PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM
2011 Central Platte River Tern and Plover Monitoring and Research Protocol

INTRODUCTION

During 2010, the Platte River Recovery Implementation Program (PRRIP or Program) revised the Program's Tern and Plover Monitoring Protocol entitled 'Monitoring the Abundance, Distribution, Reproductive Success, and Reproductive Habitat Parameters of Least Terns and Piping Plovers on the Central Platte River' (2010 Monitoring Protocol) primarily to: 1) increase the timeframe for conducting tern and plover surveys at all sites from 15 May – 15 July to 1 May – 1 August; 2) increase the frequency of surveys at potential nesting areas; 3) clarify or further define terms within the original Monitoring Protocol; and 4) allow for on-site collection of habitat parameters believed to influence reproductive success of terns and plovers within Program Associated Habitats. The Program initiated a pilot-year research study entitled '2010 Parameter-based Research on Nest-site Selection and Reproductive Success of Interior Least Terns and Piping Plovers on the Central Platte River, Nebraska' (2010 Research Protocol) to learn more about habitat parameters that influence nest placement and nest and brood survival within Program Associated Habitats. The Program also contracted U.S. Geological Survey, Northern Prairie Wildlife Research Center (USGS) to implement a 2-year Foraging Habits study that concluded in 2010.

Activities proposed for 2011 include the collection of data outlined in the Program's 2010 Monitoring Protocol as well as collecting additional data, where approved by the land owner/manager, at nesting sites and documenting the return of banded tern and plover adults and chicks from the previous 2 years. Data collected at nesting sites during 2011 will be utilized to determine effects and relationships that relate back to priority hypotheses outlined in the Program's Adaptive Management Plan (AMP), the two management strategies identified in the AMP, and overall AMP implementation. Information obtained through past banding efforts will allow us to obtain better estimates of adult and chick survival and overall reproductive success of these species and will enable us to begin to discern how a portion of each population interacts with riverine and sandpit habitats.

DESIGN CONSIDERATIONS AND SPECIFICATIONS

Area of Interest

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

Survey Design

The design consists of two main components: 1) semimonthly river surveys and 2) semimonthly sandpit surveys. Each sandpit and constructed, managed, or naturally existing river island designated as suitable habitat will be monitored for tern and plover adults, nests, broods, and fledglings from outside as well as from within the nesting area as described in the methods section below. Least tern or piping plover nests or chicks observed during any survey will be monitored twice/week from outside and/or inside the nesting area to evaluate their status. Data

collected will be used to make informed judgments regarding trends in least tern and piping plover reproductive parameters associated with Program effects on habitat.

Semimonthly River Surveys

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

Semimonthly Sandpit Surveys

All sandpits that have areas of bare sand (<25% vegetative cover) greater than 1.5 acres, and for which access can be gained, will be surveyed for active tern and plover colonies on or about 1 and 15 May, June, and July and 1 August as outlined in the Program's Monitoring Protocol. NPPD will conduct these surveys at the Lexington, Johnson, and Blue Hole Sandpits. Program staff and contracted personnel will conduct these surveys at the Dyer, Cottonwood Ranch, Broadfoot South, and Newark Sandpits. Central Platte Natural Resources District (CPNRD; i.e., Mark Czaplewski) will conduct these surveys at all sandpits, except Newark Sandpit, located between the Minden (HWY 10) and Chapman Bridges.

METHODS

Field Techniques

Standard field methods will be used during each visit to a nesting area and information such as: date; time of day (arrival and departure); weather conditions; number of adults, nests, chicks, and fledglings present; and other species of wildlife present in area will be recorded. We will conduct independent surveys of adults, nests, chicks, and fledglings from both outside and within the nesting area, and when possible will conduct these surveys during the same day. Observations of adults, nests, chicks, and fledglings collected from outside and inside the nesting area will be documented on separate data sheets; final counts reported will represent the maximum number of adults, nests, chicks, and fledglings counted by either method of observation during each site visit. Conducting independent surveys will allow us to address issues related to observer bias and biases associated with field techniques used.

