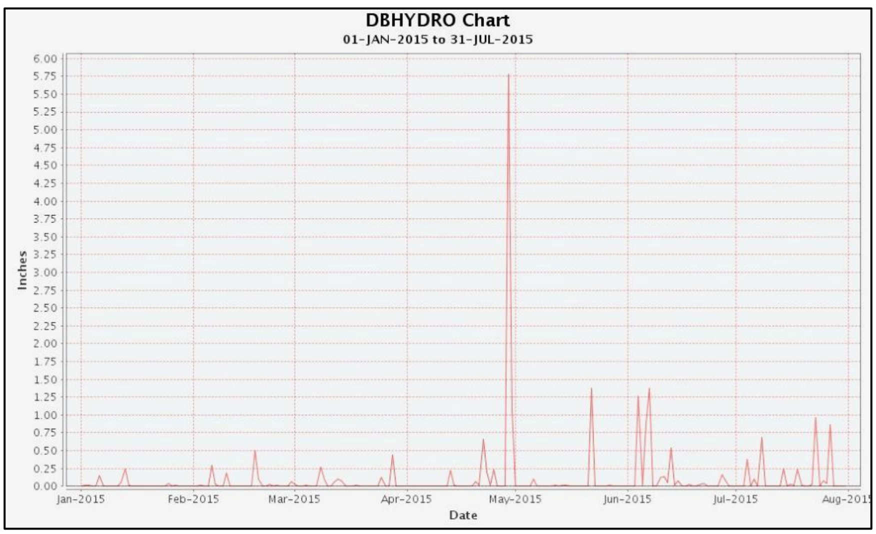


Figure 3.3: Location of Cape Sable seaside sparrow (CSSS) territories in subpopulation D during the 2015 breeding season. Numbered grey circles correspond to Everglades National Park helicopter survey sites. Eleven male sparrows were observed singing on apparent territories during 2015; only one of these males was paired and nested. Territories are color-coded by unique color-band combinations for each male sparrow. Yellow circles correspond to locations of sparrow nests monitored during 2015, and white triangles represent transect survey points.

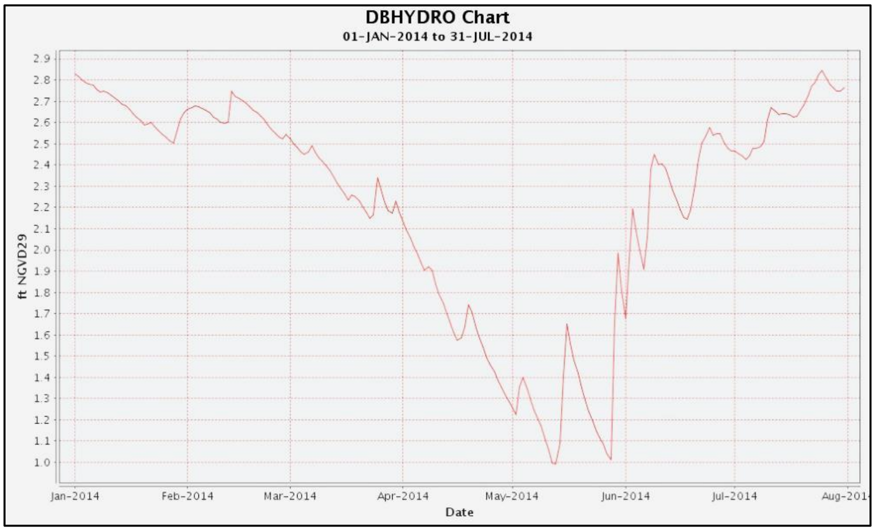


(a)

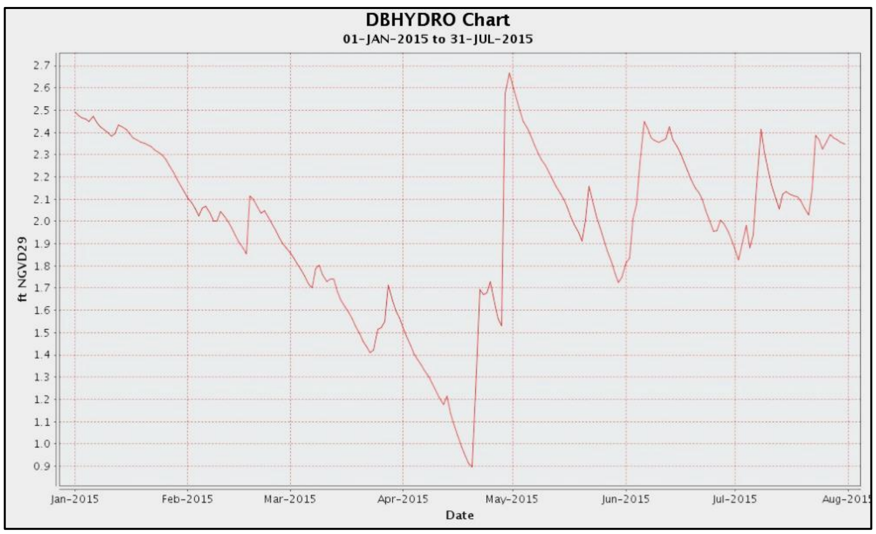


(b)

Figure 3.4: Daily total rainfall plots for the S-18C monitoring station located in Cape Sable seaside sparrow subpopulation D during the sparrow breeding season (January – July) for the past two years: (a) 2014 and (b) 2015. Plots taken from the South Florida Water Management DBHYDRO Database (SFWMD 2015b).



(a)



(b)

Figure 3.5: Daily mean water depth plots for the CSSSD1 monitoring station located in Cape Sable seaside sparrow subpopulation D during the sparrow breeding season (January – July) for the past two years: (a) 2014 and (b) 2015. Data for other monitoring stations in sparrow subpopulation D (CSSSD2, CSSSD3 and SWEVER4) not presented here, but showed similar trends. Plots taken from the South Florida Water Management DBHYDRO Database (SFWMD 2015b).

