U.S. Army Corps of Engineers
Southwestern Division

DRAFT Conservation Plan for the Interior Least Tern in the Arkansas, Canadian, and Red River Basins (Endangered Species Act, Section 7(a)(1))

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US Army Corps
of Engineers

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Executive Summary

Section 7(a)(1) of the Endangered Species Act (ESA) requires all Federal agencies to use their authorities as appropriate to carry out programs for the conservation (i.e., recovery) of endangered and threatened species. For more than a decade the U.S. Army Corps of Engineers (USACE) and Southwestern Power Administration have worked with the U.S. Fish & Wildlife Service (USFWS) and state conservation agencies to identify and resolve ecosystem management issues, including endangered species conservation associated with USACE civil works projects in the Arkansas, Canadian, and Red River systems within Arkansas, Oklahoma, and Texas to provide flood risk management, hydropower, and to facilitate navigation in the McClellan-Kerr Arkansas River Navigation System (MKARNS). For the past decade, island construction has benefitted the habitat baselines of federally endangered least terns associated with the aforementioned river systems and the MKARNS. Herein, the USACE outlines the programmatic mechanisms by which maintenance dredging and subsequent habitat construction can be utilized to implement conservation actions that maintain and improve habitat values within the USACE Southwest Division as a contribution to the range-wide recovery of endangered interior least terns inhabiting inland rivers. This program has been developed under informal consultation with the USFWS and complies with section 7(a)(1) of the ESA, USACE Environmental Operating Principles, Civil Works Ecosystem Restoration Policy (ER 1165-2-501), and supports the conservation intent of Executive Order 13186 on the Responsibilities of Federal Agencies to Protect Migratory Birds.

PART I: INTRODUCTION

Background

Section 7(a)(1) of the Endangered Species Act (ESA) requires all Federal agencies to use their authorities as appropriate to carry out programs for the conservation (i.e., recovery) of endangered and threatened species. For almost three decades the U.S. Army Corps of Engineers (USACE) Southwestern Division (SWD) and Southwestern Power Administration (SWPA) have worked with the U.S. Fish & Wildlife Service (USFWS) and state conservation agencies to identify and resolve management issues associated with the interior least tern and USACE civil works projects that provide flood risk management, facilitate navigation, and produce hydroelectric power in the Arkansas, Canadian, and Red river drainages (Southern Plains Rivers). This includes the operation of multipurpose projects on the Arkansas River in Oklahoma; the Red River from Lake Texoma to Index, Arkansas; the Canadian River from Eufaula Lake to the Arkansas River confluence; and all of the McClellan-Kerr Arkansas River Navigation System (MKARNS). USACE reservoirs in Kansas, Oklahoma, and Texas that have operational releases into the MKARNS and Red River are also included, with the exception of Grand Lake, Hudson Lake, Sardis Lake, Hugo Lake, Pine Creek, Broken Bow, and Millwood Projects.

The population of least terns (*Sternula antillarum*) that nest on large rivers in North America is known as the interior least tern, or ILT. The ILT was federally listed as an endangered species in 1985 because of suspected low numbers and concerns about breeding habitat loss and degradation due to impoundment and development of the large interior rivers in the U.S. (USFWS 1985; USFWS 1990). Sandbars and sand/gravel islands in river channels are the primary habitat components used for ILT nesting; the ILTs migrate to, and nest along, the aforementioned river segments within the USACE-SWD.

Hydrologic alterations in the Arkansas, Canadian, and Red rivers have significantly reduced or eliminated suitable natural sandbar nesting habitats for ILTs downstream of constructed structures. Most of the remaining natural sandbar areas downstream of altered reaches are small, temporary, and can become land-bridged during low flows, which provides access by terrestrial predators during the nesting season. During the ILT nesting season, SWD Tulsa District's multi-divisional and multi-agency ILT Committee meets regularly to monitor ILT nesting status, hydrologic conditions, and various stakeholder needs and/or concerns along the aforementioned river reaches and navigation system.

Since 2006, the beneficial use of dredged material from navigation channel maintenance dredging has been used to create and enhance nesting habitat for ILT along the MKARNS. Dredged-material disposal within the MKARNS provides an opportunity for placement of material where it can support the low vegetated island conditions preferred by the ILT. By combining information on the life history of ILTs with routine maintenance dredging along the MKARNS, the USACE-SWD is able to maintain

suitable nesting habitat along the navigation system where the species has had access to very limited habitat for decades. The Tulsa and Little Rock Districts work annually with the Navigation Project Office, SWPA, and contractors to create and maintain nesting islands for ILTs in the MKARNS, effectively supporting both the ILT population and habitat baseline.

Effects and actions to minimize impacts of USACE Tulsa and Little Rock Districts and SWPA projects in Southern Plains Rivers on ILT that are considered under this conservation plan have been previously addressed in USACE Management Plans (1986, 2002), Biological Assessments (1998, 2001, 2012), and Biological Opinions (BiOps) by the USFWS (1998, 2005, 2013a). In a recent 5-year review of the status of ILT, USFWS recommended removing the species from the Federal list of endangered and threatened species due to recovery; however, prior to delisting, the USFWS recommended future actions to be taken before initiation of a delisting proposal of the ILT. The recommendations called for the completion of a habitat metapopulation model, the development of conservation agreements for post-listing monitoring and management, and the development of a post-delisting monitoring strategy plan (USFWS 2013b). The purpose of this ESA Section 7(a)(1) Conservation Plan is to identify operational modifications incorporated into USACE operations and navigation projects that benefit ILT, in partial fulfillment of the USFWS recommendations to assist with the delisting process of the ILT. USACE is committed to continue post-delisting operational modifications, as well as additional conservation actions for ILT, that the agencies are disposed to conduct based upon opportunity and availability of funds.

Agency conservation programs developed under Section 7(a)(1) of the Endangered Species Act of 1973, as amended, are intended to assist Federal agencies and their potential partners in planning and implementing actions to protect and recover endangered or threatened species affected by the agencies activities. Section 7(a)(1) conservation programs do not obligate any party, including the USACE, to undertake specific actions at specific times. Implementation of conservation actions is contingent upon opportunity, annual appropriations, and other budgetary and manpower constraints.

Purpose and Scope

This Conservation Plan (Plan) is being prepared pursuant to Section 7(a)(1) of the Endangered Species Act of 1973, as amended, which requires all Federal agencies to use their authorities to carry out programs for the conservation (i.e., recovery) of endangered and threatened species. Because the ILT demonstrates metapopulation dynamics over a wide geographical range, nesting colony numbers and distribution, and bird abundance within specific portions of the bird's range will vary greatly over time. Therefore, the purpose of this Plan is to describe how the USACE-SWD can, is, and will continue to utilize its authorities and programs to maintain conditions appropriate for ILT nesting and conservation in the Arkansas, Canadian, and Red River Basins. This Plan also describes results of the SWD's efforts to implement monitoring and other conservation efforts with the goal of maintaining or increasing the species habitat and

population baselines within the SWD. Continued implementation of these activities to maintain and enhance ILT habitat is the primary goal of the Plan. Specific conservation measures are recommended to meet the purpose and goal of this Plan; however, they are contingent upon opportunity, annual appropriations, and other authority and budgetary constraints. This Plan compliments other similar plans developed within the ILT range, including the Lower Mississippi River (Kilgore et al. 2014), and the Lower Ohio River (Fischer et al. In Prep.).

