Sternula antillarum - Lesson, 1847

Least Tern

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Other English Common Names: least tern
Other Common Names: Trinta-Réis-Miúdo
Synonym(s): *Sterna antillarum* (Lesson, 1847)
Taxonomic Status: Accepted
Related ITIS Name(s): *Sterna antillarum* (Lesson, 1847) (TSN 176923)
French Common Names: Petite Sterne
Spanish Common Names: Charrán Mínimo, Gaviotín Chico Boreal
Unique Identifier: ELEMENT_GLOBAL.2.101508
Element Code: ABNNM08100
Informal Taxonomy: Animals, Vertebrates - Birds - Other Birds

Kingdom	Phylum	Class	Order	Family	Genus
Animalia	Craniata	Aves	Charadriiformes	Laridae	Sternula

Genus Size: B - Very small genus (2-5 species)

Check this box to expand all report sections: ☐

Concept Reference

Concept Reference: American Ornithologists' Union (AOU). 1998. Check-list of North American birds. Seventh edition. American Ornithologists' Union, Washington, D.C. [as modified by subsequent supplements and corrections published in *The Auk*]. Also available online: http://www.aou.org/.
Concept Reference Code: B98AOU01NAUS
Name Used in Concept Reference: *Sterna antillarum*
Taxonomic Comments: Formerly (AOU 1983, 1998) included in the genus *Sterna* but separated on the basis of genetic data that correspond to plumage patterns (Bridge et al. 2005).

Often has been considered conspecific with Old World *S. albifrons* (AOU 1983). Appears to constitute a superspecies with *S. albifrons, S. superciliaris, S. lorata*, and *S. saundersi* (AOU 1998). Massey (1976) evaluated morphological, vocal, and behavioral characteristics and concluded that nominal subspecies *antillarum* and *browni* are indistinguishable. Thompson et al. (1992) examined morphological and electrophoretic variation and found little evidence of differentiation among populations of the nominal subspecies *antillarum*, *athalassos*, and *browni*; they recommended that the subspecific taxonomy of the *S. antillarum* complex be reassessed. Johnson et al. (1998) used a quantitative colorimetry analysis to study variation among *antillarum, athalassos*, and *browni* and found differences significant enough to warrant the validity of the taxa and their importance as entities for conservation.

Conservation Status

NatureServe Status

Global Status: G4

Global Status Last Reviewed: 10Apr2016
Global Status Last Changed: 27Nov1996
Ranking Methodology Used: Ranked by inspection
Rounded Global Status: G4 - Apparently Secure
Reasons: Widely distributed, but numbers are reduced and/or declining in some areas. Nesting colonies are sensitive to disturbance.
Nation: United States
National Status: N4B (05Jan1997)

U.S. & Canada State/Province Status	
United States	Alabama (S2B,S4N), Arizona (S2M), Arkansas (S2), California (SNR), Colorado (S1B), Connecticut (S2B), Delaware (S1B), Florida (S3), Georgia (S3), Illinois (S1), Indiana (SNRB), Iowa (S1), Kansas (S1B), Kentucky (S1S2), Louisiana (S4B), Maine (S1B), Maryland (S2B), Massachusetts (S2B), Mississippi (S3B), Missouri (S1), Montana (S1B), Nebraska (SNR), New Hampshire (SHB), New Jersey (S1B,S1N), New Mexico (S1B,S4N), New York (S3B), North Carolina (S3B), North Dakota (S1), Ohio (SNA), Oklahoma (S2B), Rhode Island (S2B,S2N), South Carolina (S3), South Dakota (S2B), Tennessee (S2S3B), Texas (S3B), Virginia (S2B)

Other Statuses

Implied Status under the U.S. Endangered Species Act (USESA): PS:LE
Comments on USESA: Listed by USFWS as Endangered on U.S. west coast (subspecies *browni*) (June 2, 1970; Federal Register 35:8495) and on interior U.S. rivers, with the following caveats: Louisiana, Mississippi River and tributaries north of Baton Rouge; Mississippi, Mississippi River only, and Texas, everywhere except the Texas coast and a 50 mile zone inland from the the coast (May 28, 1985; Federal Register 50:21792).
IUCN Red List Category: LC - Least concern