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5.0 Appendices

5.1 Appendix 1

Appendix 1: Location of all Cape Sable seaside sparrow nests found in subpopulation D in 2015 and their coordinates. The coordinates are in WGS 1984. Nests were found for one pair during the 2015 breeding season (DS-15-08) on the dates indicated. Color combination of male and female sparrow leg bands indicated for each individual of the breeding pair.

Nest_ID	Month	Day	Year	Latitude	Longitude	Male_ID	Female_ID
DS-15-08A	5	1	2015	25.3427672	-80.5498405	ORBL ORAL	PUWK ORAL
DS-15-08B	5	22	2015	25.3424452	-80.5497981	ORBL ORAL	PUWK ORAL
DS-15-08C	6	25	2015	25.3430297	-80.5493366	ORBL ORAL	PUWK ORAL

5.2 Appendix 2

Appendix 2: Location of all Cape Sable seaside sparrow detections in subpopulation D in 2015 and their coordinates. The coordinates are in WGS 1984. Color combination for leg bands indicated when observed (UNB = unbanded).

GPS_ID	Month	Day	Year	Color_Combo	Latitude	Longitude
IDS001	3	19	2015	RDDP ORAL	25.341205	-80.5523019
MJD912	3	19	2015	RDDP ORAL	25.340516	-80.5530349
MJD913	3	19	2015	RDDP ORAL	25.340933	-80.5523844
IDS004	3	19	2015	PUYL ORAL	25.339885	-80.5512359
MJD920	3	19	2015	PUYL ORAL	25.339619	-80.5512978
MJD914	3	19	2015	LGRW ORAL	25.344183	-80.5501308
MJD917	3	19	2015	LGRW ORAL	25.343683	-80.5502207
MJD918	3	19	2015	WKRD ORAL	25.341528	-80.5496602
MJD919	3	19	2015	WKRD ORAL	25.34109	-80.550002
MJD915	3	19	2015	ORBL ORAL	25.344191	-80.5501296
MJD916	3	19	2015	ORBL ORAL	25.343712	-80.5499978
MJD930	3	25	2015	PUYL ORAL	25.339912	-80.5512176
MJD931	3	25	2015	PUYL ORAL	25.3398	-80.5508411
MJD932	3	25	2015	PUYL ORAL	25.339658	-80.550604
IDS012	3	25	2015	LGRW ORAL	25.343216	-80.5515146
IDS013	3	25	2015	LGRW ORAL	25.34411	-80.5502238
IDS014	3	25	2015	LGRW ORAL	25.344404	-80.5499078
IDS015	3	25	2015	LGRW ORAL	25.344208	-80.5503006
IDS016	3	25	2015	LGRW ORAL	25.344349	-80.5503479
MJD933	3	25	2015	LGRW ORAL	25.343004	-80.5513888
MJD934	3	25	2015	LGRW ORAL	25.342763	-80.5517591
IDS017	3	25	2015	ORBL ORAL	25.343809	-80.5493155
IDS018	3	25	2015	ORBL ORAL	25.344435	-80.5494119
IDS031	3	30	2015	PUYL ORAL	25.34008	-80.5513079
MJD007	4	01	2015	RDDP ORAL	25.34144	-80.5527386
MJD008	4	01	2015	RDDP ORAL	25.341383	-80.5529962
MJD001	4	01	2015	PUYL ORAL	25.339868	-80.5514085
MJD002	4	01	2015	PUYL ORAL	25.340203	-80.5514823
MJD003	4	01	2015	PUYL ORAL	25.340341	-80.5511909
MJD004	4	01	2015	PUYL ORAL	25.339897	-80.550821
MJD005	4	01	2015	PUYL ORAL	25.339697	-80.5502386
MJD006	4	01	2015	PUYL ORAL	25.339942	-80.5511566
IDS034	4	01	2015	LGRW ORAL	25.344116	-80.5518326
IDS035	4	01	2015	LGRW ORAL	25.343495	-80.5521857

GPS_ID	Month	Day	Year	Color_Combo	Latitude	Longitude
IDS036	4	01	2015	LGRW ORAL	25.343189	-80.551911
mIDS037	4	01	2015	WKRD ORAL	25.341943	-80.5505218
IDS038	4	01	2015	WKRD ORAL	25.342068	-80.5503782
IDS039	4	01	2015	WKRD ORAL	25.342281	-80.5501706
IDS040	4	01	2015	YLDP ORAL	25.342804	-80.5417803
IDS041	4	01	2015	YLDP ORAL	25.34322	-80.5424118
IDS042	4	01	2015	YLDP ORAL	25.343126	-80.5427899
IDS032	4	01	2015	BLBK ORAL	25.344517	-80.5545496
IDS033	4	01	2015	BLBK ORAL	25.344004	-80.553918
IDS051	4	03	2015	RDDP ORAL	25.341535	-80.552627
IDS052	4	03	2015	RDDP ORAL	25.341062	-80.5530345
IDS053	4	03	2015	RDDP ORAL	25.341779	-80.5529364
IDS054	4	03	2015	RDDP ORAL	25.342021	-80.5530482
IDS055	4	03	2015	PUYL ORAL	25.340174	-80.5513869
IDS056	4	03	2015	PUYL ORAL	25.340238	-80.5507015
IDS057	4	03	2015	PUYL ORAL	25.340691	-80.5505137
IDS058	4	03	2015	PUYL ORAL	25.340719	-80.5511003
MJD027	4	03	2015	LGRW ORAL	25.343736	-80.5514739
MJD028	4	03	2015	LGRW ORAL	25.343555	-80.5516011
MJD029	4	03	2015	LGRW ORAL	25.343252	-80.5515231
MJD030	4	03	2015	LGRW ORAL	25.344876	-80.5515385
MJD031	4	03	2015	LGRW ORAL	25.345381	-80.5520049
MJD032	4	03	2015	LGRW ORAL	25.345235	-80.5516523
MJD033	4	03	2015	LGRW ORAL	25.344951	-80.5514484
MJD034	4	03	2015	LGRW ORAL	25.343747	-80.551813
IDS059	4	03	2015	WKRD ORAL	25.341928	-80.5504995
IDS060	4	03	2015	WKRD ORAL	25.34222	-80.5503614
IDS061	4	03	2015	WKRD ORAL	25.342534	-80.5507781
IDS062	4	03	2015	WKRD ORAL	25.342329	-80.5501694
IDS063	4	03	2015	WKRD ORAL	25.342277	-80.5506172
IDS064	4	03	2015	YLDP ORAL	25.344004	-80.5402117
IDS065	4	03	2015	YLDP ORAL	25.344769	-80.5402072
IDS066	4	03	2015	YLDP ORAL	25.344467	-80.5399682
IDS067	4	03	2015	YLDP ORAL	25.343512	-80.5415644
IDS068	4	03	2015	YLDP ORAL	25.343028	-80.5418368
MJD025	4	03	2015	BLBK ORAL	25.344753	-80.5547324
MJD026	4	03	2015	BLBK ORAL	25.344637	-80.5540305
TXV001	4	13	2015	BLBK ORAL	25.344458	-80.5545321
TXV002	4	13	2015	BLBK ORAL	25.344443	-80.5546892
TXV003	4	13	2015	BLBK ORAL	25.344347	-80.5548945
TXV004	4	13	2015	BLBK ORAL	25.344667	-80.5541374
TXV005	4	13	2015	BLBK ORAL	25.344028	-80.5536711