This Plan considers the entire range of ILT nesting within the SWD (Tulsa and Little Rock Districts) and outlines conservation activities currently being implemented by the USACE as part of the maintenance-dredging program. Continued implementation of these activities to create and maintain suitable ILT nesting habitat is the primary goal of this Plan.

PART II: ENVIRONMENTAL SETTING

Arkansas River Basin

The Arkansas River basin is a complex system comprised of interdependent surface tributaries and groundwater components. The Arkansas River, which is the main stem segment, is an interstate stream and one of two major river systems in Oklahoma. It is the fourth longest river in the United States and the sixteenth longest in the world. Major tributaries flowing into the Arkansas River include the Cimarron, Canadian, Grand, Verdigris, and White rivers. Minor tributaries include the Currant and Big Sandy rivers in Colorado, the Pawnee, Walnut, Rattlesnake, and Little Arkansas rivers in Kansas, and the Salt Fork, Illinois, and Poteau rivers in Oklahoma.

From its source in the Rocky Mountains near Leadville, Colorado, the Arkansas River flows in an easterly direction through Kansas before entering Kay County, Oklahoma, at the upper end of Kaw Lake. In Oklahoma, the Arkansas River runs southerly through Kaw Lake then southeast while forming border portions of Kay, Noble, Osage, and Pawnee counties until reaching Keystone Lake. After leaving Keystone Dam, it continues southeasterly through Tulsa and Wagoner counties before forming part of the border between Wagoner and Muskogee counties in its lower portion. The Arkansas River converges with the Verdigris and Grand Rivers in Muskogee County where it becomes part of the MKARNS. It continues southeasterly through three locks and dams while forming border portions of Sequoyah, Haskell, and Le Flore counties. The Arkansas River leaves Oklahoma at River Mile 308.5.

Within Arkansas, the Arkansas River flows southeasterly through a series of 10 locks and dams to its confluence with the Arkansas Post canal at River Mile 19. At this point it diverges from the MKARNS and continues southeast to its confluence with the lower Mississippi River. The Arkansas River Post Canal portion of the MKARNS, which includes two locks and dams, connects the Arkansas River with the White River at River Mile 10. From that point the White River portion of the MKARNS continues

southeasterly to its confluence with the lower Mississippi River at River Mile 0; one lock and dam is located just upstream of this confluence. The lower Arkansas River and MKARNS flows through or forms border portions of Arkansas, Conway, Crawford, Desha, Faulkner, Franklin, Jefferson, Johnson, Lincoln, Logan, Perry, Pope, Pulaski, Sebastian, and Yell counties.

Canadian River Basin

The Canadian River basin is comprised of interdependent surface tributaries and groundwater components. The Canadian River, which is the mainstem segment, is an interstate stream that originates in Colfax County, New Mexico. It flows southeasterly through New Mexico then easterly through the Texas Panhandle. The Canadian River enters western Oklahoma on the border of Ellis and Roger Mills counties. The river then travels eastward about 410 miles across Oklahoma before joining the Deep Fork and North Canadian rivers at Eufaula Lake which is the only USACE project on the river.

Eufaula Lake was formed by impoundment of the Canadian River (at River Mile 27.0) at the border of Haskell and McIntosh counties, Oklahoma. Principal tributaries of the Canadian River influencing Eufaula Lake includes the Deep Fork, North Canadian, and South Canadian rivers. These tributaries converge at the central portion of reservoir which also inundates portions of Pittsburg County, Oklahoma. The Canadian River exits Eufaula Dam and flows eastward to its confluence with the MKARNS near River Mile 357 and the intersection of Haskell, Muskogee, and Sequoyah counties, Oklahoma.

Red River Basin

The Red River basin is a complex system comprised of interdependent surface tributaries and groundwater components. The Red River, which is the main stem segment, is an interstate stream and one of two major river systems in Oklahoma. It originates from the arid plains of Curry County, New Mexico, and gradually runs eastward across the Texas panhandle to the Oklahoma border; the vegetation line on the south bank loosely forms the 440-mile boundary between Texas and Oklahoma. Lake Texoma, the largest USACE project in the Red River basin, is included within the boundary reach. After leaving Oklahoma, the Red River turns south through Arkansas then southeast into Louisiana where it discharges into the Mississippi and Atchafalaya rivers.

The main stem of the Red River has a total length of 1,217 miles with a total drainage area of 94,450 square miles of which 73,671 square miles actually contribute to flows. The Oklahoma portion of the basin is comprised of 22,791 square miles while 24,463 square miles lie within Texas. There are 29 stream segments totaling 1,616 stream miles within the Red River basin. One of these segments (i.e., a mainstem reach of Red River between Denison Dam and Index, Arkansas) occurs within the SWD. The basin also includes 32 significant reservoirs, four of which are USACE

projects (i.e., Texoma, Pat Mayse, Sardis, and Hugo lakes). Downstream of Index, Arkansas, the Lower Red River segment occurs within the Mississippi Valley Division's jurisdiction; the Vicksburg District manages the J. Bennett Johnston Navigation System along this segment of the Red River and subsequently monitors for ILTs.

Hydrology and Hydraulics

Arkansas River

Floodplains in portions of the Arkansas River basin have undergone numerous changes. The navigation pools and reservoirs associated with the MKARNS now inundate many floodplain acres. Several reaches have been channelized and stabilized to improve commercial navigation. This channelization, along with the placement of levees to retain floodwaters, has reduced historic floodplain breadth and connectivity to the Arkansas River. These changes have increased the suitability of the Arkansas River floodplain for long-term human habitation and development. There have been corresponding increases in impacts to natural habitats and the natural resources they support.

The channel capacity of the un-impounded mainstem segments of the Arkansas River increases along the river continuum from approximately 40,000 cfs near Kaw Dam to about 90,000 cfs between Keystone Dam and the MKARNS confluence. Unlike the Arkansas River portion of the MKARNS, which has been intensely modified for navigation, the low water channel in both upstream segments of the river is poorly defined and is continually shifting from fluctuations in stream flow and associated sediment scour and deposition.

The presence and operation of Kaw and Keystone dams greatly influence the hydrology of the un-impounded segments of the Arkansas River in Oklahoma. The magnitude and duration of flood events in both reaches has been greatly diminished by operation of the projects for their flood risk management purpose; the peaks of larger floods are reduced and flows are released at a lesser rate, over a protracted period, with fewer damaging downstream impacts.

The hydrology of the Arkansas River between Kaw Dam and the MKARNS confluence is also highly influenced by hydropower releases, and occasionally water supply releases via the hydroelectric units, from Kaw and Keystone lakes. Wide fluctuations in daily flows are now characteristic of the Arkansas River segments downstream of the respective dams, which are in contrast to historic trends. This is especially the case during and subsequent to peak hydropower production periods. Flows can be significantly low when hydroelectric units are shut down for extended periods. These dynamic flow conditions have definable consequences for species, such as the ILT, that rely on more consistent flow patterns on lotic portions of the Arkansas River to fulfill habitat requirements.

