IMPLEMENTATION OF THE WHOOPING CRANE MONITORING PROTOCOL 2019 SPRING – FINAL REPORT



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2019 Spring Whooping Crane Monitoring Report

Implementation of the Whooping Crane Monitoring Protocol Spring 2019

Prepared by Ecological Solutions

For The Committees of the Platte River Recovery Implementation Program

Date: 10/21/2019

Summary

The Ecological Solutions (ES) team conducted the whooping crane monitoring effort for the 2019 spring migration following the protocols detailed in the *Platte River Recovery Implementation Program – Whooping Crane Monitoring Protocol – rev. June 2017.*

The spring migration monitoring took place from March 6th through April 29th. Surveys were conducted using systematic flight transects along the Platte River from Chapman to Lexington. Systematic along with opportunistic sightings, resulted in nine unique whooping cranes observed within the transect boundaries during the 55-day survey period. Below includes survey methodology, results, and supporting data.

Equipment/Materials, Personnel, and Study Area

Two Cessna 172 aircrafts, crewed by a pilot and two observers, were used to make observations along predetermined flight transects. The pilot utilized a GPS unit to follow the pre-loaded route, as well as to mark any observed objects with a waypoint. The aerial observers utilized binoculars, a Canon EOS 6D camera equipped with a 24 x 105 mm lens, and mobile phones for communication.

Ecological Solutions documented information using data sheets provided by the Platte River Recovery Implementation Program (PRRIP) Executive Director's Office (EDO), which included aerial flight logs, aerial observations, ground search efforts, and use site monitoring logs.

The area of study, often referred to as the Big Bend region stretches from the Highway 283 Platte River bridge near Lexington, Nebraska to the Platte River bridge near Chapman, Nebraska and focused on the Platte River channels and the adjacent wetlands, ponds, and waterways extending 3.5 miles out on each side of the outermost channels. The total length of

the coverage area was approximately 90 miles and was divided into two routes, an east route and a west route. Observations outside the study area were not included in the data.

Implementation and Methodology

Systematic aerial transects were flown daily conditions permitting, at an air speed of approximately 100 MPH and an altitude of approximately 1,000 – 2,000 feet from March 6 – 12 due to collision risk with snow geese, thereafter at an altitude of approximately 750 feet unless conditions demanded higher altitudes. Two flights were initiated each morning, one from Grand Island (east route) and one from Kearney (west route). Planes were required to be at transect starting points $\frac{1}{2}$ hour before sunrise. Flights were typically completed in less than two hours. In the event of adverse weather, crews were required to wait up to two hours after sunrise for conditions to improve before cancelling the flight, that is unless the pilot cancelled the flight for the day prior to that using their best judgement. River transects were flown east to west and the plane was oriented south of the southern-most river channel to reduce the effect of sun glare. Each riverine transect had two daily alternating starting points. The alternating starting points were implemented to allow different sections of the study area to be observed as early as possible in the flight times.

The east route day one started at the Platte River bridge near Chapman (Chapman bridge) and followed the river transect (OSE) to the Highway 10 bridge (Minden bridge). The pilots would then follow the targeted Primary Wetland Return Transect (PWRTE) back to the Chapman bridge, turn and follow the targeted Secondary Wetland Return Transect (CSRT) to the Highway 34 bridge. For the east route day two, flights would start at the Platte River bridge near Wood River (Wood River bridge) and follow the 0SE to the Minden bridge, then follow the PWRTE back to the Chapman bridge. The pilots would then follow the 0SE to the Wood River bridge, then return on the Secondary Wetland Return Transect (WSRT) that stretched from HWY 10 near Wood River to the Highway 34 – Platte River bridge.