GPS_ID	Month	Day	Year	Color_Combo	Latitude	Longitude
IDS107	4	15	2015	RDDP ORAL	25.341379	-80.5529967
IDS108	4	15	2015	RDDP ORAL	25.340458	-80.5525227
IDS109	4	15	2015	RDDP ORAL	25.340616	-80.5528617
IDS110	4	15	2015	RDDP ORAL	25.340397	-80.5530466
IDS111	4	15	2015	PUYL ORAL	25.339799	-80.5507581
IDS112	4	15	2015	PUYL ORAL	25.340262	-80.5506102
IDS113	4	15	2015	PUYL ORAL	25.340355	-80.5506982
IDS114	4	15	2015	PUYL ORAL	25.339819	-80.5511864
IDS115	4	15	2015	PUYL ORAL	25.34001	-80.5516605
IDS122	4	15	2015	PUYL ORAL	25.340204	-80.5505368
IDS123	4	15	2015	PUYL ORAL	25.339756	-80.5502702
IDS124	4	15	2015	PUYL ORAL	25.339587	-80.5508889
IDS125	4	15	2015	PUYL ORAL	25.339415	-80.5505495
IDS126	4	15	2015	PUYL ORAL	25.338921	-80.5492055
IDS127	4	15	2015	PUYL ORAL	25.339254	-80.5499492
IDS128	4	15	2015	PUYL ORAL	25.338687	-80.5495835
IDS129	4	15	2015	PUYL ORAL	25.339083	-80.549981
TXV013	4	15	2015	LGRW ORAL	25.342637	-80.5514836
TXV014	4	15	2015	LGRW ORAL	25.343082	-80.551789
TXV015	4	15	2015	LGRW ORAL	25.343503	-80.5518697
TXV016	4	15	2015	LGRW ORAL	25.342875	-80.5519182
TXV017	4	15	2015	LGRW ORAL	25.34252	-80.5521861
TXV018	4	15	2015	LGRW ORAL	25.342389	-80.5521192
TXV019	4	15	2015	LGRW ORAL	25.342313	-80.5517929
TXV020	4	15	2015	LGRW ORAL	25.342654	-80.5517258
MJD093	4	15	2015	WKWH ORAL	25.33473	-80.5371598
MJD094	4	15	2015	WKWH ORAL	25.335709	-80.537528
MJD095	4	15	2015	WKWH ORAL	25.334334	-80.5373879
MJD096	4	15	2015	WKWH ORAL	25.334937	-80.5366634
MJD097	4	15	2015	WKWH ORAL	25.336507	-80.5367371
MJD098	4	15	2015	WKWH ORAL	25.336862	-80.5369519
IDS116	4	15	2015	WKRD ORAL	25.341922	-80.5501976
IDS117	4	15	2015	WKRD ORAL	25.342212	-80.5506689
IDS118	4	15	2015	WKRD ORAL	25.341839	-80.5508299
IDS119	4	15	2015	WKRD ORAL	25.341426	-80.5502241
IDS120	4	15	2015	WKRD ORAL	25.340909	-80.5498717
IDS121	4	15	2015	WKRD ORAL	25.341573	-80.5501271
TXV006	4	15	2015	BLBK ORAL	25.344369	-80.553942
TXV007	4	15	2015	BLBK ORAL	25.344541	-80.5541355
TXV008	4	15	2015	BLBK ORAL	25.344509	-80.5545818
TXV009	4	15	2015	BLBK ORAL	25.343965	-80.5549816
TXV010	4	15	2015	BLBK ORAL	25.344066	-80.553973