NatureServe Global Conservation Status Factors

Range Extent: >2,500,000 square km (greater than 1,000,000 square miles)
Range Extent Comments: BREEDING: Pacific coast, central California to southern Baja California and Chiapas (Garcia and Ceballos 1995); since 1970, most nesting has occurred from Santa Barbara to San Diego County, California. Interior U.S.: locally along the Colorado, Red, Arkansas, Missouri, Ohio, and Mississippi river systems; formerly more widespread and common; has been eliminated from much of former habitat; now breeds locally in this region, north to Montana and North Dakota, east to southwestern Indiana, central Kentucky, and western Tennessee, west to eastern Colorado. Atlantic-Gulf coast: Maine south to Florida and west to Tamaulipas, coast of Yucatan Peninsula, and in West Indies (Bahamas [Sprunt 1984], Greater and Lesser Antilles [van Halewyn and Norton 1984]); islands off coast of Belize, Honduras, and Venezuela; and Bermuda (Thompson 1995, AOU 1998). About 2/3 of world population breeds in the southeastern U.S.; largest colony is at Gulfport, Mississippi (Clapp and Buckley 1984). NON-BREEDING: regularly along Pacific coast from southern Mexico to Peru and eastern coasts of Mexico, Central America, and South America to Brazil and northern Argentina (Thompson et al. 1997, AOU 1998). May remain in wintering areas during first year (Thompson et al. 1995). Casual in Hawaii (Whitman 1988).

Number of Occurrences: 81 to >300
Number of Occurrences Comments: Widely distributed, but difficult to estimate because nesting habitat is ephemeral and nesting sites may change location from year to year.

Population Size: 10,000 - 100,000 individuals
Population Size Comments: Gulf and Atlantic coast populations included about 43,000 breeding birds in the mid-1980s (USFWS 1987). Atlantic coast population from Maine to Virginia was 9341 breeding pairs in 1986 (Engstrom et al. 1990). Long Island (New York) population was about 2500-3600 pairs in 47-59 colonies in the mid-1980s (MacLean et al. 1991). In the Florida Keys in the late 1980s, there were 37 colonies on 16 keys. Interior population was about 5000 pairs in 1990 (USFWS), estimated at 6,833 birds [pairs?] in 1991 (Kirsch and Sidle 1994). California population was about 1700 pairs in 1992 (Massey, pers. comm. 1992).

Overall Threat Impact Comments: Populations were decreased greatly by formerly extensive plume hunting. Current major problems are human use and development of nesting habitat and predation on adults, eggs, and young by birds and mammals (see Burger and Gochfeld 1990). Some habitat is lost due to encroachment of vegetation, but this may be offset by habitat created when storm overwash

removes vegetation from portions of barrier beaches or creates overwash fans of sandy/gravelly substrate. Storms during spring tides sometimes wash out nests. Replacement of gravel-covered roofs by plastic-covered roofs, together with increasing human use of beaches, may seriously limit the availability of productive nesting sites in the southeastern U.S. (Gore and Kinnison 1991). Birds and mammals prey on eggs and young, and ants may prey on young in pipped eggs and on newly hatched young (Moseley 1976). Ghost crabs (OCYPODE QUADRATA) may be important predators of eggs and chicks in South Carolina (Blus and Prouty 1979). Other predators in various regions include coyote (CANIS LATRANS), red fox (VULPES VULPES), mink, weasels, raccoon (PROCYON LOTOR), striped skunk (MEPHITIS MEPHITIS), opossum (DIDELPHIS VIRGINIANA), domestic cats and dogs, feral hogs (SUS SCROFA), Norway rat, black rat, various gulls, night-herons, American kestrel (FALCO SPARVERIUS), northern harrier (CIRCUS CYANEUS) red-shouldered hawk (BUTEO LINEATUS), fish crow (CORVUS OSSIFRAGUS), and grackles (Whitman 1988, Burger and Gochfeld 1990, Thompson et al. 1997). In New Jersey, Burger (1984) found that mainland colonies with over 80 birds suffer more from predators than colonies with fewer than 80 birds, perhaps because the former are large enough to make their presence known to predators. Larger colonies may incur greater losses to predation than do smaller colonies because the former are more stable and hence known to predators (Burger 1984). On two South Carolina barrier islands, harsh weather was the primary cause of unsuccessful nesting (Cowgill 1989). Bird banding, photography, and other activities that cause young to scatter or keep adults away from nests for substantial periods of time may result in increased mortality (Zickefoose 1985). Wayward young may be attacked by nonparental adults. Exposed eggs or young may succumb to overheating and be subject to increased predation. Potential threats include chemical spills and pesticide or heavy metal pollution. Decline of interior nesting populations has been coincident with human modification of river flow (e.g., reduction of spring floods by dams) and bank stabilization and channelization, resulting in reduced availability of bare island/sandbar nesting habitat; loss of aquatic habitat diversity and resulting changes in fish species composition and abundance also may have contributed to the reduced tern population (Figg 1993). Desalination projects may reduce shallow water fish populations and thus decrease tern food resources (Schulenberg and Ptacek 1984). In arid regions, irrigation may be a threat by lowering water levels/flows and reducing river areas when terns are breeding (Schulenberg and Ptacek 1984). Grazing cattle may trampled eggs (Schulenberg and Ptacek 1984). Heavy rains and other severe weather have resulted in significant nesting losses along the Cimarron River in Kansas and on salt plains in Oklahoma (Grover and Knopf 1982). Colonies reduced by severe weather may incur increased predation (Schulenberg and Ptacek 1984). Interior populations nest mainly on riverine sandbars or salt flats that become exposed during periods of low water (Hardy 1957). As a result of vegetational succession and/or erosion, preferred nesting habitat typically is ephemeral. Hardy (1957) implied that breeding in riverine situations depends on the presence of sandbars, favorable water levels during nesting season, and sufficient food. Nests are usually located at higher elevations and away from the water. Water levels determine the size of sand bars and the extent of nesting areas (USFWS 1990). Dams above colonies generally lower habitat quality by eliminating the spring floods that are necessary for alluvium deposition and the scouring of vegetation. Ducey (1982) reported successful breeding at two privately-owned sand and gravel companies along the Platte River in Nebraska. As old breeding sites became unsuitable due to vegetation encroachment, the terns simply moved to more recently created sand deposits. See also Ziewitz et al. (1992) for information on nesting habitat in the Platte River in Nebraska. Populations in Kansas have nested on oil well sites (Schulenberg and Ptacek 1984).