The west route day one started at the Minden bridge and followed the river transect (0SW) to the Highway 283 bridge (Lexington bridge). The pilots would then follow the targeted Primary Wetland Return Transect (PWRTW) back to the Minden bridge. For the west route day two, flights would start at the Platte River bridge near Odessa (Odessa bridge) and follow the OSW to the Lexington bridge. They would turn and follow the PWRTW back to the Minden bridge and then return on the OSW to the Odessa bridge. Pilots would then follow the Secondary Wetland Return Transect (ESRT) from HWY 183 near Elm Creek to the HWY 40 near the Platte River bridge.

At the beginning of each transect and at turn around points, the aerial crews would relay their position via mobile phone to the nearby ground crews so the ground crews could maintain a relatively close proximity. If an aerial crew spotted any potential whooping crane(s), they would take photos of the object(s) and the surrounding area to confirm the identity and location. If additional confirmation was needed, they would contact the nearest ground observer, who would then position themselves to make a positive identification of the object without disturbance. If the object was determined to be a whooping crane(s), personnel at the EDO as well as the U.S. Fish and Wildlife Service (USFWS) would be immediately notified so they could take appropriate measures to minimize disturbance if needed. Otherwise, they were notified of results of surveys on a daily basis following the completion of both flights.

In addition to the systematic flights, the aerial and ground crews also confirmed and reported opportunistic sightings. Immediately after receiving a report, depending on the situation, either a plane would be deployed from the airport and/or ground personnel would systematically survey the area until the cranes were located and confirmed, or sufficient search time was allocated to confirm the cranes had left and/or were not present in the immediate area.

Using metrics developed by the EDO, in conjunction with a Geographic Information System (GIS), and facilitated by the in-flight photos and/or GPS waypoints, UTM coordinates were determined for each crane or crane group and recorded with the rest of the data.

All data was later translated from the completed data sheets directly to the PRRIP species database. It was then subjected to Quality Assurance/Quality Control (QA/QC) checks by Ecological Solutions to ensure accuracy.

Results

Confirmed Whooping Crane Sightings

A total of nine unique whooping cranes were confirmed during the 55-day monitoring effort. Forty-two documented crane groups, comprised of eight unique groups, were observed and each was given an individual crane group ID (e.g. 2019SP01 = year-season-number). A crane group consisted of any individual or group of whooping cranes observed once daily and would be re-labeled as a new group and given a new crane group ID the next day if they were still in the area. Use site #'s were notated either as a numerical value if the crane group was observed in a riverine, lacustrine, or palustrine environment or with the location's land cover classification (or "AIR" if in flight) at the time of sighting.

Table 1 includes unique crane group icons, observation dates, the number of cranes in each group, crane group ID's, use site designations, the type of observation during each sighting instance, and total crane use days. To facilitate cross-referencing, the crane group icons can be found in Tables 1, 2, 3, 4 and 5 as well as the collective crane group location maps in Figures 7 - 12 and the individual crane group location maps, shown along with a photo of each unique crane group, in Figures 13 - 29.

<u>TABLE 1.</u> Observation data of each crane group during the 2019 spring survey including unique group identifier icons, the date of observation, the number cranes in each group, group ID's, use site designation, GPS locations, and the type of observation at time of sighting.