GPS_ID	Month	Day	Year	Color_Combo	Latitude	Longitude
TXV011	4	15	2015	BLBK ORAL	25.344079	-80.5536551
TXV012	4	15	2015	BLBK ORAL	25.343985	-80.5535401
MJD142	4	24	2015	RDDP ORAL	25.340785	-80.5529056
MJD143	4	24	2015	RDDP ORAL	25.340125	-80.553162
MJD144	4	24	2015	RDDP ORAL	25.339534	-80.5531908
MJD145	4	24	2015	RDDP ORAL	25.339547	-80.5527251
MJD146	4	24	2015	RDDP ORAL	25.340513	-80.5526964
MJD147	4	24	2015	RDDP ORAL	25.340071	-80.5534221
MJD148	4	24	2015	RDDP ORAL	25.340856	-80.5530763
MJD149	4	24	2015	RDDP ORAL	25.340471	-80.5524633
MJD150	4	24	2015	PUYL ORAL	25.339747	-80.5513666
MJD151	4	24	2015	PUYL ORAL	25.339994	-80.5511419
MJD152	4	24	2015	PUYL ORAL	25.339915	-80.5509114
MJD153	4	24	2015	PUYL ORAL	25.339424	-80.5505672
MJD154	4	24	2015	PUYL ORAL	25.339106	-80.5502293
MJD155	4	24	2015	PUYL ORAL	25.339006	-80.5496752
MJD187	4	24	2015	LGRW ORAL	25.342773	-80.551816
MJD188	4	24	2015	LGRW ORAL	25.3434	-80.5517204
MJD158	4	24	2015	WKRD ORAL	25.342385	-80.5502632
MJD159	4	24	2015	WKRD ORAL	25.342302	-80.5504266
MJD160	4	24	2015	WKRD ORAL	25.342147	-80.5504762
MJD161	4	24	2015	WKRD ORAL	25.342076	-80.5507235
MJD162	4	24	2015	WKRD ORAL	25.341817	-80.550746
MJD163	4	24	2015	WKRD ORAL	25.341562	-80.5506671
MJD164	4	24	2015	WKRD ORAL	25.341196	-80.5505292
MJD165	4	24	2015	WKRD ORAL	25.34119	-80.5502848
MJD166	4	24	2015	WKRD ORAL	25.341381	-80.5500834
MJD167	4	24	2015	WKRD ORAL	25.341897	-80.5501669
MJD168	4	24	2015	WKRD ORAL	25.341943	-80.5505122
MJD169	4	24	2015	WKRD ORAL	25.341277	-80.5502145
MJD170	4	24	2015	WKRD ORAL	25.341941	-80.5501902
MJD171	4	24	2015	WKRD ORAL	25.342128	-80.5509347
MJD172	4	24	2015	WKRD ORAL	25.34238	-80.5506099
MJD173	4	24	2015	WKRD ORAL	25.342327	-80.5504622
MJD189	4	24	2015	WKRD ORAL	25.344202	-80.5533262
MJD190	4	24	2015	BLBK ORAL	25.344215	-80.5538834
MJD191	4	24	2015	BLBK ORAL	25.344669	-80.5539961
MJD192	4	24	2015	BLBK ORAL	25.344478	-80.5546021
MJD193	4	24	2015	BLBK ORAL	25.344453	-80.5546948
MJD194	4	24	2015	BLBK ORAL	25.34479	-80.5547658
MJD195	4	24	2015	BLBK ORAL	25.345016	-80.5545759
MJD196	4	24	2015	BLBK ORAL	25.34519	-80.5551398

GPS_ID	Month	Day	Year	Color_Combo	Latitude	Longitude
MJD156	4	24	2015	ORBL ORAL	25.34236	-80.5497436
MJD157	4	24	2015	ORBL ORAL	25.342219	-80.5500198
MJD174	4	24	2015	ORBL ORAL	25.342366	-80.5502295
MJD175	4	24	2015	ORBL ORAL	25.342835	-80.5502324
MJD176	4	24	2015	ORBL ORAL	25.343071	-80.5503783
MJD177	4	24	2015	ORBL ORAL	25.344014	-80.5501129
MJD178	4	24	2015	ORBL ORAL	25.344496	-80.5500845
MJD179	4	24	2015	ORBL ORAL	25.344843	-80.5500303
MJD180	4	24	2015	ORBL ORAL	25.344552	-80.5495873
MJD181	4	24	2015	ORBL ORAL	25.343649	-80.5495735
MJD182	4	24	2015	ORBL ORAL	25.343259	-80.5500389
MJD183	4	24	2015	ORBL ORAL	25.342775	-80.5501053
MJD184	4	24	2015	ORBL ORAL	25.342471	-80.550142
MJD197	4	24	2015	UNB male	25.345372	-80.5559427
MJD198	4	24	2015	UNB male	25.345952	-80.5557262
MJD199	4	24	2015	UNB male	25.346088	-80.5569144
MJD212	4	27	2015	YLDP ORAL	25.343472	-80.5406107
MJD213	4	27	2015	YLDP ORAL	25.343992	-80.5402146
MJD214	4	27	2015	YLDP ORAL	25.343943	-80.5398419
MJD215	4	27	2015	YLDP ORAL	25.343637	-80.5400776
MJD216	4	27	2015	YLDP ORAL	25.343398	-80.5406742
MJD217	4	27	2015	YLDP ORAL	25.343537	-80.5410642
MJD218	4	27	2015	YLDP ORAL	25.343687	-80.541464
MJD219	4	27	2015	YLDP ORAL	25.34338	-80.5426049
MJD256	5	01	2015	PUWK ORAL	25.342767	-80.5497791
MJD291	5	04	2015	PUYL ORAL	25.339723	-80.5508994
MJD292	5	04	2015	PUYL ORAL	25.339639	-80.5506925
MJD293	5	04	2015	PUYL ORAL	25.340142	-80.5508248
MJD294	5	04	2015	PUYL ORAL	25.340584	-80.5506639
MJD295	5	04	2015	PUYL ORAL	25.340378	-80.5504932
MJD296	5	04	2015	PUYL ORAL	25.340914	-80.5505584
IDS212	5	04	2015	WKWH ORAL	25.345068	-80.5401389
IDS213	5	04	2015	WKWH ORAL	25.344535	-80.5397033
IDS215	5	04	2015	WKRD ORAL	25.343076	-80.5496907
IDS214	5	04	2015	ORBL ORAL	25.342938	-80.5491872
MJD278	5	04	2015	RWBL ORAL	25.345798	-80.55483
MJD279	5	04	2015	RWBL ORAL	25.345939	-80.5556946
MJD280	5	04	2015	RWBL ORAL	25.3456	-80.5556088
MJD281	5	04	2015	RWBL ORAL	25.34532	-80.5544762
MJD283	5	04	2015	RWBL ORAL	25.345701	-80.5553534
MJD284	5	04	2015	RWBL ORAL	25.345381	-80.5553195
MJD285	5	04	2015	RWBL ORAL	25.344758	-80.5534655