The morphology of the Arkansas River between Kaw Dam and the MKARNS confluence has also been affected by the existence and operation of upstream USACE

projects. Much of the sediment historically transported by the Arkansas River has become trapped above Kaw and Keystone dams and this process is ongoing. Some sediment replenishment does occur from major tributaries, such as the Salt Fork, downstream of the projects. The total reduction in sediment inputs is high and this, combined with a scouring flows from the dams, causes vertical channel erosion, accelerated transport of available sediments, and a subsequent reduction in sandbar habitats. Evidence of this is most notable just below the dams where the river has degraded to bedrock in many places. Below this area, where sandbar habitats are still evident, the reduction in flows of high stage supports vegetation encroachment. All of these conditions contribute to a reduced quantity and quality of sandbar habitats used by nesting interior least terns and other species with similar habitat preferences.

MKARNS

The MKARNS, authorized by Congress in the River and Harbor Act of 1946, provides a commercial navigation pathway linking the lower Mississippi River in Arkansas to the Port of Catoosa, Oklahoma. Commercial navigation along the MKARNS is facilitated, in large part, by a series of 18 locks and dams including five in Oklahoma and 13 in Arkansas. The structures are situated longitudinally along the channel continuum in a manner that creates a chain of step pools with sufficient navigation depth connected by the lock lifts, which allows navigation traffic to negotiate the system's 420-foot elevation change using a relatively flat water surface. In addition to navigation, the high-head locks and dams are also operated by USACE for hydroelectric power production.

Suitable navigation channel depth and bank stability on the MKARNS is maintained using river training structures and revetments. Wing dikes direct main flow vectors and associated high energy gradients into the center of the channel, which reduces near-bank shear stress and induces beneficial mid-channel scour. Revetments are used to armor unstable, high risk, or actively eroding banks from erosion. These structures, when properly designed and located, can be very effective in increasing local channel stability and reducing the need for maintenance dredging. Secondary benefits typically include an increase in habitat for a variety of stream-dwelling organisms.

River flow and water storage on the MKARNS are primarily controlled by 11 reservoirs located in the Oklahoma portion of the Arkansas River basin. All reservoirs influencing the MKARNS are operated under Congressional authorization to provide various benefits including flood risk management, water supply, hydropower generation, and recreation. They also provide operational assistance to the MKARNS via sediment storage and strategic water releases made through spillways and power generating units. The timing, volume, and duration of water releases from each reservoir depends on many factors including requirements for navigation, power production, sediment transport, inflow rates, reservoir stage, downstream river stage, weather conditions, and project maintenance needs.

Canadian River

The magnitude and duration of flood events along the Canadian River between Eufaula Dam and the MKARNS confluence in Oklahoma has been greatly diminished by operation of Eufaula Lake for flood risk management. Historically, flood events measured between 1939 and 1960 at the Whitefield gage exceeded 50,000 cfs 42 times. With flood risk management, the peaks of larger floods are reduced and flows downstream are released at a lesser rate, with fewer damaging impacts, over a protracted period of time. The hydrology of the Canadian River between Eufaula Dam and the MKARNS confluence is greatly influenced by hydropower and water supply operations at Eufaula Dam. Wide fluctuations in daily flows are now characteristic of the river downstream of the dam which is in contrast to historic trends. Daily fluctuations measured at the Whitefield gage attributed to hydropower production can vary between over 12,000 cfs and less than 2,000 cfs. Flows can be significantly low when hydroelectric units are shut down for extended periods. These dynamic conditions have definable consequences to species that rely on more consistent flow patterns to fulfill habitat requirements.

Red River

From Denison Dam to Index, Arkansas, the Red River channel capacity is between 45,000 and 50,000 cfs and the banks of the river are about 1,000 feet apart. Unlike the Arkansas River portion of the MKARNS, which has been intensely modified for navigation, the low water channel in the Red River is poorly defined and is continually shifting from fluctuations in stream flow and associated sediment scour and deposition.

The magnitude and duration of flood events along this main segment of the Red River have been greatly diminished by operation of upstream USACE impoundments for flood risk management. The hydrology of the Red River between Lake Texoma and Index, Arkansas, is also greatly influenced by hydropower and water supply operations at Lake Texoma. Wide fluctuations in daily flows are now characteristic of the river downstream of the dam which is in contrast to historic trends. Daily fluctuations attributed to hydropower production can be quite high during and subsequent to peak hydropower production. Flows can be significantly low when hydroelectric units are shut down for extended periods. These dynamic Red River flow conditions have definable consequences to species that rely on more consistent flow patterns to fulfill habitat requirements.

PART III: INTERIOR LEAST TERN SPECIES ACCOUNT

Life History and Habitat

Interior least terns are piscivorous, feeding in shallow waters of streams, rivers, and lakes, usually close to their nesting sites, which are open sandy areas and other

bare ground areas along rivers and coasts (USFWS 1990). The ILT was federally listed as endangered in 1985 because of perceived low numbers and concerns about its habitat loss and degradation on large rivers of interior North America (USFWS 1990). A Recovery Plan for ILT was published in 1990 that provided a summary of the known population size, identified suspected threats, and detailed delisting criteria (USFWS 1990). The Recovery Plan also outlined recovery strategies to increase the ILT population to approximately 7,000 adults throughout its range, and to maintain drainage basin-specific target populations for 10 years (USFWS 1990).

Distribution

Interior least terns are migratory birds with an inland distribution along major river systems in the interior U.S. The USFWS used distribution and abundance information from three publications (reported to be Hardy 1957, Downing 1980, and Ducey 1981) to determine the historic geographic range and quantify a range-wide ILT population size of 1,400 to 1,800 adults in the listing rule, 50 FR 21789 (USFWS 2013b). This historic geographic range of the ILT was recorded to be distributed over the entire Great Plains between the Mississippi River and the Rocky Mountains, along the Mississippi, Ohio, Missouri, Arkansas, and Red river drainages, extending as far north as North Dakota and Montana along the Missouri River (USFWS 2013b). Within the states where ILTs still breed, their range is reduced, fragmented, and generally restricted to the less altered river segments. In Oklahoma, the birds occur along sandy stretches of the Canadian, Arkansas, Cimarron, and Red rivers and at the Salt Plains National Wildlife Refuge. Interior least terns were also known to occur in Texas along the Rio Grande near Falcon, Amistad, and Lake Casa Blanca reservoirs; in the northern panhandle along the Canadian River; and in the eastern panhandle along the Prairie Dog Town Fork of the Red River (TPWD 2016). Within the Red River system, ILTs were known to nest from Arkansas to as far as west as Highway 207 in Texas (USACE 2003a).

Several ecological factors influence the distribution and abundance of ILT. Weather and predation are the most significant factors affecting ILT egg, chick, and adult mortality within colonies, however, the major range-wide anthropogenic impacts to the species have included the loss of nesting habitat due to reservoir construction and channelization projects, water discharge regimes associated with operation of main stem impoundments, uncontrolled vegetative growth on nesting islands, and recreational use of sandbars by humans (USFWS 1985). In their 5-year review, the USFWS (2013b) also noted that reservoir construction and operation has resulted in ILT nesting opportunities and range extensions in some areas (e.g., Rio Grande), while navigation channel engineering and maintenance practices have led to increased nesting habitat and colony sizes in others (e.g., Lower Mississippi River). ILT may also exploit suitable conditions for nesting on sand pits, salt flats, industrial sites, and rooftops (USFWS 2013a).

