



## Whooping Crane Monitoring for the Cooperative Agreement and The Platte River Recovery Implementation Program

June 8, 2017

This document describes changes in the CA whooping crane monitoring protocol since Spring 2001. The Technical Committee implemented the February 23, 2001 version of this protocol during the spring 2001 season; the September 12, 2001 version during the fall 2001 season; the December 20, 2001 version during the spring and fall 2002 seasons; the August 21, 2003 version during the fall 2003, fall and spring 2004, and spring 2005 seasons; the September 16, 2005 version during fall 2005, spring and fall 2006–2010, and spring 2011 seasons; the May 31, 2011 version during fall 2011, spring and fall 2012, and spring 2013; the September 10, 2013 version during fall 2013; the March 1, 2014 version during spring and fall 2014 and spring 2015; the May 11, 2015 version during fall 2015, and spring and fall 2016; and the June 8, 2017 version beginning in the fall of 2017. The Technical Committee did not implement a survey in spring 2003. This version of the protocol incorporates changes as a result of the previous implementation periods, independent peer review, and other comments. Details of the changes have been recorded to facilitate analyses involving all the data together. Major changes included aerial survey details and the crane group numbering. Excerpts of text from the protocols are included at the end.

### **Fall 2017 –**

Implementation of Protocol dated June 8, 2017

Fall monitoring season conducted October 9 – November 16. These dates encompass the fifth and ninety-fifth percentile of initial observation dates of whooping cranes in Nebraska, 2007–2016, as well as the scheduled monitoring seasons, spring 2001–fall 2016.

### **Fall 2015 – Spring 2017**

Implementation of Protocol dated May 11, 2015

All transects will be flown at 750' altitude unless snow goose migration endangers the flight crew at which time flights will be conducted at an altitude of 2,000'

Discontinued the collection of Continuous Use Monitoring Data.

### **Spring 2014 – Spring 2015**

Implementation of Protocol dated March 1, 2014

River transect always flown in Westward direction

Two start locations for each leg of the river transect

Primary targeted wetland transects flown daily in an Eastward direction

Secondary wetland return transect on the west leg flown between Elm Creek and Kearney in an Eastward direction every other day when river flights originate at Odessa

Secondary wetland return transect on the east leg flown between Chapman and HWY 34 in a Westward direction every other day when river flights originate at Chapman

Secondary wetland return transect on the east leg flown between Wood River and HWY 281 in an Eastward direction every other day when river flights originate at Wood River

All transects will be flown at 750' altitude

Discontinued the collection of Profile and Use Characteristics Data.



Implementation of Protocol dated September 10, 2013

- Spring survey dates expanded and to be conducted between March 6 and April 29
- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Primary targeted wetland transects always flown in an Eastward direction
- Secondary wetland return transect on the west leg flown between Elm Creek and Kearney in an Eastward direction every other day when river flights originate at Odessa
- Secondary wetland return transect on the east leg flown between Chapman and HWY 34 in a Westward direction every other day when river flights originate at Chapman
- Secondary wetland return transect on the east leg flown between Wood River and HWY 281 in an Eastward direction every other day when river flights originate at Wood River
- All transects will be flown at 750' altitude
- List of definitions expanded to include Stopover, Use Location, Use Site, Systematic Sighting, and Opportunistic Sighting.
- Added a table of additional metrics that may be included in analyses of whooping crane data that will not be collected by the Consultant.
- Added a map showing the location of river and primary and secondary return transects.
- Added 2 figures showing the median and fifth and 95<sup>th</sup> percentile of whooping crane observations in Nebraska during spring and fall.

**Fall 2011 – Spring 2013**

Implementation of Protocol dated May 31, 2011

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude
- Decoys placed on private, Governmental, Non-governmental, or Program properties (see additional modifications of the September 16, 2005 Monitoring Protocol below)

**Spring 2011**

Implementation of Protocol dated September 16, 2005 (Modified Summer 2010)

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude

Decoys only placed in active river channel on governmental, NGO, and Program properties. River profiles not collected at decoy locations and rebar protocol was abandoned.



**Fall 2010**

Implementation of Protocol dated September 16, 2005 (Modified Summer 2010)

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude

Decoys only placed in active river channel on governmental, NGO, and Program properties.  
River profiles not collected at decoy locations and rebar protocol was abandoned.