Outside Survey/Monitoring

Outside surveys will be performed on or about 1 and 15 May, June, and July and 1 August as outlined in the Program's Monitoring Protocol. When active nests or broods are present at a site, the site will be monitored from outside the nesting colony twice/week as outlined in the *Nest and Brood Monitoring* Section below. Observations will be conducted using binoculars and/or spotting scopes at a distance great enough to not cause disturbance to nesting birds (usually >165 ft, but closer or farther as terrain dictates) and for at least 1/2 hour. Observations will be conducted from multiple locations to provide as complete of coverage of the site as possible. Observers will scan the area using binoculars and/or a spotting scope at least five times and will

record the number and/or status of adults, nests, chicks, and fledglings observed as well as any other pertinent information.

Inside Survey/Monitoring

Inside surveys at sandpit sites will be performed twice/week using a systematic grid-search pattern which is the most commonly used method for nest searching (Figure 1) on or about the same days outside searches are conducted. To initiate this search method, investigators will form a straight line on the edge of and parallel to the waterline of a sandpit pond (see Figure 1). Investigators will be evenly spaced and the distance between individuals will not exceed 10 yards. The spacing will be adjusted to ensure that all nests can be detected while not pushing chicks out of their territory. For example, if visibility is low because of vegetation or other factor, then the distance between technicians will be decreased; however, this distance will be increased when chicks are encountered to allow chicks to move between observers.

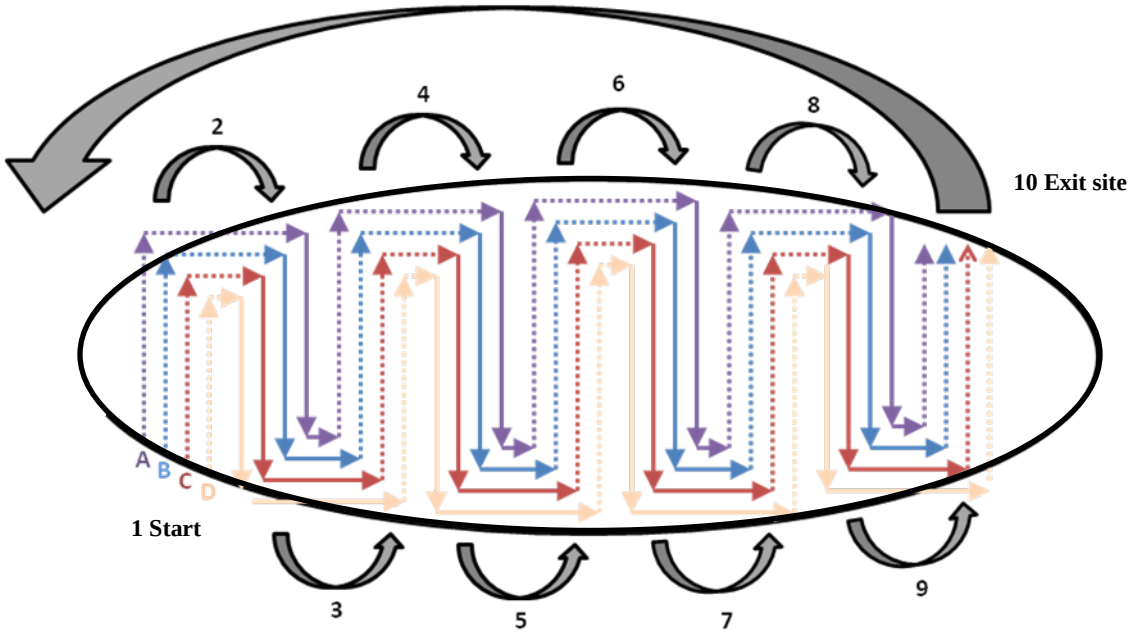

Figure 1. Systematic grid-search pattern used to locate nests and broods while conducting inside surveys of suitable nesting sites

On riverine sites, surveys will be conducted ‘within’ nesting areas on a weekly basis (i.e., no more frequently than once per week) either: (1), via airboat or canoes during semimonthly surveys of all riverine sites or, (2) by having two people walk in the river channel alongside sandbar islands during weeks that semimonthly surveys are not conducted. Semimonthly surveys of all riverine sites will be conducted on or about 1 and 15 May, June, and July and 1 August via airboat or canoe regardless of interior least tern or piping plover presence; however, we will perform ‘inside surveys’ of riverine sites between semimonthly boat surveys only if adult interior least terns or piping plovers are present and first observed from outside the site. When active nests or broods are present at a riverine site, the site will be monitored twice/week; once from outside the nesting area only, and once from outside and then ‘within’ the site as described in (2), above.