2 d	Unique	Obs. ^{# of}	Group ID				Observation	See	
SP	Group Icon	Dates	Cranes Adult:Juv	#	Use Site #	UTMx	UTMy	Туре	Figures
		3/18/19	1:0	2019SP01	1	540444	4512058	Systematic	13 - 15
		3/18/19	1:0	2019SP02	2	533958	4510447	Systematic	16, 17
		3/18/19	1:0	2019SP03	3	524055	4506517	Systematic	18, 19
		3/18/19	1:0	2019SP04	4	506124	4501607	Systematic	20, 21
		3/20/19	1:0	2019SP05	5	541984	4513042	Systematic	13 - 15
		3/20/19	1:0	2019SP06	AIR	534713	4510686	Ground	16, 17
		3/21/19	1:0	2019SP07	6	501582	4501367	Systematic	20, 21
		3/21/19	1:0	2019SP08	Grassland	521406	4505782	Ground	18, 19
		3/22/19	1:0	2019SP09	7	506441	4501626	Systematic	20, 21
		3/25/19	1:0	2019SP10	Ag/corn	543388	4506756	Ground	13 - 15
		3/26/19	1:0	2019SP11	8	550127	4515811	Systematic	22, 23
		3/26/19	2:0	2019SP12	9	471226	4503802	Systematic	24, 25
		3/26/19	1:0	2019SP13	10	509033	4501913	Systematic	20, 21
		3/27/19	1:0	2019SP14	Ag/corn	543388	4506756	Ground	13 - 15
		3/27/19	1:0	2019SP15	Ag/corn	552041	4512137	Ground	22, 23
		3/28/19	1:0	2019SP16	11	541387	4512870	Ground	13 - 15
		3/28/19	1:0	2019SP17	Ag/beans	505517	4511148	Ground	22, 23
		3/29/19	1:0	2019SP18	12	510327	4504828	Systematic	20, 21
		3/29/19	1:0	2019SP19	AIR	544866	4510346	Systematic	13 - 15
		3/29/19	1:0	2019SP20	AIR	550463	4515783	Systematic	22, 23
		3/30/19	1:0	2019SP21	13	510234	4504440	Systematic	20, 21
		3/30/19	1:0	2019SP22	Ag/corn	551711	4512521	Ground	22, 23
		3/31/19	1:0	2019SP23	14	509009	4501887	Systematic	20, 21
		3/31/19	1:0	2019SP24	15	550677	4515941	Systematic	22, 23
		3/31/19	1:0	2019SP25	16	544745	4514487	Systematic	13 - 15
		4/1/19	1:0	2019SP26	17	549331	4515322	Systematic	22, 23
		4/1/19	1:0	2019SP27	18	544594	4514461	Systematic	13 - 15
		4/1/19	1:0	2019SP28	19	510182	4502677	Systematic	20, 21
		4/2/10	1:0	2019SP29	Ag-corn	545639	4506376	Ground	13 - 15
		4/2/19	1:0	2019SP30	Ag-corn	550605	4513312	Ground	22, 23
		4/3/19	1:0	2019SP31	20	548240	4515131	Systematic	22, 23
		4/3/19	1:0	2019SP32	Ag-corn	545639	4506376	Ground	13 - 15
		4/4/19	1:0	2019SP33	Ag-corn	545639	4506376	Ground	22, 23
		4/5/19	1:0	2019SP34	21	549967	4515714	Systematic	22, 23
		4/5/19	1:0	2019SP35	Ag-corn	544952	4506221	Ground	13 - 15

		4/6/19	1:0	2019SP36	22	544909	4514471	Systematic	13 - 15
		4/7/19	1:0	2019SP37	23	549800	4515636	Systematic	22, 23
		4/7/19	1:0	2019SP38	Grassland	544165	4512720	Ground	13 - 15
				Continu	ued on next	page			
				Continued	from previo	ous page			
	Unique	Obs.	# of	Group ID				Observation	See
5	Group Icon	Dates	Cranes Adult:Juv	#	Use Site #	UIMX	UIMy	Туре	Figures
ŊG	Group Icon	Dates 4/8/19	Cranes Adult:Juv 1:0	# 2019SP39	Ag-corn	545071	4512010	Type Ground	Figures 13 - 15
PRING	Group Icon	Dates 4/8/19 4/9/19	Cranes Adult:Juv 1:0 1:0	# 2019SP39 2019SP40	Ag-corn 24	545071 544722	4512010 4514386	Type Ground Systematic	Figures 13 - 15 13 - 15
SPRING	Group Icon	Dates 4/8/19 4/9/19 4/13/19	Cranes Adult:Juv 1:0 1:0 1:0	# 2019SP39 2019SP40 2019SP41	Ag-corn 24 25	545071 544722 529120	4512010 4514386 4508375	Type Ground Systematic Systematic	Figures 13 - 15 13 - 15 26, 27
SPRING	Group Icon	Dates 4/8/19 4/9/19 4/13/19 4/14/19	Cranes Adult:Juv 1:0 1:0 1:0 1:0	# 2019SP39 2019SP40 2019SP41 2019SP42	Ag-corn 24 25 26	545071 544722 529120 516667	4512010 4514386 4508375 4505238	Type Ground Systematic Systematic	Figures 13 - 15 13 - 26, 27 28, 29