A range-wide survey effort for the interior least tern population was coordinated by the American Bird Conservancy (ABC) in 2005 and a subsequent report was developed in November 2006. In the report, survey data was collected over a defined

survey time frame (2 week window) corresponding to the peak nesting activity period of the least tern (Lott 2006). A total of 17,591 adult interior least terns were counted during the 2005 range-wide survey efforts; the data was collected from the Missouri River System, Mississippi-Ohio River System, Arkansas River System, and the Red River System, as well as from the non-coastal river systems in Texas and New Mexico (Figure 1). It is important to note that the ABC range-wide survey effort included areas not detailed in the Recovery Plan for the species (Lott 2006; USFWS 1990).

Interior least terns are believed to be seasonal migrants to Central and South America and the Caribbean. The ILT populations seem to follow major river basins southward to the confluence with the Mississippi River, feeding and resting along the way. In Oklahoma, migration usually begins in mid- to late August with adults and young staging at prime fishing sites along the major rivers.

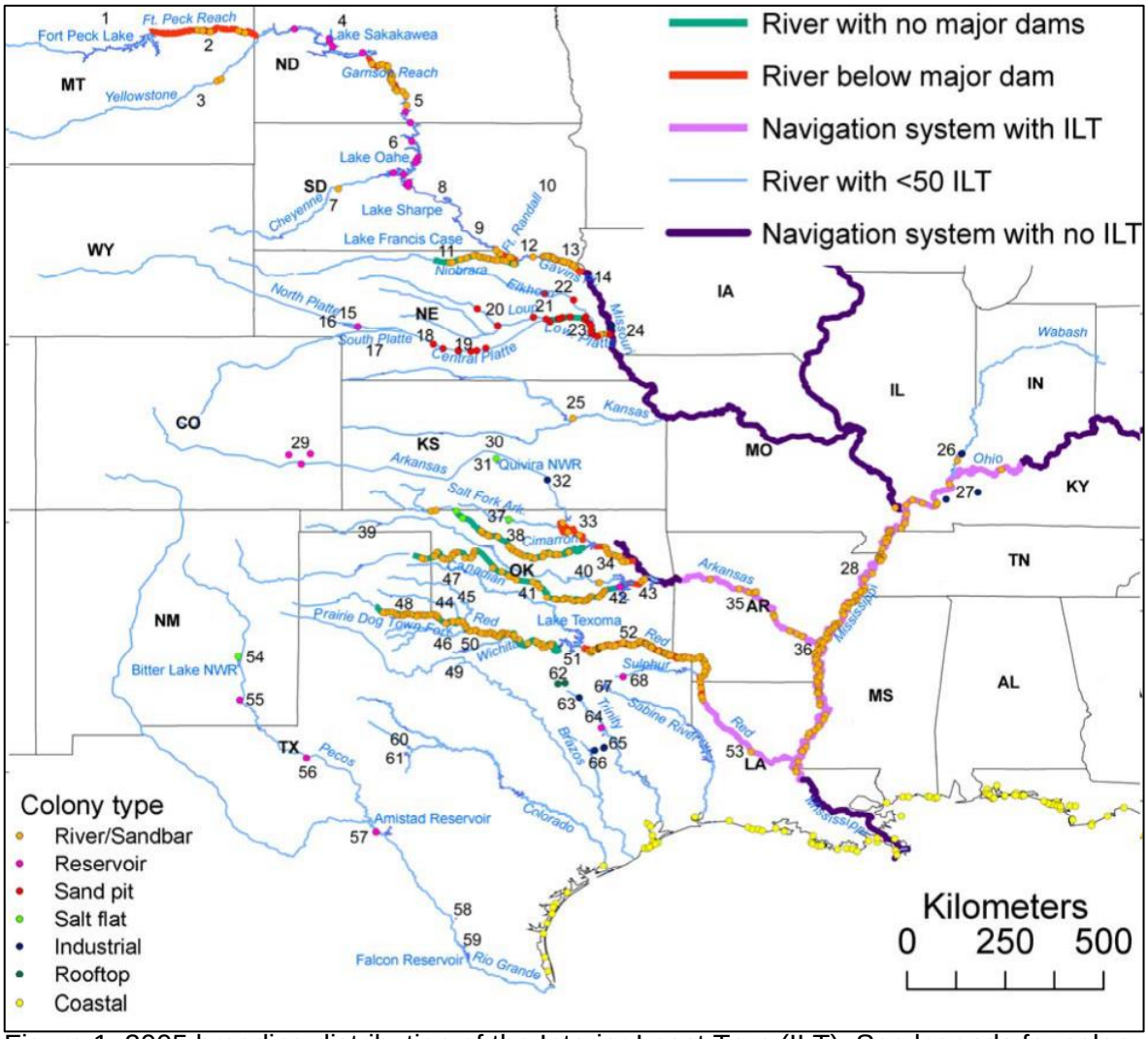

Figure 1. 2005 breeding distribution of the Interior Least Tern (ILT). See legends for colony types and river types. Numbers on the map correspond to geographic segment numbers (from Lott 2006).

Breeding and Nesting

ILTs are migratory shorebirds that begin breeding at age two or three, spending four to five months of each year at their breeding sites in North America (Figure 1; USFWS 2013a). Upon arriving at breeding areas, courtship occurs. Bare to sparsely vegetated sandbars and islands are the primary habitat component used for ILT nesting; when sandbars become densely covered in vegetation, they are no longer suitable for tern nesting. New habitat is formed and/or enhanced when high water removes existing vegetation or deposits new sand. New habitat is also created when sand is mechanically deposited during the dredged-material disposal process to create sandbars in navigation systems. There are four main factors that determine the suitability of sandbars that ILT use for nesting: (1) the elevation of the sandbar; (2) the distance of nesting habitat from large (>2 m high) shrubs and trees; (3) the absence of sandbar vegetation; and (4) the availability of small fishes within 10 km of nesting colonies (Lott et al 2013). When creating islands in the navigation system or creating/enhancing natural sandbar habitat, the USFWS (2013a) provides the following guidance criteria: 1) the substrate must consist of well drained particles ranging in size from fine sand to small (<1 in. in diameter) stone; 2) the size/shape of the nesting area should be a minimum of 1 acre, preferably 5 – 10 acres, circular to oblong in shape, maximizing surface area, and exceed 18 in. above the water line at nest initiation; and 3) have smooth topography, with <10% early successional vegetation.

ILT nest in colonies, with the nests being either close together or scattered throughout (USFWS 1990). The nest is a shallow depression in a predominantly open, sandy area, in which two to three eggs are laid (USFWS 1990). Both sexes share incubation of the eggs, which lasts about three weeks. The chicks typically fledge after three weeks and continue to receive parental care until migration, which is usually complete by early September (USFWS 1990). ILTs will renest if egg or chick loss occurs early enough in the season; in their research, Lott et al. (2013) report that ILTs have the ability to renest up to three times in a single breeding season, which contributes to the species' resiliency.

Wintering

At the end of their breeding season along the large interior rivers of the United States, the adult and fledgling ILTs are believed migrate to, and winter along, the Central American coast and the northern coast of South America (USFWS 1990). Little is known about the ILT wintering areas and threats specific to the species, as once the fall migrants arrive at the Gulf Coast, they cannot be distinguished from other least tern populations and therefore, what limited data there is on the wintering areas is inclusive of other least tern populations (USFWS 2013b).

Monitoring

Since the listing of the species in 1985, knowledge and understanding of the range and population demographics of ILT has increased. This can be attributed to the

increased monitoring efforts, which revealed larger population numbers and improved the knowledge base of the overall distribution of this species.