Surveys within riverine and sandpit sites will be conducted no more than one and two times during a seven-day period, respectively; activity within the nesting 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^{o}F (4^{o}C) and <90^{o}F (32^{o}C).

Adult and Chick Band Observations

When previously marked tern and plover adults and chicks are observed, we will record as complete a band combination as possible to enable us to link each bird to the river system, site within the system, and possibly the specific nest they hatched from if banded as a chick or the nest they were banded on if banded as an adult.

Nest and Brood Monitoring

To confirm their status, active nests and broods at sandpit sites will be monitored twice a week using both survey methods outlined above. Active nests and broods at riverine sites will be monitored twice/week as well; however, to confirm their status they will be monitored from outside the nesting area twice/week and will be monitored from 'within' the nesting area, (i.e., via (1) or (2), above) no more than once/week. Regardless of survey method used, new nests will be approached when encountered or suspected to confirm their status and to collect habitat measurements outlined below. We will monitor nests/chicks until the nests/chicks become inactive either through success (hatch/fledge) or failure. If no activity is observed at formerly active nests, the nests will be approached close enough to assess nest fate. The fate of each nest and brood, including an estimate of the number of hatched eggs and fledged chicks will be documented. An estimate of the number of successfully fledged chicks will be based on age and date chicks were last observed or will be directly counted if chicks are observed flying from natal areas. Each site will be monitored twice a week until nests and chicks are no longer observed at the natal area.

HABITAT MEASUREMENTS

On-site Data Collection

When a new nest is observed, we will document the presence of adults tending each nest, document management activities applied to the nest (elevating, caging, etc), collect a GPS location of the nest, mark nests with a numbered nest marker, float eggs, take a photograph of the nest, and proceed to collect additional habitat measurements as outlined below. Numbered nest markers (e.g., tongue depressor or paint stir-stick) will be place 10 feet north of each nest at a maximum height of 6 inches to allow observers to easily locate and identify nests during subsequent visits. To determine the initiation date, we will float all eggs present in the bowl following methods of Hays and LeCroy (1971) and outlined in the U.S. Army Corps of Engineers' *Least Tern and Piping Plover Monitoring Handbook* (U.S. Army Corps of Engineers, 2009). In order to minimize the amount of time spent at nests and within the nesting colony, we will use a digital camera to collect information at each nest. The camera will be placed on a tripod stand set at a standardized height that results in a 1-yd^2 area field of view centered on the nest at ground level. Prior to collecting the image, we will place a 3×5-inch card, uniquely identifying each nest, in the camera's field of view to ensure images collected at each nest are properly identified. While at the nest, we will also determine the maximum height of living or

current-year vegetation within a 1-yd^2 area centered on the nest. At riverine sites, we will use a laser range finder to measure distances to predator perch and non-suitable nesting habitat excluding water (e.g., vegetated patch or bank line), will classify % bare sand area at each nesting site, and will measure the wetted width of the channels on each side of the nesting area. We will also collect a GPS location at the waterline nearest the nest and perpendicular to flow at riverine sites to determine distance to and elevation above the waterline for each nest. At sandpit sites, we will use a GPS unit or GIS to delineate the waterline, mark predator perches, and mark non-suitable nesting habitat present so that these distance measures can be determined off-site using a GIS.

Off-site Data Collection/Recording

We will document site-level management activities (pre-emergent herbicide, predator fence, disking, etc) applied to each suitable nesting site in the study area. Information such as number of eggs, % canopy cover, substrate size, distance to nearest current year vegetation >6 inches tall within a 1-yd^2 area, and the presence/absence of nest furniture will be determined off-site through visual examination of images taken at each nest. A GIS will be used to measure the elevation of each nest above the waterline, distance to the nearest conspecific and other species' nest located at each site, active channel width at suitable riverine nesting sites (width at 1,200cfs including land), and pond size at sandpit sites. Throughout the nesting season, we will also obtain and record data such as maximum and minimum daily precipitation, temperature, and river flows between observation periods to evaluate their influence on nest and brood survival.

Biological, Reproductive, and Habitat Definitions

Nest – A scrape in the sand, usually lined with pebbles, with eggs in it; excludes randomly deposited, non-incubated, individual eggs.

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

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

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

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

Nest Management – Management activities applied specifically to nests (i.e., exclosures).

Nest Bowl – Nest cup (depression) including a 3-inch buffer area around the cup.