1. This total includes earlier USFWS reported sighting dates. Please see Table 4, USFWS groups 19A-02 and 19A-07.

Crane use days were calculated by multiplying the number of individual cranes in each group by the number of days the group was observed or known to be in the area, plus one day, as each group was assumed to have been present the evening prior to the morning of the first observation. This resulted in a total of 76 crane use days during the spring survey (See Table 4. USFWS groups 19A-02 and 19A-07 for dates not included in Table 1). Whooping cranes were observed on 22 of the 55 days of the survey effort (40.0% of the days; Table 1).

According to the surveys conducted by the U.S. Fish and Wildlife Service during the winter of 2017 – 2018 (the most recent available), the Aransas – Wood Buffalo migratory whooping crane population was estimated to be 505 birds (See the following web link for source). The 9 individuals observed by this monitoring effort constitutes approximately 1.8% of the migratory population using the Platte River survey area during the 2019 spring migration.

https://www.fws.gov/uploadedFiles/WHCR%20Update%20Winter%202017-2018.pdf

Observed whooping crane use of the Great Bend region of the Platte River during spring systematic surveys of the associated habitat reach for the PRRIP has increased significantly (P < 0.01) since the initiation of monitoring efforts in 2001 (Figure 1).



Figure 1. Observed use of the central Platte River during spring and fall migration seasons, 2001-2018.

Streamflow and Unobstructed Channel Width at Whooping Crane Use Locations

According to USGS streamflow data, the Platte River streamflow was notably higher than the median daily levels due to excessive snow melt and rain (11 years at Kearney and 77 years at Grand Island – See Figures 2 & 3).

The discharge rates used in Table 2 were obtained from the USGS gauging station nearest in location and time of measurement to each associated crane group and time of observation with the exception of 2019SP12 on 3/26, as there were no data at the nearest station during the time of observation (Cottonwood Ranch) so the measurement was obtained from the next nearest, at Kearney. The discharge ranged from a low of 1690 cubic feet per second (cfs) at Kearney on 4/29 to a high of 15,500 cfs at Grand Island on 3/16 during the survey period. At the specific crane group observation times, streamflow ranged from 2260 cfs – 7510 cfs.

Unique Group Icon	Date	Gauging station	Discharge (cfs)	Crane Group ID	Use Site #	# of Cranes Adults:Juv
	3/18/19	Grand Island	7510	2019SP01	1	1:0
	3/18/19	Grand Island	7510	2019SP02	2	1:0
	3/18/19	Kearney	4800	2019SP04	4	1:0
	3/20/19	Grand Island	5610	2019SP05	5	1:0
	3/21/19	Kearney	3020	2019SP07	6	1:0
	3/22/19	Kearney	2390	2019SP09	7	1:0
	3/26/19	Grand Island	4150	2019SP11	8	1:0
	3/26/19	Kearney	3250	2019SP12	9	1:0
	3/26/19	Grand Island	4090	2019SP13	10	1:0
	3/28/19	Grand Island	4040	2019SP16	11	1:0
	3/29/19	Kearney	3180	2019SP18	12	1:0
	3/30/19	Kearney	3090	2019SP21	13	1:0
	3/31/19	Kearney	3080	2019SP23	14	1:0
	3/31/19	Grand Island	3980	2019SP24	15	1:0
	3/31/19	Grand Island	3980	2019SP25	16	1:0
	4/1/19	Grand Island	3770	2019SP26	17	1:0
	4/1/19	Grand Island	3070	2019SP27	18	1:0
	4/1/19	Kearney	3020	2019SP28	19	1:0
	4/3/19	Grand Island	3250	2019SP31	20	1:0
	4/5/19	Grand Island	3440	2019SP34	21	1:0
	4/6/19	Grand Island	3520	2019SP36	22	1:0
	4/7/19	Grand Island	2970	2019SP37	23	1:0
	4/9/19	Grand Island	3140	2019SP40	24	1:0
	4/13/19	Kearney	2260	2019SP41	25	1:0
	4/14/19	Kearney	2260	2019SP42	26	1:0