Within the SWD, the Tulsa District initiated annual nesting season ILT counts in 1990 along the Arkansas River below Kaw and Keystone Dams. The Canadian River surveys below Eufaula Dam to the MKARNS confluence were added to the yearly surveys in 1999 and the Red River surveys from Denison Dam to Index, AR were added to the yearly surveys in 2000. Yearly surveys along the MKARNS in the Little Rock District began in 2006. In 2005, USACE Engineer Research and Development Center Environmental Laboratory (ERDC-EL) and the ABC coordinated a range-wide survey during the last two weeks of June; over 140 participants contributed to the survey for which Lott (2006) provided results. Results from the 2005 range-wide survey reported that the majority of the ILT were counted on the lower Mississippi River (62%), while the Arkansas River system had 11.6%, and the Red River system had 10.4% of the total birds counted (USFWS 2013a). A total of 17,591 ILTs were counted nesting along rivers, on sand pits, at reservoirs, salt flats, industrial sites, and on rooftops (USFWS 2013a). The USFWS based their 5-yr review and subsequent recommendations for initiating delisting the species based on the data presented by Lott (2006) in his review of the distribution and abundance of ILT population from 2005 range-wide survey.

Recovery Status

The Recovery Plan delisting criteria for ILT details protection and management of essential breeding habitats, a range-wide population of 7,000 birds, and population targets for five river drainages - Missouri, Mississippi, Arkansas, Red, and Rio Grande Rivers (USFWS 1990). Habitat protection and management programs have been established across the ILT range over the past 20 years, primarily under Section 7(a)(2) consultations. The 2005 range-wide ILT population survey resulted in more than 17,000 birds counted, exceeding the Recovery Plan range-wide population delisting criteria (Lott 2006). In the recent 5-year review of ILT status, the USFWS (2013b) recommended delisting the species due to recovery, pending the development of ESA Section 7(a)(1) conservation plans, a range-wide metapopulation model, and a post-listing monitoring plan to ensure consideration of the species post-listing.

PART IV: EFFECTS ANALYSIS

Several concerns have been identified for the ILT in the SWD. These include: habitat loss and modification, effects of pollution and contaminants on chicks and adults, and human disturbance to ILT nests and chicks. The following outlines the factors affecting the ILT and the response of the species from the ILT Program in the SWD.

Habitat Loss and Modification

Long term effects on the nesting habitat for the ILT have occurred as a result of channelization of the Arkansas River for navigation and through the construction of

multipurpose projects along the Arkansas, Canadian, and Red rivers. Construction of dams along the aforementioned river systems has trapped the sediment load which would otherwise be transported downstream and maintain portions of riverine sandbar habitat. Additionally, the modified releases from the multipurpose projects for flood risk management have resulted in reduction in magnitude of natural flood/flow events that historically transported sediment and scoured sandbars of vegetation. The reduction in stream sediment transport combined with the reduction in large flow events and duration has impacted the quantity and quality of ILT nesting habitat below the dams. Vegetation encroachment behind navigational dikes and revetments in the MKARNS could also contribute to loss of tern nesting habitat. Operations for hydropower and water supply can result in land-bridging, which can increase recreational-related impacts and possibly terrestrial predation as well, on sandbars.

Positive impacts on ILT nesting success have also occurred from flood risk management and hydropower releases; large flood events during ILT breeding season can be reduced to prevent complete inundation of all the nesting colonies sites and the ability to release water over extended periods of time can prevent land-bridging, which deters direct human disturbance and potential predation. Through the beneficial use of dredged material, several islands for ILT nesting have been constructed within the navigation system; these islands are less susceptible to high flows and low flows, as the river stage in the navigation system remains relatively constant throughout the ILT nesting season. The islands have been maintained via enhancement with additional dredged material, rip-rap placement to prevent erosion, and herbicide application to minimize vegetation encroachment. During years with high flows when the habitat in the river segments below dams have been inundated, the islands in the navigation system provide habitat for breeding ILTs.

Pollution and Contaminants

Pollutants that enter the river system within breeding areas can indirectly affect ILTs via effects on water quality and absorption through the food chain. Pollutants and contaminants can also be released into the water through the dredging activity and, depending on concentrations, could become available to the ILTs through direct contact at disposal sites and/or indirectly through the food chain.

To maintain the depth of navigation throughout the channel, maintenance dredging is performed along the MKARNS within SWD; the material is disposed of at disposal sites and/or used for ILT habitat creation and enhancement per the Dredge Maintenance Management Plan (DMMP). Historical evidence suggests that some areas of the MKARNS may have contained elevated levels of contaminants, raising concerns about disturbing and releasing them into the water column. Within SWD, the USACE found levels of arsenic, cyanide, and mercury to be above the classification guidelines in Pool 16 (USACE 1995); however, additional sampling of sediments within the areas proposed to be dredged failed to document elevated levels of contaminants (USACE 2005).

To maintain suitable ILT nesting habitat and to reduce potential perch sites for avian predators on islands constructed and/or enhanced, pesticides approved for aquatic application are used. Application of the herbicide is conducted outside of ILT nesting season to minimize any exposure to a nesting colony site. No incidences of death or decreased fitness of ILT due to pollution and contaminants from pesticide application or dredging activities have been reported to date.

Disturbance

Predation (avian and terrestrial) and human disturbance can have impacts to nesting ILTs. Incubating adults defend their colony by flying up from the nest, giving an alarm call, and mobbing and diving at the cause of the disturbance. During this time, eggs and chicks are exposed to the heat.

Within the SWD, human disturbance has been observed along the rivers and on islands constructed in the MKARNS. In the Tulsa District, sandbar use by the public (swimming, camping, fishing, hunting for artifacts, ATV use, and sand mining) is observed downstream of reservoirs. Hydropower operations from the multipurpose projects can result in periods of low river flows, which can increase the potential for land bridging and associated human disturbance, as well as terrestrial predation at ILT colonies. Islands in the MKARNS constructed for ILT nesting habitat often experience disturbance from recreational activities as well.

The ILT Committee meets regularly during the summer to discuss flood risk management and/or hydropower releases and any impacts to nesting ILTs. All observed human disturbance activities identified during the monitoring surveys are coordinated with the USFWS. Signs are posted at islands constructed in the navigation system within the SWD and public outreach and education is conducted via presentations and media events. Prevention of land bridging through water management can deter some terrestrial predation; however, it cannot prevent avian predation.

PART V: SWD ENVIRONMENTAL BASELINE

Historical and Current ILT in the SWD

<u>Oklahoma (and Texas) – Tulsa District</u>

In Oklahoma, monitoring of ILT colonies for fledging success in Oklahoma has been done sporadically at Optima Lake, at the Salt Plains NWR, and at the Little and Big Salt Plains. However, the Tulsa District has intensively monitored for least terns on the Arkansas River since 1990 and on the Canadian and Red rivers since 1999 and 2000, respectively, in compliance with the 1998, 2005, and 2013 BiOps. Site specific surveys along the MKARNS began in 2006 when habitat specifically for the endangered species was first constructed with dredge material disposal.

