



1 **PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM**
2 **2015 Central Platte River Tern and Plover Monitoring and Research Protocol**
3

4 **INTRODUCTION**

5 During 2010, the Platte River Recovery Implementation Program (PRRIP or Program) revised the
6 Program’s Tern and Plover Monitoring Protocol entitled ‘Monitoring the Abundance, Distribution,
7 Reproductive Success, and Reproductive Habitat Parameters of Least Terns and Piping Plovers on the
8 Central Platte River’ (2010 Monitoring Protocol) primarily to: 1) increase the timeframe for conducting
9 tern and plover surveys at all sites from 15 May – 15 July to 1 May – 1 August; 2) increase the frequency
10 of surveys at potential nesting areas; 3) clarify or further define terms within the original Monitoring
11 Protocol; and 4) allow for on-site collection of habitat parameters believed to influence reproductive
12 success of terns and plovers within Program Associated Habitats (2011 Monitoring Protocol). The
13 Program also retained U.S. Geological Survey - Northern Prairie Wildlife Research Center (USGS) to
14 implement a 2-year Foraging Habits study that concluded in 2010. The Program has since retained the
15 USGS to continue to implement inside and outside monitoring and banding at managed and unmanaged
16 sites within the Program Associated Habitat area (2011 Monitoring Protocol).

17 Activities proposed for 2015–2018 include the collection of data outlined in the Program’s 2015
18 Monitoring Protocol as well as banding tern and plover adults and chicks where approved by the land
19 owner/manager. Data collected at nesting sites during 2015–2018 will be utilized to determine effects
20 and relationships that relate back to priority hypotheses outlined in the Program’s Adaptive Management
21 Plan (AMP), the two management strategies identified in the AMP, and overall AMP implementation.
22 Information obtained through banding efforts will allow us to obtain better estimates of chick survival and
23 overall reproductive success of these species and will allow us to discern how the species interact with
24 riverine and sandpit habitats. Banding will also serve as an essential tool in providing long-term
25 information such as site fidelity (within Program Associated Habitats as well as across multiple river
26 systems), recruitment, fledgling and adult survival, and seasonal as well as annual movement patterns.
27 Since interior least terns and piping plovers are banded within several river systems, we can gather
28 information at both a local and regional scale which could result in better demographic population
29 models, a better understanding of how central Platte River terns and plovers contribute to the overall
30 population recovery goals, and additional guidance for future efforts to recover the species.

31 **DESIGN CONSIDERATIONS AND SPECIFICATIONS**

32 **Area of Interest**

33 The area of interest consists of the Platte River beginning at the junction of U.S. Highway 283 and
34 Interstate 80 near Lexington, Nebraska, and extending eastward to Chapman, Nebraska. This includes
35 approximately 90 miles of the Platte River and sandpits within 3.5 miles of the main channel or within 2
36 miles of a side channel if the side channel extends beyond 3.5 miles of the main channel.

37 **Survey Design**

38 The design consists of two main components: 1) semi-monthly river surveys and 2) semi-monthly sandpit
39 surveys. Each sandpit and constructed, managed, or naturally existing river island designated as suitable
40 habitat will be monitored for tern and plover adults, nests, broods, and fledglings from outside as well as
41 from within the nesting area as described in the methods section below. Least tern or piping plover nests
42 or chicks observed during any survey will be monitored twice/week from outside and inside the nesting
43 area to evaluate their status. Data collected will be used to make informed judgments regarding trends in
44 least tern and piping plover reproductive parameters associated with Program effects on habitat.
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46 *Semi-monthly River Surveys*

47 Airboat surveys of the entire 90-mile study area between Lexington and Chapman, Nebraska will be
48 conducted on or about 1 and 15 May, June, and July and 1 August as outlined in the Program's
49 Monitoring Protocol. Nebraska Public Power District personnel (NPPD; i.e., Jim Jenniges) will survey
50 potential nesting habitat between the Lexington Bridge and the J-2 Return (i.e., Lexington Island).
51 Program staff and contracted personnel will survey the Platte River between the J-2 Return and the Alda
52 Bridge. U.S. Fish and Wildlife Service personnel will conduct surveys between the Alda and Chapman
53 Bridges when possible, otherwise Program staff and contracted personnel will conduct these surveys. If
54 nesting occurs on a river island between the Alda and Chapman Bridges, Program staff and contracted
55 personnel will monitor nests and broods as outlined below.