Short-term Trend: Decline of 10-30%
Short-term Trend Comments: North American Breeding Bird Survey (BBS) data indicate a significant decline in North America, 1978-1988 (Sauer and Droege 1992). Gulf and Atlantic coast populations apparently were stable in the mid-1980s (USFWS 1987). Atlantic coast population from Maine to Virginia apparently increased from 6740 breeding pairs in 1977 to 9341 pairs in 1986; however, the increase may have been caused in part by improved and expanded monitoring efforts; colonies with population decreases outnumbered colonies with increases 166 to 106 (Engstrom et al. 1990). In Massachusetts, increased from 1000+ pairs in 1974 to over 2415 pairs in 1984, due mainly to active management (Blodgett, pers. comm.). As of the early 1990s, populations in Massachusetts and Long Island (New York) appeared to be relatively stable (Raithel, pers. comm.). In Florida, Gulf Coast population increased from 250 pairs in two colonies in 1983 to 1012 pairs in eight colonies in 1990 (Gore 1991). Populations in the Florida Keys were stable from the mid-1970s through the 1980s (Hovis and Robson 1989). Interior population declined through at least the early 1980s; decline has taken place over many decades. Many populations are not fledging enough young to successfully increase local populations, but there appears to be immigration from Gulf populations and a good deal of movement among interior populations. Local populations fluctuate substantially (Kirsch and Sidle 1994). USFWS (1990) categorized the status of the interior population as "improving." California population has responded well to management, and populations are continuing to increase; population increased from 600 pairs in 1970 to 1700 pairs in 1992 (Massey, pers. comm.).

Other NatureServe Conservation Status Information

Inventory Needs: Continued population monitoring, EO inventory, and mapping.