<u>TABLE 2.</u> Associated crane group use sites and streamflow discharge (cfs) based on nearest gauging station.

Table 3 includes unobstructed channel width, as measured in GIS, at each in-channel use location. Unobstructed channel widths at riverine use sites ranged from 65 - 1,261 feet (average = 699 feet).

Unique Group Icon	Group ID #	Use Site #	UTMx	UTMy	Unobstructed Channel Width (ft)
	2019SP01	1	540444	4512058	544
	2019SP02	2	533958	4510447	65
	2019SP04	4	506124	4501607	270
	2019SP05	5	541984	4513042	818
	2019SP07	6	501582	4501367	249
	2019SP09	7	506441	4501626	996
	2019SP11	8	550127	4515811	528
	2019SP12	9	471226	4503802	760
	2019SP13	10	509033	4501913	1,031
	2019SP16	11	541387	4512870	469
	2019SP18	12	510327	4502848	527
	2019SP21	13	510234	4504440	304
	2019SP23	14	509009	4501887	1,015
	2019SP24	15	550677	4515941	522
	2019SP25	16	544745	4514487	1,147
	2019SP26	17	549331	4515322	539
_	2019SP27	18	544594	4514461	1,202
	2019SP28	19	510182	4502677	1,110
	2019SP31	20	548240	4515131	470
	2019SP34	21	549967	4515714	435
	2019SP36	22	544909	4514471	1015
	2019SP37	23	549800	4515636	486
	2019SP40	24	544722	4514386	1,261
	2019SP41	25	529120	4508375	657
	2019SP42	26	516667	4505238	1,057

TABLE 3. Unobstructed channel width at each in-channel crane use location.



Figure 2



Figure 3

USFWS/PRRIP Data Comparison

Table 4 compares the USFWS whooping crane sighting data (provided by Matt Rabbe – USFWS whooping crane lead) to the PRRIP survey effort on all reported observations in the Big Bend corridor. Included are the icons associated with each unique crane group, the date(s) the group was observed, the number of individuals in the group and each agency's identification numbers assigned to the respective groups.

The difference in ID #'s is due to the USFWS data operating on an "initial sighting" basis of identification, whereas PRRIP assigns a new crane group ID number each day observed.

There was one instance where a crane group (19A-18; Table 4) was reported directly to USFWS, and therefore are not included in the PRRIP data. Groups 19A-02 and 19A-07 were reported to USFWS on dates prior to ES/EDO staff observations. Of note, both flights were canceled due to inclement weather on one of the days that 19A-18 was observed.

Unique Group Icon	Date	# of WC Ad:Juv	USFWS ID #	PRRIP ID #
	3/17 - 4/1	1:0	19A-02	2019SP04, 07, 09, 13, 18, 21, 23, 28
	3/18 - 3/20	1:0	19A-03	2019SP02, 06
	3/18 - 3/21	1:0	19A-04	2019SP03, 08
	3/18 - 4/9	1:0	19A-05	2019SP01, 05, 10, 14, 16, 19, 25, 27, 29, 32, 35, 36, 38-40
	3/21 - 4/8	1:0	19A-07	2019SP11, 15, 17, 20, 22, 24, 26, 30, 31, 33, 34, 37
	3/25 - 3/26	2:0	19A-14	2019SP12
N/A	3/27 - 3/28	1:0	19A-18	N/A
	4/13 - 4/13	1:0	19A-39	2019SP41
	4/14 - 4/14	1:0	19A-40	2019SP42