GPS_ID	Month	Day	Year	Color_Combo	Latitude	Longitude
MJD286	5	04	2015	RWBL ORAL	25.344617	-80.5534297
MJD287	5	04	2015	RWBL ORAL	25.344619	-80.5535382
MJD288	5	04	2015	RWBL ORAL	25.344764	-80.55373
MJD289	5	04	2015	RWBL ORAL	25.345017	-80.5539809
MJD290	5	04	2015	RWBL ORAL	25.345311	-80.5547054
MJD282	5	04	2015	UNB male 1	25.347175	-80.5550512
IDS289	5	11	2015	RDDP ORAL	25.340085	-80.5524481
IDS290	5	11	2015	RDDP ORAL	25.339293	-80.552871
IDS291	5	11	2015	RDDP ORAL	25.340569	-80.5532258
IDS292	5	11	2015	RDDP ORAL	25.339951	-80.5526902
IDS293	5	11	2015	RDDP ORAL	25.339155	-80.5531375
IDS294	5	11	2015	RDDP ORAL	25.340535	-80.5531398
IDS295	5	11	2015	PUYL ORAL	25.339934	-80.5506437
IDS296	5	11	2015	PUYL ORAL	25.339843	-80.5508656
IDS297	5	11	2015	PUYL ORAL	25.339998	-80.551151
IDS298	5	11	2015	PUYL ORAL	25.339546	-80.5507477
IDS299	5	11	2015	PUYL ORAL	25.339892	-80.5508843
IDS300	5	11	2015	PUYL ORAL	25.339737	-80.5504904
IDS301	5	11	2015	PUYL ORAL	25.339598	-80.5508936
IDS308	5	11	2015	PUYL ORAL	25.339707	-80.550707
MJD400	5	11	2015	LGRW ORAL	25.34232	-80.5521666
MJD401	5	11	2015	LGRW ORAL	25.342895	-80.5520118
MJD402	5	11	2015	LGRW ORAL	25.34317	-80.5513313
MJD403	5	11	2015	LGRW ORAL	25.342867	-80.551229
MJD404	5	11	2015	LGRW ORAL	25.342322	-80.5515705
MJD405	5	11	2015	LGRW ORAL	25.342818	-80.5517887
MJD406	5	11	2015	LGRW ORAL	25.34304	-80.5519663
MJD407	5	11	2015	LGRW ORAL	25.343448	-80.5513712
MJD408	5	11	2015	LGRW ORAL	25.343881	-80.5514365
MJD409	5	11	2015	LGRW ORAL	25.343571	-80.5516234
MJD410	5	11	2015	LGRW ORAL	25.343327	-80.5518193
MJD411	5	11	2015	LGRW ORAL	25.34243	-80.5517354
MJD412	5	11	2015	LGRW ORAL	25.342645	-80.5519335
MJD413	5	11	2015	LGRW ORAL	25.34238	-80.5520874
MJD414	5	11	2015	LGRW ORAL	25.343404	-80.5514714
MJD415	5	11	2015	LGRW ORAL	25.343881	-80.5514696
IDS302	5	11	2015	WKRD ORAL	25.341582	-80.5506004
IDS303	5	11	2015	WKRD ORAL	25.341789	-80.5502713
IDS304	5	11	2015	WKRD ORAL	25.342116	-80.5496433
IDS305	5	11	2015	WKRD ORAL	25.341529	-80.5498812
IDS306	5	11	2015	WKRD ORAL	25.341161	-80.5499397
IDS307	5	11	2015	WKRD ORAL	25.342218	-80.5504318