56 *Semi-monthly Sandpit Surveys*

57 All sandpits that have areas of bare sand (<25% vegetative cover) greater than 1.5 acres, and for which
58 access can be gained, will be surveyed for active tern and plover colonies on or about 1 and 15 May, June,
59 and July and 1 August. NPPD will conduct outside surveys at the Lexington, Johnson, and Blue Hole
60 Sandpits. Program staff and contracted personnel will conduct inside surveys at all Program managed
61 sites, Lexington, Johnson, and Blue Hole Sandpits, and additional sites where nesting occurs and access
62 can be gained. Central Platte Natural Resources District (CPNRD; i.e., Mark Czaplewski) will conduct
63 outside surveys at all sandpits located between the Alda and Chapman Platte River Bridges.

64 **METHODS**

65 **Field Techniques**

66 Standard field methods will be used during each visit to a nesting area and information such as: date; time
67 of day (arrival and departure); weather conditions; number of adults, nests, chicks, and fledglings present;
68 and other species of wildlife present in area will be recorded. Where inside and outside surveys are
69 conducted, observations of adults, nests, chicks, and fledglings collected from outside and inside the
70 nesting area will be documented on separate data sheets; final counts reported will represent the
71 maximum number of adults, nests, chicks, and fledglings counted by either method of observation during
72 each site visit. Continuing to conduct independent surveys at a handful of sites will allow us to address
73 issues related to observer bias and biases associated with field techniques used.

74 *Outside Survey/Monitoring*

75 Where conducted, outside surveys will be performed using binoculars and/or spotting scopes at a distance
76 great enough to not cause disturbance to nesting birds (usually >165 ft, but closer or farther as terrain
77 dictates) and for at least 1/2 hour. Observations will be conducted from multiple locations to provide as
78 complete of coverage of the site as possible. Observers will scan the area using binoculars and/or a
79 spotting scope at least five times and will record the number and/or status of adults, nests, chicks, and
80 fledglings observed as well as any other pertinent information.

81 *Inside Survey/Monitoring*

82 Where conducted, inside surveys will be performed using a systematic grid-search pattern which is the
83 most commonly used method for nest searching (see Figure 1). To initiate this search method,
84 investigators will form a straight line on the edge of and parallel to the longest side of a sandbar or sandpit
85 pond as shown in the figure below. Investigators will be evenly spaced and the distance between
86 individuals will not exceed 10 yards unless chicks are encountered. The spacing will be adjusted to
87 ensure that all nests can be detected while not pushing chicks out of their territory. For example, if
88 visibility is low because of vegetation or other factor, then the distance between technicians will be
89 decreased; however, this distance will be increased when chicks are encountered to allow chicks to move
90 between observers.