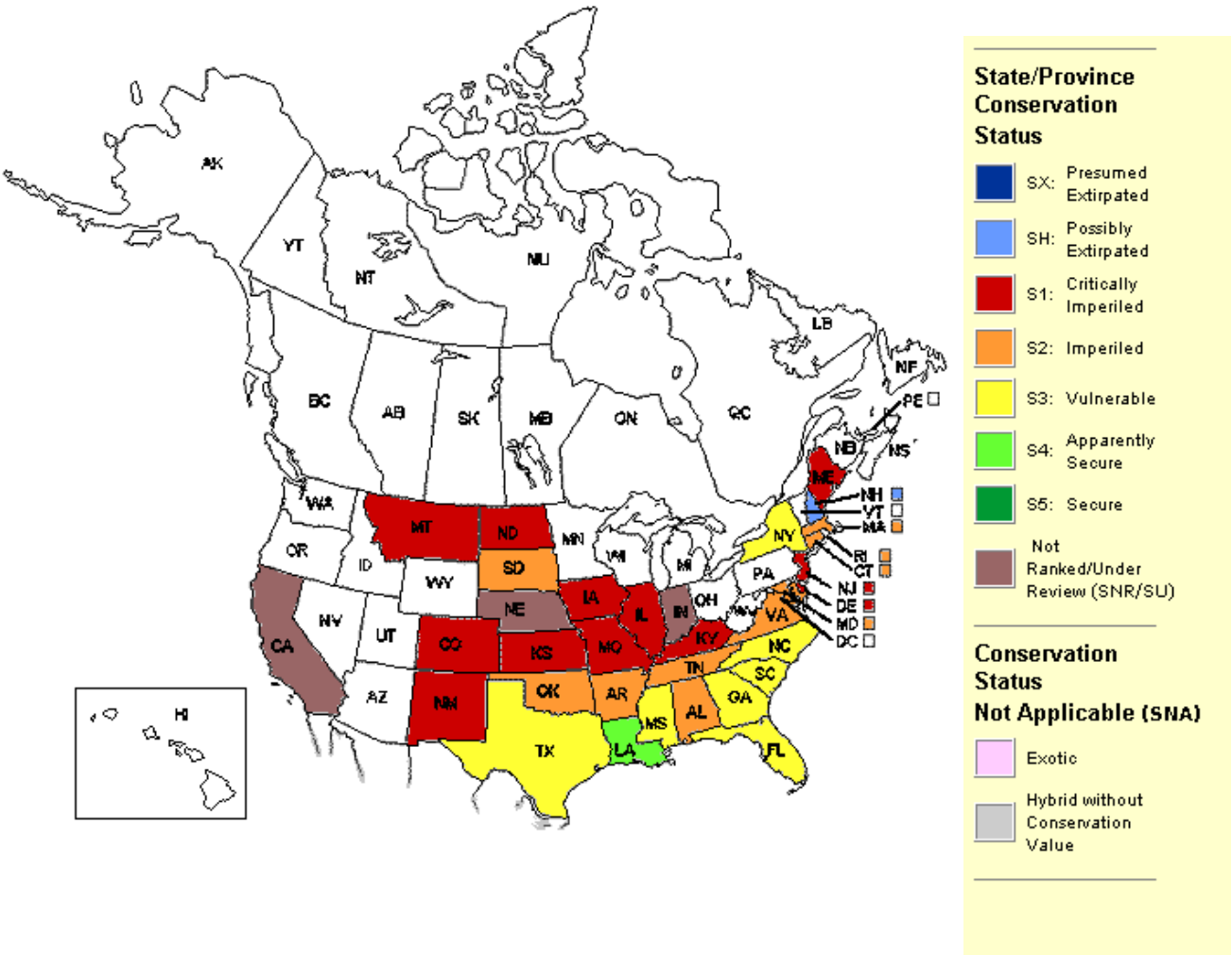
Protection Needs: It is important to protect actual and potential habitat, not just previous nesting sites; colonies tend to shift with vegetational encroachment and other changes. Habitat should be maintained throughout the range to ensure that birds can nest somewhere when conditions in certain areas are poor (e.g., Midwest flooding in 1993) (Kirsch and Sidle 1994).

River systems should be protected from dams and other hydrological developments; river flows must be protected to create and isolate breeding habitat. Shallow water feeding grounds should also be protected. Active colonies need to be protected from human intrusion.

Distribution

Global Range: (>2,500,000 square km (greater than 1,000,000 square miles)) BREEDING: Pacific coast, central California to southern Baja California and Chiapas (Garcia and Ceballos 1995); since 1970, most nesting has occurred from Santa Barbara to San Diego County, California. Interior U.S.: locally along the Colorado, Red, Arkansas, Missouri, Ohio, and Mississippi river systems; formerly more widespread and common; has been eliminated from much of former habitat; now breeds locally in this region, north to Montana and North Dakota, east to southwestern Indiana, central Kentucky, and western Tennessee, west to eastern Colorado. Atlantic-Gulf coast: Maine south to Florida and west to Tamaulipas, coast of Yucatan Peninsula, and in West Indies (Bahamas [Sprunt 1984], Greater and Lesser Antilles [van Halewyn and Norton 1984]); islands off coast of Belize, Honduras, and Venezuela; and Bermuda (Thompson 1995, AOU 1998). About 2/3 of world population breeds in the southeastern U.S.; largest colony is at Gulfport, Mississippi (Clapp and Buckley 1984). NON-BREEDING: regularly along Pacific coast from southern Mexico to Peru and eastern coasts of Mexico, Central America, and South America to Brazil and northern Argentina (Thompson et al. 1997, AOU 1998). May remain in wintering areas during first year (Thompson et al. 1995). Casual in Hawaii (Whitman 1988).