GPS_ID	Month	Day	Year	Color_Combo	Latitude	Longitude
MJD470	5	15	2015	DPBK ORAL	25.33653	-80.5365346
MJD471	5	15	2015	DPBK ORAL	25.336257	-80.5365359
MJD472	5	15	2015	DPBK ORAL	25.336666	-80.5430898
IDS373	5	19	2015	LGRW ORAL	25.342457	-80.5517918
IDS374	5	19	2015	LGRW ORAL	25.342777	-80.5517141
IDS375	5	19	2015	LGRW ORAL	25.3437	-80.5517535
IDS376	5	19	2015	LGRW ORAL	25.343549	-80.5513511
IDS377	5	19	2015	LGRW ORAL	25.343084	-80.5515085
IDS378	5	19	2015	LGRW ORAL	25.342307	-80.5517161
IDS379	5	19	2015	LGRW ORAL	25.342324	-80.5515296
IDS380	5	19	2015	LGRW ORAL	25.342819	-80.5512078
IDS381	5	19	2015	LGRW ORAL	25.343376	-80.551625
IDS382	5	19	2015	LGRW ORAL	25.343805	-80.5514738
IDS383	5	19	2015	LGRW ORAL	25.343941	-80.5511637
IDS366	5	19	2015	WKRD ORAL	25.342188	-80.5505702
IDS367	5	19	2015	WKRD ORAL	25.341568	-80.5504246
IDS368	5	19	2015	WKRD ORAL	25.341874	-80.5505652
IDS369	5	19	2015	WKRD ORAL	25.342308	-80.5504306
IDS370	5	19	2015	WKRD ORAL	25.342528	-80.5507081
IDS371	5	19	2015	WKRD ORAL	25.341462	-80.55023
IDS372	5	19	2015	WKRD ORAL	25.34223	-80.5503536
IDS384	5	19	2015	ORBL ORAL	25.344013	-80.5500869
IDS385	5	19	2015	ORBL ORAL	25.344331	-80.5501103
IDS386	5	19	2015	ORBL ORAL	25.343971	-80.550005
IDS387	5	19	2015	ORBL ORAL	25.343064	-80.5504807
IDS388	5	19	2015	ORBL ORAL	25.342835	-80.5504885
IDS389	5	19	2015	ORBL ORAL	25.342967	-80.5506106
MJD510	5	19	2015	DPBK ORAL	25.336504	-80.5366559
MJD511	5	19	2015	DPBK ORAL	25.3364	-80.5365583
MJD512	5	19	2015	DPBK ORAL	25.336113	-80.5362978
MJD513	5	19	2015	DPBK ORAL	25.336569	-80.5355294
MJD514	5	19	2015	DPBK ORAL	25.336604	-80.53535
MJD515	5	19	2015	DPBK ORAL	25.336294	-80.5351204
MJD516	5	19	2015	DPBK ORAL	25.335884	-80.5352176
MJD517	5	19	2015	DPBK ORAL	25.335965	-80.5361482
MJD518	5	19	2015	DPBK ORAL	25.336055	-80.5361486
MJD519	5	19	2015	DPBK ORAL	25.336725	-80.5363795
MJD520	5	19	2015	DPBK ORAL	25.337287	-80.5368234
MJD521	5	19	2015	DPBK ORAL	25.337135	-80.5371913
MJD522	5	19	2015	DPBK ORAL	25.337327	-80.5374167
MJD523	5	19	2015	DPBK ORAL	25.337263	-80.5376824
MJD524	5	19	2015	DPBK ORAL	25.336724	-80.5381022

GPS_ID	Month	Day	Year	Color_Combo	Latitude	Longitude
MJD525	5	19	2015	DPBK ORAL	25.336295	-80.5381228
IDS458	5	28	2015	RDDP ORAL	25.340412	-80.5527766
IDS459	5	28	2015	RDDP ORAL	25.34048	-80.5525081
IDS460	5	28	2015	RDDP ORAL	25.340911	-80.5527552
IDS461	5	28	2015	RDDP ORAL	25.338672	-80.5526389
IDS462	5	28	2015	RDDP ORAL	25.340469	-80.5524846
IDS463	5	28	2015	RDDP ORAL	25.338946	-80.5530008
IDS464	5	28	2015	PUYL ORAL	25.339756	-80.5505569
IDS465	5	28	2015	PUYL ORAL	25.339439	-80.5505584
IDS466	5	28	2015	PUYL ORAL	25.339658	-80.5508619
IDS467	5	28	2015	PUYL ORAL	25.339902	-80.5508896
IDS468	5	28	2015	PUYL ORAL	25.339486	-80.5507004
IDS469	5	28	2015	PUYL ORAL	25.339989	-80.5511657
IDS470	5	28	2015	PUYL ORAL	25.339999	-80.5506238
IDS471	5	28	2015	PUYL ORAL	25.339825	-80.5505144
IDS472	5	28	2015	PUYL ORAL	25.339807	-80.5507568
MJD645	5	28	2015	LGRW ORAL	25.343242	-80.5517262
MJD646	5	28	2015	LGRW ORAL	25.342811	-80.5517868
MJD647	5	28	2015	LGRW ORAL	25.342417	-80.5516249
MJD648	5	28	2015	LGRW ORAL	25.342265	-80.5517924
MJD649	5	28	2015	LGRW ORAL	25.342849	-80.5516572
MJD650	5	28	2015	LGRW ORAL	25.342907	-80.5517622
MJD651	5	28	2015	LGRW ORAL	25.343037	-80.5519114
MJD652	5	28	2015	LGRW ORAL	25.342911	-80.5519642
MJD653	5	28	2015	LGRW ORAL	25.342722	-80.5520468
MJD654	5	28	2015	LGRW ORAL	25.342691	-80.5518487
MJD655	5	28	2015	LGRW ORAL	25.342753	-80.5515272
MJD656	5	28	2015	LGRW ORAL	25.343062	-80.5514118
MJD657	5	28	2015	LGRW ORAL	25.343952	-80.5509415
MJD658	5	28	2015	LGRW ORAL	25.344245	-80.5508324
MJD659	5	28	2015	LGRW ORAL	25.344163	-80.5505291
IDS473	5	28	2015	WKRD ORAL	25.341229	-80.5502257
IDS474	5	28	2015	WKRD ORAL	25.341527	-80.5503629
IDS475	5	28	2015	WKRD ORAL	25.342052	-80.5511883
IDS476	5	28	2015	WKRD ORAL	25.341834	-80.5507496
IDS477	5	28	2015	WKRD ORAL	25.341495	-80.5502147
IDS478	5	28	2015	WKRD ORAL	25.341875	-80.550705
IDS479	5	28	2015	WKRD ORAL	25.341995	-80.5501756
IDS480	5	28	2015	WKRD ORAL	25.341613	-80.5500114
IDS481	5	28	2015	WKRD ORAL	25.3421	-80.5501456
IDS482	5	28	2015	WKRD ORAL	25.342015	-80.5503626
IDS483	5	28	2015	WKRD ORAL	25.341512	-80.5501177