**Spring 2010**

Implementation of Protocol dated September 16, 2005

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude

**Fall 2009**

Implementation of Protocol dated September 16, 2005

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude

**Spring 2009**

Implementation of Protocol dated January 14, 2004

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude

**Fall 2008**

Implementation of Protocol dated September 16, 2005

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude

**Spring 2008**

Implementation of Protocol dated September 16, 2005

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude



**Fall 2007**

Implementation of Protocol dated September 16, 2005

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude

**Spring 2007**

Implementation of Protocol dated January 14, 2004

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude

**Fall 2006**

Implementation of Protocol dated September 16, 2005

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude

**Spring 2006**

Implementation of Protocol dated September 16, 2005

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude

**Fall 2005**

Implementation of Protocol dated September 16, 2005

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude

**Spring 2005**

Implementation of Protocol dated January 14, 2004

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude



Changes during implementation:

1. Added Time field in 'WC use Locations' table for time of sighting. If a crane returns to the same location on the same day it will have the same date, crane group ID, and location ID, but different time.
2. Does not appear the flight information was recorded correctly. Specifically, the rows of the 'WC Flight surveys' table are not unique by flight date, transect ID, flight direction and flight origin. The flight origin does not appear to change for the two halves of a split transect.

**Fall 2004**

Implementation of Protocol dated January 14, 2004

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude

Changes during implementation:

1. Flight origin not used

**Spring 2004**

Implementation of Protocol dated January 14, 2004

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude
- Research to determine relative value of afternoon versus morning flights continued

Changes during implementation:

1. Flight origin not used; contractor added 1 or 2 to transect ID when split

**Fall 2003**

Implementation of Protocol dated August 23, 2003 & Research document with same date

- River transect always flown in Westward direction
- Two start locations for each leg of the river transect
- Seven return transects always flown in Eastward direction
- All transects will be flown at 750' altitude
- Research to determine relative value of afternoon versus morning flights

Changes during implementation:

1. Added 'Research transect' field to 'WC Flight Surveys' table, with YES entered for afternoon flights.
2. Flight Origin added to 'WC Flight Surveys' table



### **Fall 2002**

Implementation of Protocol dated August 1, 2002

River transect flight direction alternated between east and west

Seven return transects flown in alternating direction

River transect flown at 750' altitude, while the return transects flown at 1000'

### **Spring 2002**

Implementation of Protocol dated December 20, 2001

River transect flight direction alternated between east and west

Seven return transects flown in alternating direction

River transect flown at 750' altitude, while the return transects flown at 1000'

### **Fall 2001**

Implementation of Protocol dated September 12, 2001

River transect flight direction alternated between east and west

Six upland transects flown in alternating direction

Flights at 500 feet in protocol but contractor report states "The riverine transects were flown at an altitude of 750 feet while the return transects were flown at an altitude of 1000 feet".

Changes during implementation:

1. Flight direction added to 'WC Flight Surveys' table.

### **Spring 2001**

Implementation of Protocol dated February 23, 2001

River transect always flown in Westward direction

Six upland transects flown in East direction

Flights at 1000 feet

### **Crane Group Numbering** (protocol section IV.B.3 Crane Group Numbering)

#### **December 20, 2001**

Any time a crane group is observed in the study area by the survey crew, a *Crane Group ID* will be assigned to the group. The *Crane Group ID* will consist of the following information: year; "SP" for the spring monitoring period or an "FA" for the fall; sequential number (e.g. 2002FA01, 2002FA02, 2002FA03,... etc). Any time a crane group is observed in the study area by the survey crew, a new *Crane Group ID* will be assigned. Each time a different sighting of a crane group occurs, it will get a new *Crane Group ID*. Judgments about the likelihood of a crane group being the same group previously observed will be noted in the field datasheets and database.

#### **August 1, 2002**

Any time a crane group is observed in the study area by the survey crew, a crane group ID will be assigned to the group. The crane group ID will consist of the year, followed by an "SP" for the spring monitoring period or an "FA" for the fall, followed by a sequential number (2002FA01, 2002FA02, 2002FA03,... etc). Any time a crane group is observed in the study area by the survey crew, a new crane group ID will be assigned unless the surveyors note on the data



sheets the reasons why they believe this is a previously recorded group (using their professional judgment). In this case, the same crane group ID will be used.