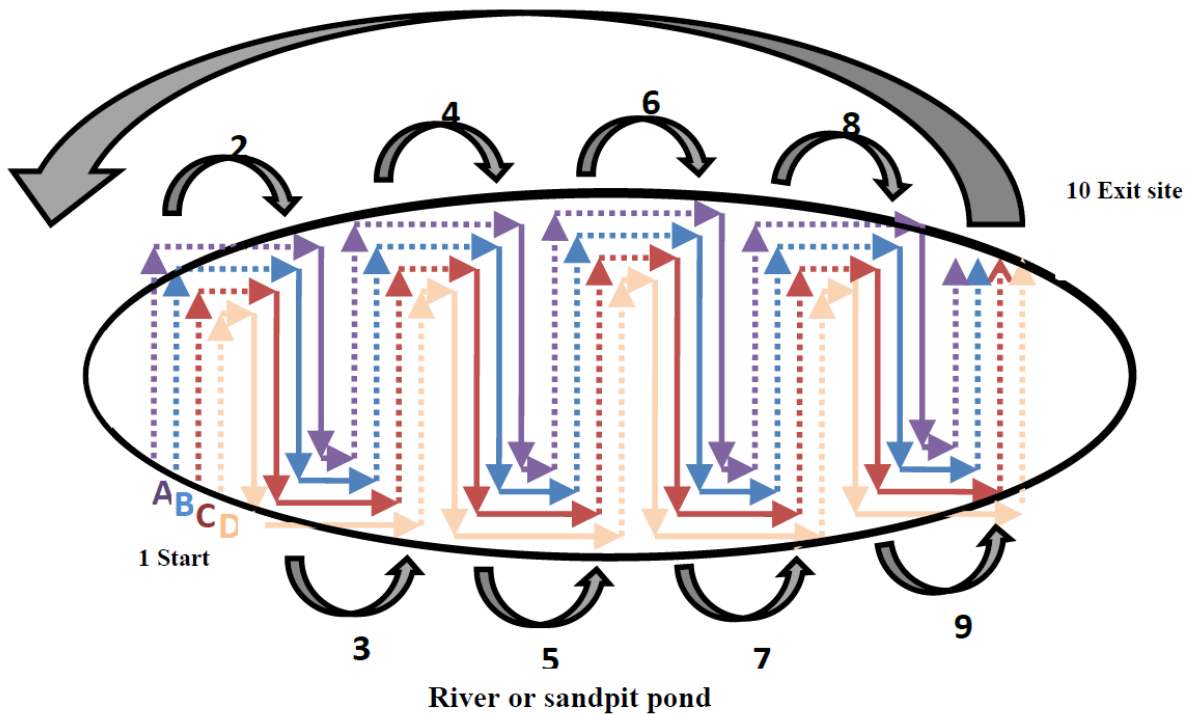


Figure 1. Systematic grid-search pattern used to locate nests and broods while conducting inside surveys of suitable nesting sites

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Surveys within each nesting colony will be conducted no more than twice during a seven-day period; activity within the colony areas will be limited so that individual adults are not kept off their nest or away from their brood for >20 minutes (unless further restricted by the Program’s State or Federal permit). To reduce stress and mortality to eggs and chicks, all within-site nest visits will be conducted when wind speeds are <25mph and sand is not blowing around, it is not precipitating, and the temperature is >40°F (4°C) and <90°F (32°C).

100 *Adult and Chick Banding*

101 Where allowed, unmarked tern and plover nesting adults and all chicks observed will be marked with a
102 combination of bands that will be unique to the central Platte River, sites within Program Associated
103 Habitats, and specific nests. Chicks will be captured and banded when encountered while conducting nest
104 and brood searches within the nesting colony. Chicks will be captured by hand, weighed, and fitted with
105 a unique combination of bands. When possible, chicks will be captured and released as broods. Chick
106 banding will only occur when air temperature are >40°F (4°C) and <90°F (32°C), the wind is minimal
107 (<25 mph), and there is no precipitation. Unmarked adult plovers will be trapped on their nest after 2-5
108 days of incubation as determined by egg floating, but before eggs are pipping. Live eggs will be replaced
109 with fake ones during trapping and will be returned to the nest bowl at the completion of the trapping
110 event. Trapping events will be conducted at least two hours prior to or following nest and brood surveys,
111 will last no longer then 20 minutes, and will take place when air temperatures are >40°F (4°C) and <90°F
112 (32°C), the wind is minimal (<25 mph), and there is no precipitation.

113 *Nest and Brood Monitoring*

114 To confirm their status, active nests and broods will be monitored twice per week as outlined above. We
115 will monitor nests/chicks until they become inactive either through success (hatch/fledge) or failure. The
116 fate of each nest and brood, including an estimate of the number of hatched eggs and fledged chicks will
117 be documented. An estimate of the number of successfully fledged chicks will be based on age and date



118 chicks were last observed or will be directly counted if chicks are observed flying from natal areas. When
119 possible, band combinations will be collected from previously marked birds to more accurately ascertain
120 which nests chicks and/or broods were generated from. Each site will be monitored twice a week until
121 nests and chicks are no longer observed at the natal area.