GPS_ID	Month	Day	Year	Color_Combo	Latitude	Longitude
IDS484	5	28	2015	WKRD ORAL	25.341676	-80.5496813
MJD660	5	28	2015	ORBL ORAL	25.343018	-80.5502388
MJD661	5	28	2015	ORBL ORAL	25.343065	-80.5500093
MJD662	5	28	2015	ORBL ORAL	25.343242	-80.5497542
MJD663	5	28	2015	ORBL ORAL	25.343644	-80.5492763
MJD664	5	28	2015	ORBL ORAL	25.343788	-80.5491433
MJD665	5	28	2015	PUWK ORAL	25.343957	-80.5491851
MJD666	5	28	2015	PUWK ORAL	25.344124	-80.5490821
MJD667	5	28	2015	ORBL ORAL	25.34416	-80.5490985
MJD668	5	28	2015	PUWK ORAL	25.343748	-80.5493064
MJD669	5	28	2015	ORBL ORAL	25.343741	-80.5492995
MJD670	5	28	2015	ORBL ORAL	25.34322	-80.5493295
MJD671	5	28	2015	ORBL ORAL	25.342912	-80.549898
MJD672	5	28	2015	ORBL ORAL	25.343104	-80.550179
MJD673	5	28	2015	ORBL ORAL	25.342612	-80.5496918
MJD740	6	03	2015	RDDP ORAL	25.340727	-80.5529473
IDS533	6	03	2015	DPBK ORAL	25.336403	-80.5415678
IDS534	6	03	2015	DPBK ORAL	25.335896	-80.5417031
IDS535	6	03	2015	DPBK ORAL	25.33589	-80.5414699
IDS536	6	03	2015	DPBK ORAL	25.335756	-80.5413061
IDS537	6	03	2015	DPBK ORAL	25.335657	-80.5417751
MJD731	6	03	2015	UNB male 2	25.341623	-80.5415448
MJD732	6	03	2015	UNB male 2	25.341866	-80.5414783
MJD733	6	03	2015	UNB male 2	25.342307	-80.5416196
MJD734	6	03	2015	UNB male 2	25.342348	-80.5419037
MJD735	6	03	2015	UNB male 2	25.342335	-80.5422664
MJD736	6	03	2015	UNB male 2	25.342233	-80.5422319
MJD737	6	03	2015	UNB male 2	25.34203	-80.5421357
MJD738	6	03	2015	UNB male 2	25.3418	-80.5418361
MJD739	6	03	2015	UNB male 2	25.341941	-80.5416805
MJD755	6	04	2015	PUWK ORAL	25.342637	-80.5491961
MJD741	6	04	2015	UNB male 2	25.342566	-80.5411285
MJD742	6	04	2015	UNB male 2	25.342441	-80.5411626
MJD743	6	04	2015	UNB male 2	25.342378	-80.5415906
MJD744	6	04	2015	UNB male 2	25.342256	-80.5416547
MJD745	6	04	2015	UNB male 2	25.342276	-80.5418045
MJD746	6	04	2015	UNB male 2	25.342536	-80.5418078
MJD747	6	04	2015	UNB male 2	25.3425	-80.5422993
MJD748	6	04	2015	UNB male 2	25.34251	-80.542565
MJD749	6	04	2015	UNB male 2	25.342598	-80.5429116
MJD750	6	04	2015	UNB male 2	25.342528	-80.5430266
MJD751	6	04	2015	UNB male 2	25.342561	-80.5451086

GPS_ID	Month	Day	Year	Color_Combo	Latitude	Longitude
MJD752	6	04	2015	UNB male 2	25.342302	-80.5460797
MJD753	6	04	2015	UNB male 2	25.342369	-80.54651
MJD754	6	04	2015	UNB male 2	25.342348	-80.5468381
IDS607	6	11	2015	RDDP ORAL	25.339238	-80.5528221
MJD1009	6	11	2015	PUYL ORAL	25.340408	-80.5509488
MJD1010	6	11	2015	LGRW ORAL	25.34435	-80.5494684
MJD1011	6	11	2015	LGRW ORAL	25.344352	-80.5501379
MJD1012	6	11	2015	LGRW ORAL	25.34412	-80.5506019
MJD1013	6	11	2015	LGRW ORAL	25.343305	-80.5512506
MJD1014	6	11	2015	LGRW ORAL	25.343334	-80.551418
MJD1015	6	11	2015	LGRW ORAL	25.343354	-80.5516356
MJD1016	6	11	2015	LGRW ORAL	25.342825	-80.5517821
MJD1017	6	11	2015	LGRW ORAL	25.342841	-80.5511688
MJD1018	6	11	2015	LGRW ORAL	25.343138	-80.5513338
MJD1019	6	11	2015	LGRW ORAL	25.343976	-80.5509335
IDS602	6	11	2015	WKRD ORAL	25.341267	-80.5502616
IDS603	6	11	2015	WKRD ORAL	25.341594	-80.5499745
IDS604	6	11	2015	WKRD ORAL	25.34195	-80.5499503
IDS605	6	11	2015	WKRD ORAL	25.342275	-80.5504822
IDS606	6	11	2015	WKRD ORAL	25.341577	-80.5501245
IDS588	6	11	2015	DPBK ORAL	25.336288	-80.5412197
IDS589	6	11	2015	DPBK ORAL	25.336381	-80.5417461
IDS590	6	11	2015	DPBK ORAL	25.335984	-80.5416501
IDS591	6	11	2015	DPBK ORAL	25.336064	-80.5414116
IDS592	6	11	2015	DPBK ORAL	25.336465	-80.5415793
IDS593	6	11	2015	DPBK ORAL	25.336723	-80.5417367
IDS594	6	11	2015	DPBK ORAL	25.336223	-80.5419593
IDS595	6	11	2015	DPBK ORAL	25.336181	-80.5413365
IDS596	6	11	2015	DPBK ORAL	25.336499	-80.5413549
IDS597	6	11	2015	DPBK ORAL	25.336519	-80.5419675
IDS598	6	11	2015	DPBK ORAL	25.336161	-80.5412596
IDS599	6	11	2015	DPBK ORAL	25.336542	-80.5413625
IDS600	6	11	2015	DPBK ORAL	25.335959	-80.5416536
IDS601	6	11	2015	DPBK ORAL	25.336581	-80.5417697
IDS654	6	16	2015	RDDP ORAL	25.339924	-80.5527242
IDS655	6	16	2015	RDDP ORAL	25.340878	-80.5531211
IDS656	6	16	2015	RDDP ORAL	25.34069	-80.552731
IDS657	6	16	2015	RDDP ORAL	25.340458	-80.5528934
IDS658	6	16	2015	RDDP ORAL	25.34103	-80.5528461
IDS659	6	16	2015	RDDP ORAL	25.33995	-80.5527216
IDS660	6	16	2015	RDDP ORAL	25.339204	-80.5528475
IDS661	6	16	2015	RDDP ORAL	25.340399	-80.5528107