### **Aerial Survey** (Protocol section *IV.B.1. Detecting/Locating Whooping Crane Stopovers*)

#### **Protocol February 23, 2001**

Spring 2001

Planes will fly at an altitude of approximately 300 meters (1,000 feet) and at 100 mph. A Cessna 172 or similar aircraft will be used. One plane will begin at Chapman and fly **west** to the Nebraska Highway 10 (Minden) Bridge. The second plane will begin at the Minden Bridge and fly **west** to the Lexington Bridge. Surveys along the flight line will begin 15 minutes prior to sun rise or when visibility is adequate in the opinion of the observer (e.g., the start time might be later on overcast days). Each plane will begin the surveys (i.e., traveling west) flying south of the main channel centerline, such that the main channel(s) can be clearly viewed. When the westward leg of each survey is completed, the planes will return to the airport/landing strip (i.e., traveling east) flying one, two or three miles either north or south of the center line of the river (6 possibilities). The survey will continue on the return flight along one of the six transects. The exact transect traveled each day will be determined using a rotating schedule. This will provide a systematic aerial survey to locate whooping crane groups in areas outside of the channel as well as within the channel.

#### **Protocol September 12, 2001**

Fall 2001

Each plane will begin the survey flying north or south of the main channel centerline, such that the main channel(s) can be clearly viewed (i.e., one day south of the channel centerline, next day north of the channel centerline). When the river leg of the survey is completed, the planes will fly the return leg surveying one, two or three miles either north or south of the center line of the river (6 upland transect possibilities). The upland transect that is surveyed each day will be determined based on a predetermined, systematically rotating schedule. Similarly, **the initial direction of flight for the first leg of each survey will alternate between West and East**, although the river leg will always be flown first. This design will provide a systematic aerial survey to locate whooping crane groups in areas outside of the channel as well as within the channel.

#### **Protocol December 20, 2001**

Spring 2002

Each plane will begin the survey flying the river transect along the river, such that the main channel(s) can be clearly viewed by both observers looking out the passenger side of the plane. When the river leg of the survey is completed, each plane will **fly one of 7 return flights** with each observer looking out different sides of the plane. The 7 return flights are one, two or three miles either north or south of the center line of the river and directly down the centerline of the river (Figure 1). **The flight direction for the river transect on each day will be alternated between East and West** (the direction of flight for the return transect will always be the opposite of the direction of flight for the river transect). The return transect surveyed each day will be determined based on a predetermined, systematically rotating schedule. This design will



provide a systematic aerial survey to locate whooping crane groups in areas outside of the channel as well as within the channel.

### **Protocol August 1, 2002**

Fall 2002 – No aerial survey changes

### **Spring 2003 – Monitoring Protocol not implemented**

### **Protocol & Research document August 23, 2003**

Fall 2003

**All aerial surveys will be flown such that the flight direction when flying the river transect will be away from the rising sun.** To help address the concern that one end of the river transect will always be flown early and the other late, **there will be two start locations for each leg (east side and west side) of the study area.** Using the eastern section as an example: day one the flight will begin at Chapman, fly the river west to Minden, fly a predetermined return transect (upland) back to Chapman. Day two the flight will begin at the Wood River bridge, fly the river transect west to Minden, fly a predetermined return transect back to Chapman, and then fly the rest of the river transect from Chapman to Wood River. This pattern will continue through the survey period. The start points for the west leg will be the Minden Bridge and Odessa Bridge. During the river transect, observers will be situated such that the main channel(s) can be clearly viewed by both observers looking out the passenger side of the plane. This will necessitate that the plane fly just south of the main channel.

### **Protocol January 14, 2004**

Spring 2004, Fall 2004, and Spring 2005

No aerial survey changes

### **Protocol September 16, 2005**

Fall 2005, Spring 2006, Fall 2006, Spring 2007, Fall 2007, Spring 2008, Fall 2008, Spring 2009, Fall 2009, and Spring 2010.

No aerial survey changes

After the start direction changed, the recording of data also changed. The number of flights in the database appears to double because every other day, river flights are split in half and are (sometimes) recorded on two separate rows.

Fall 2003- did not record split river transects on separate rows.

Spring 2004- Split into separate rows, indicated which half in transect ID, no flight origin

Fall 2004- Split into separate rows but did not indicate which half with transect ID or flight origin

Spring 2005- Split into separate rows, used flight direction and flight origin- flight origin appears to be wrong, did not change for multiple rows in a day. Must represent origin of entire flight.