Arkansas and Canadian Rivers. The USACE, Tulsa District has been consulting with the Service with respect to the interior least terns on the Arkansas River since 1987. The Arkansas River population from Kaw Dam to Muskogee, Oklahoma, has been intensively surveyed since 1990. In compliance with the Reasonable and Prudent Measures (RPM) in the 2005 and 2013 BiOps, the Tulsa District constructed and maintained three interior least tern islands in the MKARNS (USFWS 2005; USFWS 2013a); Kerr Island (constructed in 2006) and Stoney Point Island (constructed in 2009) were constructed in R.S. Kerr Reservoir of the MKARNS, and Spaniard Creek Island (constructed in 2010) was constructed in the Webber Falls Reservoir of the MKARNS.

Over the past 25 seasons (1990 – 2015), the Arkansas River, from Kaw Dam to the MKARNS confluence, observed adult population has varied from approximately 200 to a maximum of 732 birds (excluding the flood years; Table 1); observed production has varied from as few as 6 to as many as 293 fledglings (excluding the flood years; Table 2). The majority of ILT production occurs on the Arkansas River from Tulsa, Oklahoma, downstream to the Highway 69 Bridge north of Muskogee, Oklahoma (Table 2). The recruitment of nesting adults from the Kaw Dam to the upper end of Keystone Lake stretch of the river varies due to more limited habitat availability. Very few ILTs have been known to nest between Keystone Dam and the I-244 Bridge in Tulsa, Oklahoma, where extensive sediment shifting has occurred. On the Canadian River, from Eufaula Dam to the MKARNS confluence, the observed annual adult population has varied from very few (4) to a maximum of 170 birds since surveys began in 1999 for this stretch of the river (Table 1); observed production has varied from none to as many as 30 fledglings (excluding the flood years; Table 2).

Due to the relatively stable river stage and lack of inundation, the islands in the MKARNS provide available nesting habitat to ILTs even when flows along the impounded rivers limit habitat availability (Tables 1 and 2). Since their creation, the combined observed adult population has varied from 56 to 250 on the islands in the MKARNS (Table 1). Excluding 2015, the observed production has varied from 13 to as many as 92 fledglings (Table 2); 2015 was the first year that Kerr Island did not have nesting success. The Tulsa District, with funding assistance from SWPA, has conducted annual habitat maintenance on the constructed islands, including reinforcement with rip rap to reduce erosion (at Kerr Island), enhancement and expansion with material from maintenance dredging activities, herbicide spraying, prescribed burning, and manual and mechanical vegetation removal.

Red River. Least terns were once common in the Red River Basin; between 1910 and 1960, they were reported from most of the counties along the Texas-Oklahoma border (USACE 2012). The Tulsa District has been conducting intensive ILT nesting surveys on the lower 240-mile stretch of the Red River below Lake Texoma since 2000; excluding flood years, the observed adult population has varied from 530 to 1009 (Table 1); observed production has varied from 12 to 224 fledglings (Table 2).

Arkansas – Little Rock District

The Little Rock District has monitored for interior least on the MKARNS within the State of Arkansas every year since 2006 in compliance with the 2005 and 2013 BiOps. Since 2006, the observed adult population has varied from 136 to 553 birds (Table 1); observed production has varied from 9 to 139 fledglings (Table 2).

During the high flows of 2007, ILTs were discovered nesting on rooftops of buildings within a mile radius of the Arkansas River in Arkansas (Nupp and Watterson 2007). The preferred rooftop utilized by the terns for nesting were large and flat, that of manufacturing plants, and either fully or partially covered with small river rock that resembles the terns' natural riverine sandbar habitat (Nupp and Watterson 2007). Without the terns using the rooftops as habitat, the fledgling numbers would have been consistently under the compliance goal during high flow years (2007 and 2015; Tables 1 and 2).

Table 1. Summary of ILT observed adult population in the SWD, 1990 – 2015. Data from 2012 Biological Assessment (USACE 2012) and Annual Incidental Take Reports.

	Tulsa District				Little Rock District
Year	Arkansas River (Kaw Dam– MKARNS)	Canadian River (Eufaula Dam – MKARNS)	MKARNS	Red River (Denison Dam – Index, AR)	MKARNS
1990	188				
1991	302				
1992	280				
1993	406				
1994	278				
1995	212				
1996	381				
1997	277				
1998	226				
1999	195	106			
2000	285	170		631	
2001	535	65		813	
2002	574	71		544	
2003	566	33		678	
2004	544	75		1009	
2005	725	76		870	
2006	540	26	130	530	364
2007[1]	-	27	100	-	192
2008	520	101	81	625	266
2009	592	92	84	629	553
2010	348	4	341	744	417
2011	446	32	39	743	504
2012	453	14	74	643	470
2013	386	10	113	651	548
2014	732	27	250	651	434
2015[1]	-	-	56	54	136

[1]No surveys conducted to due to flooding and flood risk management releases

Table 2. Summary of ILT observed fledgling production in the SWD, 1990 – 2015. Data from 2012 Biological Assessment (USACE 2012) and Annual Incidental Take Reports.

Year	Tulsa District				Little Rock District
	Arkansas River (Kaw Dam– MKARNS)	**Canadian River (Eufaula Dam – MKARNS)**	**MKARNS**	**Red River (Denison Dam – Index, AR)**	**MKARNS**
1990	151				
1991	287				
1992	83				
1993	143				
1994	103				
1995	82				
1996	65				
1997	65				
1998	65				
1999	66	0			
2000	85	0		33	
2001	123	7		205	
2002	187	4		58	
2003	167	7		82	
2004[1]	6	6		12	
2005	162	25		84	
2006	254	4	92	63	81
2007[2]	-	0	62	-	60
2008	120	21	13	146	84
2009	238	30	35	47	49
2010	78	0	73	118	59
2011	297	3	58	224	104
2012	293	16	33	169	139
2013	140	0	83	110	81
2014	259	6	87	71	84
2015[2]	-	-	-	-	9

[1]High flow year; ILTs re-nested
[2]No surveys conducted to due to flooding and flood risk management releases

PART VI: MANAGEMENT AND CONSERVATION MEASURES IN THE SWD

The objective of this USACE-SWD conservation plan is to carry out agency mission activities while maintaining or improving appropriate habitat conditions necessary for robust, resilient, and self-sustaining populations of the ILT. The goals to meet conservation planning objectives are to utilize reasonable, prudent, and cost-effective management practices and channel maintenance activities, within USACE authority and where economically justifiable, to maintain and improve Southern Plains River channel habitat values for ILTs and other native species.

The USACE-SWD Districts (Tulsa and Little Rock) formed a multi-agency ILT committee, which consists of members from various state, tribal, and federal agencies (USFWS, SWPA, Oklahoma Municipal Power Authority, Osage Nation, and Oklahoma Department of Wildlife Conservation) which developed the Management Guidelines and Strategies for Interior Least Terns in 2002. For this conservation plan, USACE-SWD has identified the following strategies and associated actions to maintain appropriate habitat conditions for ILT nesting success, and minimize adverse effects on ILT colonies. Many of these strategies and actions (developed by the ILT Committee) have already, to one degree or another, been implemented, tested, and monitored for more than a decade. Herein, the USACE-SWD and associated Districts incorporate the following strategies and actions as Best Management Practices, as authorized and required under Section 7(a)(1) of the ESA, to conserve the federally endangered ILT. This conservation plan also complies with procedures and mandates under the USACE Environmental Operating Principles, the Civil Works Ecosystem Restoration Policy (USACE ER 1165-2-501), the Migratory Bird Treaty Act, and Executive Order 13186 on the "Responsibilities of Federal Agencies to Protect Migratory Birds."