122 **HABITAT MEASUREMENTS**

123 **On-site Data Collection**

124 When a new nest is observed, we will document the presence of adults tending each nest, document
125 management activities applied to the nest (elevating, caging, etc), collect a GPS location of the nest, mark
126 nests with a numbered nest marker, float eggs, take a photograph of the nest, and proceed to collect
127 additional habitat measurements as outlined below. Numbered nest markers (e.g., tongue depressor or
128 paint stir-stick) will be placed 10 feet north of each nest, at a maximum height of 6 inches, to allow
129 observers to easily locate and identify nests during subsequent visits. To determine the initiation date, we
130 will float all eggs present in the bowl following methods of Hays and LeCroy (1971) and outlined in the
131 U.S. Army Corps of Engineers' *Least Tern and Piping Plover Monitoring Handbook* (U.S. Army Corps
132 of Engineers, 2009). In order to minimize the amount of time spent at nests and within the nesting
133 colony, we will use a digital camera to collect information at each nest. The camera will be placed on a
134 tripod stand or held at a standardized height that results in a 1-yd² area field of view centered on the nest
135 at ground level. Prior to collecting the image, we will place a 3×5-inch card, uniquely identifying each nest,
136 in the camera's field of view to ensure images collected at each nest are properly identified. While at the
137 nest, we will also determine the maximum height of living or current-year vegetation within a 1-yd² area
138 centered on the nest. At riverine sites, we will use a laser range finder to measure distances to predator
139 perch and non-suitable nesting habitat excluding water (e.g., vegetated patch or bank line), will classify %
140 bare sand area at each nesting site, and will measure the wetted width of the channels on each side of the
141 nesting area. We will also collect a GPS location at the waterline nearest the nest and perpendicular to
142 flow at riverine sites to determine distance to and elevation above the waterline for each nest. At sandpit
143 sites, we will use a GIS to delineate the waterline, mark predator perches, and mark non-suitable nesting
144 habitat present so that these distance measures can be determined off-site using a GIS.

145 **Off-site Data Collection/Recording**

146 We will document site-level management activities (pre-emergent herbicide, predator fence, disking, etc)
147 applied to each suitable nesting site in the study area. Information such as number of eggs, % canopy
148 cover, substrate size, distance to nearest current year vegetation >6 inches tall within a 1-yd² area, and the
149 presence/absence of nest furniture will be determined off-site through visual examination of images taken
150 at each nest. A GIS will be used to measure the elevation of each nest above the waterline, distance to the
151 nearest conspecific and other species' nest located at each site, active channel width at suitable riverine
152 nesting sites (width at 1,200cfs including land), and pond size at sandpit sites. Throughout the nesting
153 season, we will also obtain and record data such as daily precipitation, temperature, and river flows
154 between observation periods so we can evaluate their influence on nest and brood survival.

155 **Biological, Reproductive, and Habitat Definitions**

156 Nest – A scrape in the sand, usually lined with pebbles, with eggs in it. Scrapes without eggs and
157 randomly deposited non-incubated eggs(s) outside of a nest bowl will not be considered nests.

158 Nest Initiation – A nest is initiated when it is constructed and at least one egg is laid.

159 Total Nests Initiated – Total number of nests initiated whether successful or not. This total includes first
160 nesting attempts as well as re-nesting attempts.

161 Incubation Period – The incubation period for interior least terns and piping plovers will be considered to
162 be 21 and 28 days, respectively, from when the adult begins to incubate the eggs.