TABLE 4. USFWS/PRRIP Whooping Crane Group ID Comparisons

Ground Search Effort and Opportunistic Observations

There were twenty-six instances where ground crews either independently observed a WC group or they acted on a confirmation request to verify either a public sighting or a white object spotted by aerial crews within the survey area during the 55-day monitoring effort. In Table 5, the "miles driven" column indicates the total miles driven in the effort to locate a potential crane group, starting from the location of the last reported sighting or known location based on previous days' observations, then continuing until the crane group or white object is located and identified or a reasonable amount of effort has been put forth. In three instances the crane groups were observed by air crews and confirmed by ground crews. There were eighteen instances in which crane groups were observed by ground crews only, with one of those representing a roost or use site (Table 1). There were five instances of same-day repeated group sightings. They were: 2019SP02 on 3/18, 2019SP03 on 3/18, 2019SP05 on 3/20, 2019SP07 on 3/21 and 2019SP36 on 4/6. The remaining seven ground searches resulted in no whooping crane observation or confirmations.

Unique Group Icon	Date	Source	WC Confirmed Ad:Juv	Miles Driven	Aerial/Ground Effort
N/A	3/18	Air crew	None	3	Both
N/A	3/18	Air crew	None	1	Both
N/A	3/18	Air crew	None	1	Both
	3/18	Air crew	1:0	1	Both
	3/18	Air crew	1:0	1	Both
	3/20	Air crew	1:0	1	Both
	3/20	Known	1:0	1	Ground
	3/21	Public	1:0	3	Ground
	3/25	Known	1:0	2	Ground
N/A	3/26	Public	None	12	Ground
	/27	Known	1:0	1	Ground
	3/27	Known	1:0	1	Ground
	3/28	Known	1:0	2	Ground
	3/28	Known	1:0	4	Ground
	3/30	Known	1:0	1	Ground
	4/2	Known	1:0	3	Ground
	4/2	Known	1:0	1	Ground
	4/3	Known	1:0	2	Ground
	4/4	Known	1:0	1	Ground
N/A	4/4	PRRIP Staff	None	6	Ground
	4/5	Known	1:0	1	Ground
	4/6	Known	1:0	3	Ground
	4/7	Known	1:0	1	Ground
	4/8	Known	1:0	1	Ground
N/A	4/9	Air crew	None	1	Both
N/A	4/9	Air crew	None	18	Both

TABLE 5. Ground search effort and opportunistic observations.

Incidental Take

The USFWS requests information and documentation of any human activity that occurred in the proximity of Whooping Cranes that could constitute "take" as defined by the Endangered Species Act i.e. "...to harass, harm, pursue, hunt, shoot, wound, kill, capture, or collect, or attempt to engage in any such conduct". Because harassment interrupts essential feeding or sheltering behaviors, the definition includes disturbance of Whooping Cranes sufficient to result in cranes taking flight.

LETHAL OR CRIPPLING TAKE

There were no observations of crippling or lethal take of Whooping Cranes this season as a result of the monitoring conducted by ES.

HARASSMENT

Ecological Solutions staff did not observe or engage in any activity that could be construed as harassment as defined by USFWS.

PUBLIC DISTURBANCE

Ecological Solutions staff did not observe any incident of public disturbance of whooping cranes.

Observation Efficiency Trials

Twenty-five whooping crane decoys were randomly placed by PRRIP personnel along the aerial transects. Flight crews spotted 6 of the decoys in a wetted channel (60.0%), 1 in Ag-corn (20.0%), 2 in a lowland or grassland (40.0%), and 1 in an open water pit/pond/lake (20.0%), for an overall spotting efficiency of 40.0% (Table 6).