Agency conservation programs developed under Section 7(a)(1) of the ESA are intended to assist Federal Agencies and their potential partners in planning and implementing actions to protect and recover endangered or threatened species affected by the agencies activities. These conservation measures are a guide for meeting the goal and objective outlined above, and do not obligate any party, including the USACE, to undertake specific actions at specific times. Implementation of the actions outlined below is contingent upon authority, opportunity, impacts on project purposes, annual appropriations and other budgetary and manpower constraints.

Strategy 1: Utilize USACE authorities to maintain suitable ILT nesting habitat in the Southern Plains Rivers. A long-term management strategy of the USACE-SWD is to maintain suitable ILT nesting habitat, which is minimally impacted by the normal operation of multipurpose water resource projects. The following are detailed actions the USACE-SWD can continue to implement, when feasible or per an approved deviation request, to protect the nesting ILTs along the Arkansas, Canadian, and Red Rivers in the Tulsa District, including the MKARNS in both the Tulsa and Little Rock Districts. All actions outlined below that require a deviation from a master water control plan or single project water control plan will require a formal deviation request submitted to the appropriate District office, following Engineering Regulation (ER) 1110-2-240 and local District procedures. Per ER 1110-2-1400, the USACE SWD Commander is responsible for reviewing and approving any deviations from approved water control plans.

Actions:

A. <u>Utilize reservoir storage and operational flexibility to provide periodic high flow events below dams for habitat restoration and maintenance (form new sandbars, maintain channel widths, and scour existing sandbars)</u>. Historically, high flows in the spring along Southern Plains Rivers contributed to natural

vegetation management, as the high flows would keep woody vegetation from establishing and create new, or enhance existing, nesting habitat (USFWS 2013a). The creation of reservoirs have altered the frequency and magnitude of high flow events along the rivers due to flood risk management operations. In the 2013 BiOp, the USFWS discussed the Leslie et al. (2000) recommendation of periodic (at least every 7 years) scouring flows to help maintain the quality of ILT nesting habitat below hydropower facilities. Leslie et al. (2000) defined the scouring flows as approximately 100,000 cfs after studying the effects of the significant flows below Keystone Dam in 1993 had on ILT nesting. However, during analysis of the effects of dam operations on ILT nesting habitat and reproductive success on the Arkansas River in Oklahoma, Lott and Wiley (2012) reported river flows exceeding 50,000 cfs for over 3 weeks resulted in habitat renewal below Keystone Dam. Flows of this magnitude occurred in 1987, 1993, 1995, 1999, 2007, and 2008 (Lott and Wiley 2012). Since 2008, flows have exceed 50,000 cfs for the Arkansas, Canadian, and Red rivers; however, not for a 3 week duration. In 2015, scouring flows exceeding 100,000 cfs (as defined by Leslie et al. 2000) occurred along the Red and Canadian Rivers for approximately 15 consecutive days and 8 consecutive days, respectively; the Red River flows peaked above 200,000 cfs and the Canadian River flows peaked above 170,000 cfs flows.

Providing high flow releases from multipurpose projects during the non-nesting period has been a management strategy objective since the development and implementation of the Management Guidelines for the Interior Least Terns for the Tulsa District (USACE 2003b). High flow releases are, and will continue to be based upon thorough analysis of the hydrology of the region, balanced with stakeholder needs, water management plans, and USACE authority. Opportunities for high flow releases to maintain ILT nesting habitat within the SWD will continue to be discussed during ILT Committee meetings/conference calls. During years when the hydrologic conditions do not allow for high flow releases, other methods for habitat restoration and maintenance will be considered.

B. Utilize reservoir operational flexibility to reduce flooding during nesting season. To reduce loss of nest and chicks due to flooding ILT nests and/or inundating colony sites, the Tulsa District assesses hydrological conditions and hydropower needs to determine feasibility of limiting maximum water releases. For reservoirs in the flood control pool, this action may reduce flood storage capacity in a reservoir and extend periods of higher lake elevations. If conditions are such that water is conserved in the flood control pool by limiting maximum water releases, the ability to provide sufficient flows for minimum water releases may be increased (see Action C). However, when reservoir levels are in the flood control pool, there can be impacts to other project purposes including flood risk management, navigation, hydropower, recreation, fish and wildlife, etc. In addition, when reservoirs are in flood pool,

increased inflows from a rain event within a reservoir's basin could require activating flood risk management operations and stopping flood protection of nests.

An additional action that can help reduce flooding of nests is to utilize reservoir operational flexibility, when feasible, to provide releases for higher (relative for each river reach) river flows during the ILT spring migration to breeding sites and during the estimated onset of nesting; under particular hydrological conditions, this action has been determined to be effective for hydropower (and flood risk management) operations later in the nesting season. When this action has been utilized, the higher river flows at the onset of ILT nesting resulted in nest placement on available sandbar nesting habitat (SNH) at higher elevations and reduced nest flooding. Additionally, the storage availability created in the reservoirs by providing higher flows at the onset of ILT nesting potentially decreases the need for flood risk management operations later in the nesting season that can result in nest inundation. This action will continue to be evaluated for use at the onset of each ILT nesting season to provide greater flexibility of power releases (and potential flood releases) throughout summer and reduced chance of inundating active ILT colony sites.

C. <u>Utilize reservoir operational flexibility to reduce land bridging of nesting areas.</u> Hydropower operations from the multipurpose projects can result in periods of low river flows, which can increase the potential for land bridging and associated human disturbance and terrestrial predation at ILT colonies. Sandbar use by the public is observed downstream of reservoirs within the Tulsa District; common activities include swimming, camping, fishing, and ATV use along the rivers in Oklahoma. Additionally, Oklahoma's rivers often contain prehistoric and historic artifacts intermixed in sandbars. These materials likely originated further upstream, were eroded out of context, and were eventually transported downstream during high water events. The public often hunts for these artifacts along the sandbars during periods of low river flow, which increases human foot traffic in the riverbed habitat area. Given the life history and nesting habit of the ILT, human disturbance on colony sites does result in unintentional mortality of eggs and/or chicks and, depending on the activity, could result in destruction of an entire active colony site.

Both avian and terrestrial mammal predation impact ILT nesting and fledging success. During periods of low river flows, land bridging provides opportunity for increased terrestrial predation pressure. Providing releases to reach minimum flows (relative to each reservoir) to prevent land bridging is an action that requires extensive coordination of water resources; the Tulsa District will continue to evaluate the opportunity to utilize this action when feasible. Furthermore, potential projects that occur along the river, such as low water dams proposed for the Arkansas River corridor, will be evaluated

and provision of environmental flows will be addressed, as well as the mitigation for any lost ILT nesting habitat. The provision of environmental flows may help reduce the periods of low flows that occur from hydropower operations.

D. Where appropriate, utilize dredged-material to create low to moderate height islands. Creation of multiple small nesting islands is preferred over fewer large nesting islands. In 2005, the Tulsa District developed the DMMP and has experienced significant success using dredged material to construct ILT nesting islands. For example, two islands constructed in the Webbers Falls and R. S. Kerr Reservoirs in the MKARNS, Spaniard Creek Island and Kerr Island, respectively, have provided significant ILT nesting habitat that can support relatively large numbers of nesting least terns. The Little Rock District has also constructed ILT nesting islands in the Arkansas portion of the MKARNS. The constructed islands provide relatively high quality ILT nesting habitat and can provide successful reproduction when other riverine sites are negatively affected by flooding (USFWS 2013a). The pool levels created by the dams along the navigation channel typically experience less stage fluctuations and flooding throughout the year; therefore, ILT colonies established on the artificially constructed nesting habitat in the navigation system are less susceptible to inundation. For these reasons, beneficial use of dredged material to construct and maintain suitable nesting habitat for ILT will continue to be an action utilized by SWD in the Tulsa and Little Rock Districts, where appropriate and authorized, per the current DMMP. Future updates to the DMMP will continue to address and incorporate this action as a beneficial use of dredge material, as appropriate.