GPS_ID	Month	Day	Year	Color_Combo	Latitude	Longitude
MJD1056	6	16	2015	PUYL ORAL	25.34024	-80.5516447
MJD1057	6	16	2015	PUYL ORAL	25.339941	-80.5509195
MJD1058	6	16	2015	PUYL ORAL	25.339843	-80.5510746
MJD1059	6	16	2015	PUYL ORAL	25.339703	-80.550848
MJD1060	6	16	2015	PUYL ORAL	25.340224	-80.5510677
MJD1061	6	16	2015	PUYL ORAL	25.340403	-80.5513313
MJD1062	6	16	2015	PUYL ORAL	25.340426	-80.5506922
MJD1063	6	16	2015	PUYL ORAL	25.340085	-80.5508973
MJD1064	6	16	2015	PUYL ORAL	25.340696	-80.5512483
MJD1065	6	16	2015	PUYL ORAL	25.340223	-80.5512712
IDS682	6	16	2015	LGRW ORAL	25.342901	-80.5516763
IDS683	6	16	2015	LGRW ORAL	25.342402	-80.5517581
IDS662	6	16	2015	WKRD ORAL	25.341126	-80.5499432
IDS663	6	16	2015	WKRD ORAL	25.34176	-80.5498661
IDS664	6	16	2015	WKRD ORAL	25.341847	-80.5498063
IDS665	6	16	2015	WKRD ORAL	25.342016	-80.5500117
IDS666	6	16	2015	WKRD ORAL	25.342173	-80.5503558
IDS667	6	16	2015	WKRD ORAL	25.341467	-80.550019
IDS668	6	16	2015	WKRD ORAL	25.34172	-80.5494145
IDS669	6	16	2015	WKRD ORAL	25.342213	-80.5499912
IDS670	6	16	2015	WKRD ORAL	25.341974	-80.5505026
IDS671	6	16	2015	WKRD ORAL	25.34152	-80.5503561
IDS672	6	16	2015	WKRD ORAL	25.341137	-80.549839
IDS673	6	16	2015	WKRD ORAL	25.341263	-80.5502609
IDS674	6	16	2015	WKRD ORAL	25.342251	-80.5508223
IDS675	6	16	2015	ORBL ORAL	25.342009	-80.5495538
IDS677	6	16	2015	ORBL ORAL	25.342887	-80.5495562
IDS678	6	16	2015	ORBL ORAL	25.343542	-80.5496434
IDS679	6	16	2015	PUWK ORAL	25.343428	-80.5498322
IDS680	6	16	2015	ORBL ORAL	25.343393	-80.5501117
IDS681	6	16	2015	ORBL ORAL	25.343383	-80.549655
MJD1066	6	16	2015	ORBL ORAL	25.342766	-80.5499041
MJD1067	6	16	2015	ORBL ORAL	25.342633	-80.5500126
MJD1068	6	16	2015	ORBL ORAL	25.342579	-80.5496801
MJD1069	6	16	2015	ORBL ORAL	25.34269	-80.5499524
MJD1070	6	16	2015	ORBL ORAL	25.342447	-80.5500174
MJD1071	6	16	2015	ORBL ORAL	25.342329	-80.5499171
MJD1072	6	16	2015	ORBL ORAL	25.342202	-80.5499512
MJD1073	6	16	2015	ORBL ORAL	25.343566	-80.5495975
MJD1074	6	16	2015	ORBL ORAL	25.343163	-80.5495369
MJD1075	6	16	2015	ORBL ORAL	25.343265	-80.5497141
MJD1076	6	16	2015	ORBL ORAL	25.343083	-80.5503609

GPS_ID	**Month**	**Day**	**Year**	**Color_Combo**	**Latitude**	**Longitude**
MJD1077	6	16	2015	ORBL ORAL	25.342691	-80.5499648
MJD1078	6	16	2015	ORBL ORAL	25.342327	-80.5499026
MJD1079	6	16	2015	ORBL ORAL	25.342084	-80.5497417
MJD1080	6	16	2015	ORBL ORAL	25.342875	-80.5494059
MJD1081	6	16	2015	ORBL ORAL	25.343171	-80.5492398
MJD1082	6	16	2015	ORBL ORAL	25.34302	-80.5492867
MJD1083	6	16	2015	PUWK ORAL	25.342851	-80.5494668
IDS776	7	02	2015	RDDP ORAL	25.340528	-80.5526806
IDS775	7	02	2015	WKRD ORAL	25.342089	-80.5500916
MJD1077	6	16	2015	ORBL ORAL	25.342691	-80.5499648
MJD1078	6	16	2015	ORBL ORAL	25.342327	-80.5499026
MJD1079	6	16	2015	ORBL ORAL	25.342084	-80.5497417
MJD1080	6	16	2015	ORBL ORAL	25.342875	-80.5494059
MJD1081	6	16	2015	ORBL ORAL	25.343171	-80.5492398
MJD1082	6	16	2015	ORBL ORAL	25.34302	-80.5492867
MJD1083	6	16	2015	PUWK ORAL	25.342851	-80.5494668
IDS776	7	02	2015	RDDP ORAL	25.340528	-80.5526806
IDS775	7	02	2015	WKRD ORAL	25.342089	-80.5500916