Decoy	Date Placed	Date Tested	UTMx	UTMy	Туре	Detected
1	3/21/19	3/22/19	452683	4503323	Wetted channel	NO
2	3/22/19	3/27/19	448069	4504794	Wetted channel	YES
3	3/22/19	3/23/19	571425	4536989	Wetted channel	YES
4	3/29/19	3/30/19	446344	4503973	Wetted channel	NO
5	4/1/19	4/3/19	444457	4504387	Wetted channel	YES
6	4/3/19	4/5/19	497387	4500911	Wetted channel	NO
7	4/3/19	4/5/19	513711	4503034	Wetted channel	YES
8	4/15/19	4/16/19	558917	4522777	Wetted channel	YES
9	4/16/19	4/18/19	560188	4524137	Wetted channel	YES
10	4/18/19	4/19/19	554552	4518268	Wetted channel	NO
11	3/18/19	3/20/19	483866	4495602	Ag - corn	NO
12	3/21/19	3/22/19	554666	4514798	Ag - corn	YES
13	4/9/19	4/12/19	502339	4498187	Ag - corn	NO
14	4/12/19	4/13/19	549021	4513696	Ag - corn	NO
15	4/13/19	4/14/19	547756	4512442	Ag - corn	NO
16	3/20/19	3/21/19	487800	4503663	Grassland-lowland	NO
17	3/21/19	3/22/19	479211	4503083	Grassland-lowland	YES
18	3/22/19	3/23/19	538105	4511817	Grassland-lowland	YES
19	3/25/19	3/26/19	505789	4500690	Grassland-lowland	NO
20	4/1/19	4/3/19	479056	4503250	Grassland-lowland	NO
21	3/18/19	3/21/19	438879	4502871	Open water pit/pond/lake	NO
22	3/21/19	3/22/19	572557	4535977	Open water pit/pond/lake	YES
23	4/1/19	4/3/19	537339	4507343	Open water pit/pond/lake	NO
24	4/3/19	4/5/19	441887	4503129	Open water pit/pond/lake	NO
25	4/16/19	4/19/19	546072	4514537	Open water pit/pond/lake N	

TABLE 6. Observation Efficiency Trials Using Whooping Crane Decoys

Flight Statistics and Sighting Frequency

Of the 110 scheduled flights, there were 69 instances when crews were able to depart the airport, of which 41 were completed, resulting in an overall completion of 62.7% (Table 7). Thirty-eight flights were cancelled or incomplete due to inclement weather and three to logistical issues.

	East	West	Totals
COMPLETED	37	32	69
CANC./INCOMP.	18	23	41
SEASON TOTAL	55	55	110
% COMPLETED	67.3%	58.2%	62.7%

TABLE 7. Flight Completion Rates

FLIGHT RESULTS

Of the 302 scheduled systematic transects, 156 (51.6%) were completed. During this time, 56 whooping crane groups were observed from the air while conducting systematic flights for an overall sighting-per-transect frequency of 18.5% (Table 8). Fifteen crane groups were observed by ground crews only (See Table 1), so were not included in this chart.

TABLE 8. Whooping Crane Sighting Frequency per Transect

		#WC	Fraguanay			
		Completed	Cancel/Incomp.	TOTAL	Groups ¹	riequency
Ð	$0SE, 0SW^2$	69	41	110	22	20.0%
RIN	PWRTE, PWRTW ³	69	41	110	5	4.5%
SP	WSRT/CSRT, ESRT ⁴	52	30	82	0	0.0%
	TOTALS	190	112	302	27	8.9%

¹These groups may or may not consist of crane(s) observed on previous days. See crane group ID designation on page 4 under "Confirmed Whooping Crane Sightings".

²Primary Transect (Riverine), (East – 0SE, West – 0SW)

³Primary Return transect, (East – PWRTE, West – PWRTW)

⁴Secondary Return transect, (East – WSRT and CSRT, West – ESRT)

Supplements QA/QC of database was performed by ES Original datasheets – Retained at PRRIP **FIGURE 6.** Distribution of initial whooping crane group observations during the 2018 fall survey (yellow) and 2019 spring survey (red) in relation to the PRRIP lands (highlighted in blue) and all other conservation lands (highlighted in green).