Nest Furniture – Any non-living object present within the diameter of the nest bowl such as driftwood, large cobble, boulder, bivalve, bone, etc.

Vegetative Cover – Percent canopy cover within a 1-yd^2 area around the nest (<1%, 1-5%, 5-10%, 10-20%, >20%)

Vegetation Height – Maximum height of all vegetation in a 1-yd^2 area centered on the nest

Distance to Water – Distance from each nest to the nearest water line measured with a laser range finder or a GIS

Distance to Predator Perch – Distance to nearest predator perch ≥10 feet tall (i.e., tree, power-line pole, etc.) measured via laser rangefinder or off-site using a GIS.

Distance to Live Vegetation – Measured distance in inches from the center of a nest to living or current year vegetation within a 1-yd^2 area of the nest.

Nearest Bank (riverine) – Distance, across water at flows of 1,200cfs, from each nest to the nearest bank measured via laser rangefinder or off-site using a GIS.

Nest Elevation – Difference between the elevation of each nest and nearest water surface obtained via survey-grade GPS unit placed at the nest and nearest waterline when first observed.

Nesting colony – Area encompassed by multiple nests within which disturbance to one nest results in a disturbance reaction by adults of other nests. In cases where only a single nest is present, the nest will serve as the "colony" for habitat measurements.

Colony Centroid – Average Northing and Easting GPS measure for all nests within a single colony.

Site – A group of river islands within close proximity of each other and managed as a group or sandpit island habitat surrounded by common water.

Site Management – Management activities applied to the colony site (i.e. predator fencing, predator trapping, herbicide application, disking, mowing, etc.).

Brood – 1 or more chicks that hatched from a single nest.

Brood-rearing Period – The brood-rearing period for interior least terns and piping plovers will be considered to be 21 or 28 days post-hatch, respectively, unless more conclusive evidence of fledging is documented.

Fledge – An interior least tern or piping plover chick will be considered fledged when it is 21 or 28 days old, respectively, when it is covered in unsheathed feathers, has a black eye stripe (interior least terns), and has a short tail, or when sustained flight is observed.

Successful Brood – Interior least tern or piping plover brood with $\geq$1 chick that fledges or survives 21 or 28 days after hatching, respectively.

Number of Pairs – Number of pairs will be estimated one of two ways: 1) the maximum number of nests and number of broods detected during any one survey; or 2) half of the maximum number of adults counted during any one survey. Data collection will allow the estimation of the number of pairs using either method.

Bare Sand – River island or sandpit site with <20% vegetative cover.

Bare Sand Area – Total area with <20% vegetative cover at the colony site.

% Bare Sand Area – Percent of the nesting area classified as bare sand (<25%, 25-50%, 50-75%, >75%)

Active Channel (riverine) – Channels carrying water at minimum flows of 1,200 cfs.

Channel Width (riverine) – Width of entire open-channel, including land, measured from the center of river islands in a direction perpendicular to river flow.

Wetted Channel Widths (riverine) – Wetted width of the channel on each side of the nesting area measured with a survey grade GPS unit or laser-range finder.

Pond Size (sandpit) – Size of pond adjacent to sandpit sites. This parameter will be measured using a GIS.

Adjacent Land Use – Land use classification within 200 feet of river island or sandpit sites.

Site-specific water flow – We will obtain maximum, minimum, and average daily discharge (ft3/sec) as well as observation-period specific discharge data at 4 locations from the "USGS Real-Time Water Data for Nebraska" website including Overton (USGS gage 06768000), Cottonwood Ranch near Overton (USGS gage 06768035), Kearney (USGS gage 06770200), and Grand Island, Nebraska (USGS gage 06770500). We will use the location of each river island site with respect to the nearest upstream and downstream USGS gage to extrapolate flow data collected at the nearest upstream USGS gage of the site to determine site- and observation-period-specific flow at the time habitat characteristics are measured.

Available or Suitable Nesting Habitat – Nesting habitat will be classified as "available" or "suitable" if it is a river island or sandpit site with nesting interior least tern or piping plover adults, or if it fits the following minimum habitat criteria as defined by the Program:

Riverine Habitat

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

Sandpit Habitat

- Sandpits within Program associated habitats along the river
- Per site, at least 1.5 acres of bare sand (in a ratio of 1.5 to 4.5 acres of water)
- Less than 25% vegetative cover
- Edge of bare sand at least 200 feet from any vegetation 1.5 m or higher