E. Develop, implement, and update ILT management guidelines for each dam. To provide comprehensive guidelines for the management and protection of ILTs nesting below USACE water resource multipurpose projects on the Arkansas, Canadian, and Red Rivers, in 2002 the Tulsa District developed the *Management Guidelines and Strategies for Interior Least Terns USACE-Tulsa District*; the document was later revised in 2003 (USACE 2003). Each reservoir's seasonal pool plan (if applicable), upper and lower limits, and minimum release capacity are outlined in the document to assist the ILT Committee when considering providing flood protection of ILT nests or minimum releases. The long-term and short-term management strategies outlined in the document have been incorporated since 2002 and constitute a significant part of the potential actions outlined to be implemented for the current management strategy of utilizing USACE authorities to maintain suitable ILT nesting habitat within the SWD in this section 7(a)(1) Conservation Plan. The Tulsa District's management guidelines for ILTs may be updated to reflect changing conditions such as the available nesting habitat elevations downstream of reservoirs, safety ratings of dams, and updates to seasonal pool plans.

In 1986, the Little Rock District developed actions for the recovery of ILTs in the Arkansas portion of the MKARNS, which were implemented. Currently, Little Rock District is the process of developing long-term management guidelines for nesting ILTs along the MKARNS in Arkansas.

F. Conduct vegetation control where necessary to maintain conditions for ILT nesting. Vegetation encroachment contributes significantly to loss of SNH for ILTs. Vegetation encroachment and nesting suitability can be managed through mechanical and chemical means when utilizing water management resources from the multipurpose projects is not feasible. Physical and chemical methods to remove vegetation from nesting sites and improve nesting habitat requires extensive labor and material resources. Optimizing the use of dredged material during routine navigation channel maintenance along the MKARNS in areas of existing islands is more cost-effective and, therefore, the preferred habitat management option that will be used when the opportunity exists. Evaluation, monitoring, and maintenance activities will be conducted as funding allows.

Strategy 2: Develop cost-effective monitoring program to evaluate and adjust operations to maintain and enhance ILT nesting habitats. The USACE ERDC-EL has coordinated with USFWS, ABC, and the U.S. Geological Survey to complete development of a range-wide monitoring program for the ILT which is described in A Sampling Design for Monitoring Interior Least Tern Population Trends (Bart et al. 2015). A manuscript is currently in review (Bart et al. In Review). Should the ILT be delisted, monitoring within the SWD will be part of a required 21-yr range-wide post-delisting monitoring plan.

Actions:

A. Conduct targeted monitoring during the ILT nesting season. Field surveys of the ILT will continue after delisting, per the draft post-delisting monitoring plan (PDMP) protocol developed by Bart et al. (2015) which serves to (1) streamline and standardize monitoring techniques, and (2) provide a robust means of assessing range-wide population status into the future. This monitoring protocol will rely upon sub-sampling rather than complete counts of adults throughout the range.

B. Collaborate with USFWS to periodically monitor and measure habitat. Additional field surveys can be conducted to evaluate ILT response to USACE island construction and maintenance within the SWD. Though not a requirement, it is understood that more intensive monitoring beyond the PDMP requirement can provide more precise estimates of mean data for the USFWS' analysis. Contingent upon opportunity, annual appropriations and other budgetary constraints, additional field surveys of ILT may be conducted in coordination with the PDMP.

C. Develop annual summary of conservation actions and monitoring results. Results of the field surveys can help inform adaptive management and support conservation actions by Districts. Currently, the Tulsa District reports on both Tulsa District and Little Rock District ILT monitoring results and conservation actions to the USFWS annually. Per the PDMP, USFWS will prepare a range-wide PDMP report of the ILT at the end of each comprehensive survey period (every 3 years after implementation). The annual reports developed by the Tulsa District provided to the USFWS will assist in the range-wide PDMP report requirement.

Strategy 3: Minimize human disturbance of nesting ILT. Public use on the sandbars along the rivers within the SWD is a common occurrence. As discussed under Strategy 1 Action C, above, the public uses some sandbars for recreational activities; the public also use the islands constructed in the navigation system. Public education to assist in minimizing human disturbance to the nesting ILTs has been a part of the ILT Management Program within Tulsa and Little Rock Districts and will continue based upon opportunity and budgetary considerations.

Actions:

A. Signage will be posted and maintained at boat ramps constructed and/or maintained by the USACE, and on nesting islands under USACE management or control. Human disturbance has been observed on the natural sandbars and constructed islands along the rivers within Tulsa and Little Rock Districts where ILT nest. Signage has been used as a tool for educating the public of ILT presence and decreasing disturbance during the ILT reproductive periods. Signs that detail the potential presence of the ILTs in a particular area can continue to be posted at access points to the navigation system as well as on sites known for high human disturbance. USACE will continue to work with landowners for access, where applicable, and the USFWS concerning signage requirements.

B. Collaborate with various State agency personnel to inform public and private landowners of ILT presence. Collaboration and coordination with State conservation agency personnel has been conducted in Tulsa and Little Rock Districts in order to assist with public education and enforcement of restricted access on USACE created and managed ILT nesting habitat. Tulsa and Little Rock Districts can continue to provide data and logistical support as appropriate to facilitate collaborative activities. This can include posting signs during early ILT nesting island creation, providing mapping information, and sharing of any data collected.

   Additionally, as part of the public education and outreach program, support of media events and public/private school education regarding preservation of the ILT and its habitat can continue.

Strategy 4: Share restoration, research, and monitoring responsibilities and costs by developing partnerships with other Federal and State agencies and NGOs.

Actions:

A. Meet annually with State and Federal partners to review actions and ILT response. Tulsa and Little Rock Districts can work with USFWS, SWPA, ERDC-EL, Oklahoma Department of Wildlife Conservation, Arkansas Game and Fish Commission, and other partners to share research, monitoring, and possible funding responsibilities. As a component of continued ILT conservation, a formalized agreement among the agencies would reinforce cooperative efforts to maximize the potential for ILT nesting success within the SWD.

B. Develop NGO partnerships to share restoration and funding responsibilities as budget and authority allow. This can include partnerships with universities, the local chapter of the National Audubon Society, and other special interest groups to assist in accomplishing the shared goal of continued conservation and recovery of the ILT.

Implementation

All of the above strategies and actions have been at least partially implemented, becoming standard operating procedure for Tulsa and Little Rock Districts. In their 5-year review of ILT status, the USFWS recommended delisting the species due to recovery, pending (in part) the development of management plans to ensure consideration of the species post-delisting (USFWS 2013b). The SWD Tulsa and Little Rock Districts commit to continued implementation of the strategies and actions outlined above, as opportunities within authority and funding allow. All strategies and actions are subject to modification based upon new information in coordination with Federal and State partners.

PART VII: CONTRIBUTORS

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