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FIGURE 7. Observed whooping crane locations. 1 of 6 collective crane group maps. See Table 1 for color icon coding and details.

FIGURE 8. Observed whooping crane locations. 2 of 6 collective crane group maps. See Table 1 for icon color coding and details.

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FIGURE 9. Observed whooping crane locations. 3 of 6 collective crane group maps. See Table 1 for icon color coding and details.

FIGURE 10. Observed whooping crane locations. 4 of 6 collective crane group maps. See Table 1 for icon color coding and details.

FIGURE 11. Observed whooping crane locations. 5 of 6 collective crane group maps. See Table 1 for icon color coding and details.

FIGURE 12. Observed whooping crane locations. 6 of 6 collective crane group maps. See Table 1 for icon color coding and details.

FIGURE 13. Map 1 of 2 Observed locations of the 1:0 crane group designated with ID #'s: 2019SP01, 05, 10, 14, 16, 19, 25, 27, 29, 32, 35, 36, & 38 - 40. This group was observed in the survey area 3/18 - 4/09.

FIGURE 14. Map 2 of 2 Observed locations of the 1:0 crane group designated with ID #'s: 2019SP01, 05, 10, 14, 16, 19, 25, 27, 29, 32, 35, 36, & 38 - 40. This group was observed in the survey area 3/18 - 4/09.

FIGURE 15. This photo was taken during a ground observation of the 1:0 crane group 2019S25 at Use Site 16 on 3/31 in the main channel of the Platte River.

FIGURE 16. Observed locations of the 1:0 crane group designated with ID #'s: 2019SP02 & 06. This group was observed in the survey area 3/18 - 3/20.

FIGURE 17. This photo was taken during a systematic observation of the 1:0 crane group 2019SP02 on 3/18 at use site 2 in the main channel of the Platte River.

FIGURE 18. Observed locations of the 1:0 crane group designated with ID #'s: 2019SP03 & 04. This group was observed in the survey area 3/18 - 3/21.

FIGURE 19. This photo was taken during a systematic observation of the 1:0 crane group 2019SP03 at use site 3 on 3/18 in a flooded grassland near Denman, NE.

FIGURE 20. Observed locations of the 1:0 crane group designated with ID #'s: 2019SP04, 07, 09, 13, 18, 21, 23 & 28. This group was observed in the survey area 3/17 - 4/01.

FIGURE 21. This photo was taken during the systematic observation of the 1:0 crane group 2019SP04 at use site 4 on 3/18 in the main channel of the Platte River.

FIGURE 22. Observed location of the 1:0 crane group designated with ID #'s: 2019SP11, 15, 17, 20, 22, 24, 26, 30, 31, 33, 34 & 37. This group was observed in the survey area 3/21 - 4/08.

FIGURE 23. This photo was taken during a ground observation of the 1:0 crane group 2019SP30 in a cornfield on 3/30 near Doniphan, NE.

FIGURE 24. Observed locations of the 2:0 crane group designated with ID # 2019SP12. This group was observed in the survey area 3/26.

FIGURE 25. This photo was taken during a systematic observation of the 2:0 crane group 2019SP12 use site 9 on 3/26 in the main channel of the Platte River.

FIGURE 26. Observed location of the 1:0 crane group designated with ID # 2019SP41. This group was observed in the survey area on 4/13.

FIGURE 27. This photo was taken during a systematic observation of the 1:0 crane group 2019SP41 use site 25 on 4/13 in the main channel of the Platte River.

FIGURE 28. Observed location of the 1:0 crane group designated with ID # 2019SP42. This group was observed in the survey area on 4/14.

FIGURE 29. This photo was taken during a systematic observation of the 1:0 crane group 2019SP42 use site 26 on 4/14 in the main channel of the Platte River.