Fall 2005- Split into separate rows, used flight direction and flight origin- best





**This issue was fixed in the final SP06 database (and retained in subsequent complete databases). The SAS program and other documentation is in 'C:\Projects\Platte\Protocols\Whooping crane\Database\final SP06\flight fix'.**

Fall 2010 and Spring 2011

Decoys only placed in active river channel (i.e., no off-channel decoy locations) on governmental, non-governmental, and Program properties. River Profiles not collected at randomly generated decoy locations. The 'Rebar Protocol' was also abandoned.

### **Protocol May 31, 2011**

Modifications of the September 16, 2005 Protocol made during summer 2010 and 2011 include:

- Added information on availability of additional data such as telemetry, 2005 land cover/use, LiDAR, and annual habitat suitability analysis data
- Moved Protocol history to document titled 'WC Monitoring Changes Through Time 2001-2011'
- Specified camera requirements to be used by air and ground crews
- Removed collecting video at use sites (never been collected)
- Removed collecting river profile data at random/decoy locations (changed during 2010)
- Included additional aerial surveys and ability to relocate cranes via telemetry project lost during the day (changed during 2010)
- Replaced stadia transit and rod method of collecting river profile data and replaced it with the use of GPS equipment with elevation accuracies  $\leq \pm 6$  inches or other means approved by the Program
- Added Active Channel Width as a parameter to be measured
- Added 'proportion of population using the central Platte River' as an indicator
- Added information explaining how the contractor could complete river transects
- Moved full definition of 'Visual Obstruction' to the definition section in the methods
- Contractor will conduct basic analyses as requested by the Program including analyses related to use of Program defined complex, suitable, and unsuitable habitat
- Contractor will produce migration-period summaries and 1 annual report where data is analyzed, presented, and summarized
- Specified that InfoPath is needed to upload data to the Program's database
- Decoys randomly placed on private lands as well as NGO, governmental, and Program lands.
- Program staff or partners will place decoys in the field

Implemented Fall 2011 – Spring 2013



### **Protocol September 10, 2013**

#### Modifications of the May 31, 2011 Protocol

- Changed Spring survey dates to implement monitoring protocol from March 6 – April 29
- Abandoned 7 return transects and implemented targeted primary and secondary wetland return transects
  - Primary targeted wetland return transect flown in an Eastward direction daily
  - Secondary wetland return transect on the west leg flown between Elm Creek and Kearney in an Eastward direction every other day when river flights originate at Odessa
  - Secondary wetland return transect on the east leg flown between Chapman and HWY 34 in a Westward direction every other day when river flights originate at Chapman
  - Secondary wetland return transect on the east leg flown between Wood River and HWY 281 in an Eastward direction every other day when river flights originate at Wood River
- Added a map showing the location of river and primary and secondary return transects.
- List of definitions expanded to include Stopover, Use Location, Use Site, Systematic Sighting, and Opportunistic Sighting.
- Added a table of additional metrics that may be included in analyses of whooping crane data that will not be collected by the Consultant.
- Added 2 figures showing the median and fifth and 95<sup>th</sup> percentile of whooping crane observations in Nebraska during spring and fall.
- 10 decoys placed in cornfields, wet meadows, river channels, and wetlands
  - Began placing 10 decoys in cornfields and wet meadows in fall 2012; added wetlands in fall 2013.

Implemented Fall 2013

### **Protocol March 1, 2014**

#### Modifications of the September 10, 2013 Protocol

- Abandoned Profile and Use Characteristic data collection and removed information pertaining to this data from the protocol.
- 10 decoys placed in cornfields, wet meadows, river channels, and wetlands.
- Moved Protocol history to document titled 'WC Monitoring Changes Through Time 2001-2014'

Implemented Spring 2014 – Spring 2015

### **Protocol May 11, 2015**

#### Modifications of the March 1, 2014 Protocol

- All transects will be flown at 750' altitude unless snow goose migration endangers the flight crew at which time flights will be conducted at an altitude of 2,000'
- Discontinued the collection of Continuous Use Monitoring Data.
- Moved Protocol history to document titled 'WC Monitoring Changes Through Time 2001-2015'



Modifications of the May 11, 2015 Protocol

- Conducted fall surveys from October 9 – November 16

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