163 Successful Nest – A nest is successful when at least one egg hatches.



- 164 Nest Management – Management activities applied specifically to nests (i.e., exclosures).
- 165 Nest Bowl – Nest cup (depression) including a 3-inch buffer area around the cup.
- 166 Nest Furniture – Any non-living object present within the diameter of the nest bowl such as driftwood,
167 large cobble, boulder, bivalve, bone, etc.
- 168 Vegetative Cover – Percent canopy cover within a 1-yd² area around the nest (<1%, 1-5%, 5-10%, 10-
169 20%, >20%)
- 170 Vegetation Height – Maximum height of all vegetation in a 1-yd² area centered on the nest
- 171 Distance to Water – Distance from each nest to the nearest water line measured with a laser range finder
172 or a GIS
- 173 Distance to Predator Perch – Distance to nearest predator perch \geq 10 feet tall (i.e., tree, power-line pole,
174 etc.) measured via laser rangefinder or off-site using a GIS.
- 175 Distance to Live Vegetation – Measured distance in inches from the center of a nest to living or current
176 year vegetation within a 1-yd² area of the nest.
- 177 Nearest Bank (riverine) – Distance, across water at flows of 1,200cfs, from each nest to the nearest bank
178 measured via laser rangefinder or off-site using a GIS.
- 179 Nest Elevation – Difference between the elevation of each nest and nearest water surface obtained off-site
180 using a GIS.
- 181 Nesting colony – Area encompassed by multiple nests within which disturbance to one nest results in a
182 disturbance reaction by adults of other nests. In cases where only a single nest is present, the nest will
183 serve as the “colony” for habitat measurements.
- 184 Colony Centroid – Average Northing and Easting GPS measure for all nests within a single colony.
- 185 Site – A group of river islands within close proximity of each other and managed as a group or sandpit
186 island habitat surrounded by common water.
- 187 Site Management – Management activities applied to the colony site (i.e. predator fencing, predator
188 trapping, herbicide application, disking, mowing, etc.).
- 189 Brood – 1 or more chicks that hatched from a single nest.
- 190 Brood-rearing Period – The brood-rearing period for interior least terns and piping plovers will be
191 considered to be 21 or 28 days post-hatch, respectively, unless more conclusive evidence of fledging is
192 documented.
- 193 Fledge – An interior least tern or piping plover chick will be considered fledged when it is 21 or 28 days
194 old, respectively, when it is covered in unsheathed feathers, has a black eye stripe (interior least terns),
195 and has a short tail, or when sustained flight is observed.
- 196 Successful Brood – Interior least tern or piping plover brood with \geq 1 chick that fledges or survives 21 or
197 28 days after hatching, respectively.
- 198 Number of Pairs – Number of pairs will be estimated using the Program’s Breeding Pair Estimator (BPE;
199 Program 2014; Baasch et al. in prep).
- 200 Bare Sand – River island or sandpit site with <20% vegetative cover.
- 201 Bare Sand Area – Total area with <20% vegetative cover at the colony site.
- 202 % Bare Sand Area – Percent of the nesting area classified as bare sand (<25%, 25-50%, 50-75%, >75%)



- 203 Active Channel (riverine) – Channels carrying water at minimum flows of 1,200 cfs.
- 204 Channel Width (riverine) – Width of entire open-channel, including land, measured from the center of
205 river islands in a direction perpendicular to river flow.
- 206 Wetted Channel Widths (riverine) – Wetted width of the channel on each side of the nesting area
207 measured with a survey grade GPS unit or laser-range finder.
- 208 Pond Size (sandpit) – Size of pond adjacent to sandpit sites. This parameter will be measured using a GIS.
- 209 Adjacent Land Use – Land use classification within 200 feet of river island or sandpit sites.
- 210 Site-specific water flow – We will obtain maximum, minimum, and average daily discharge (ft³/sec) as
211 well as observation-period specific discharge data at 4 locations from the “USGS Real-Time Water Data
212 for Nebraska” website including Overton (USGS gage 06768000), Cottonwood Ranch near Overton
213 (USGS gage 06768035), Kearney (USGS gage 06770200), and Grand Island, Nebraska (USGS gage
214 06770500). We will use the location of each river island site with respect to the nearest upstream and
215 downstream USGS gage to extrapolate flow data collected at the nearest upstream USGS gage of the site
216 to determine site- and observation-period-specific flow at the time habitat characteristics are measured.
- 217 Available or Suitable Nesting Habitat – Nesting habitat will be classified as “available” or “suitable” if it
218 is a river island or sandpit site with nesting interior least tern or piping plover adults, or if it fits the
219 following minimum habitat criteria as defined by the Program:

220 **Riverine Habitat**

- 221 • At least 50% water within a one quarter-mile river reach
- 222 • Within the same one quarter-mile reach of river, at least 1.5 acres of sand, 1.5 feet above 1,200
223 cfs reference stage in minimum channel width of 400 feet
- 224 • Minimum buffer of island edge to bank of 50 feet
- 225 • Bare sand (i.e., less than 25% vegetative cover); existing vegetation less than 1.5 m in height
- 226 • Edge of island at least 200 feet from any vegetation 1.5 m or higher above the top elevation of
227 the nesting island/bar

228 **Sandpit Habitat**

- 229 • Sandpits within Program associated habitats along the river
- 230 • Per site, at least 1.5 acres of bare sand (i.e., less than 25% vegetative cover)
- 231 • Edge of bare sand at least 200 feet from any vegetation 1.5 m or higher