U.S. States and Canadian Provinces



NOTE: The maps for birds represent the breeding status by state and province. In some jurisdictions, the subnational statuses for common species have not been assessed and the status is shown as not-assessed (SNR). In some jurisdictions, the subnational status refers to the status as a non-breeder; these errors will be corrected in future versions of these maps. A species is not shown in a jurisdiction if it is not known to breed in the jurisdiction or if it occurs only accidentally or casually in the jurisdiction. Thus, the species

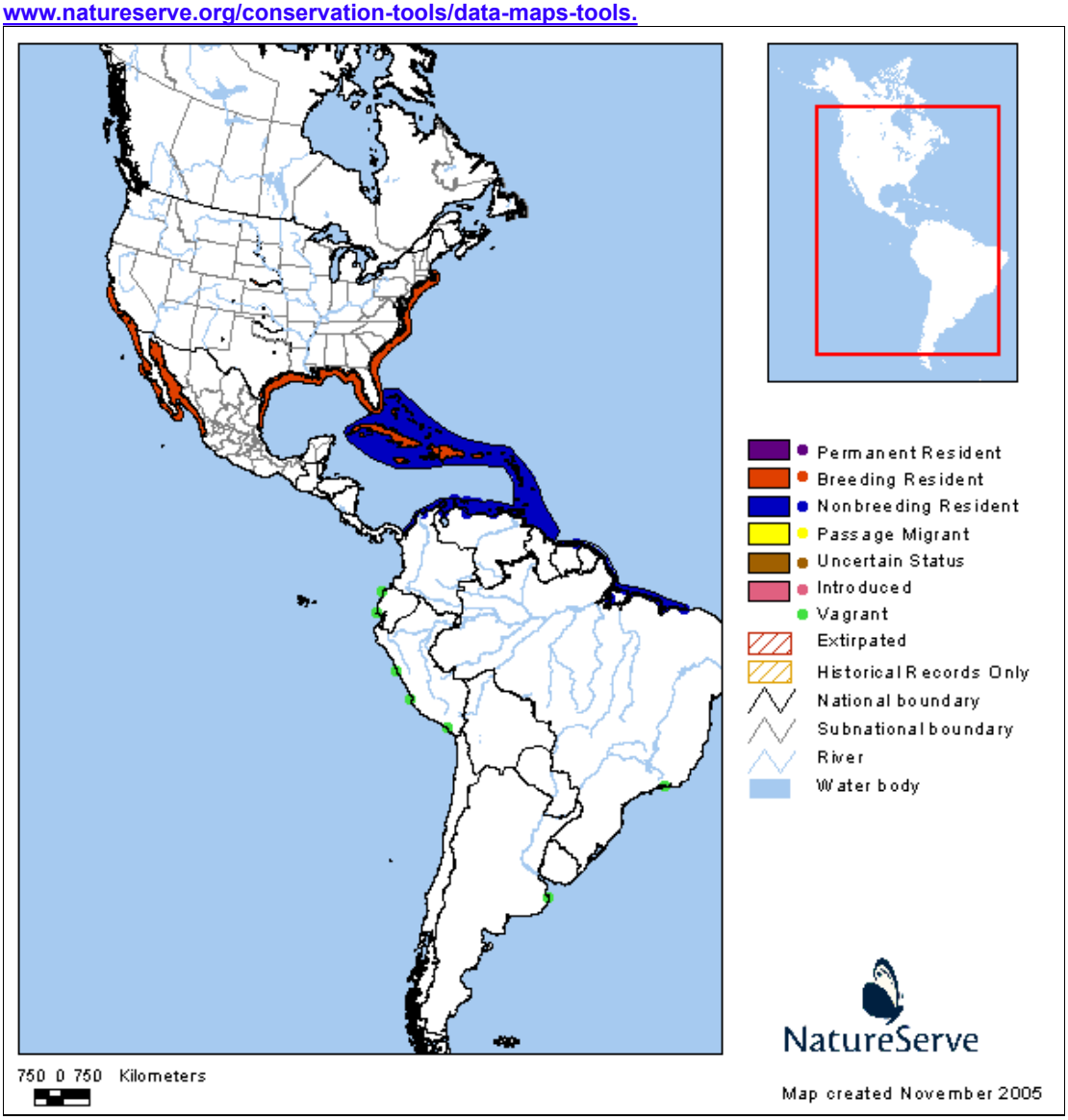
may occur in a jurisdiction as a seasonal non-breeding resident or as a migratory transient but this will not be indicated on these maps. See other maps on this web site that depict the Western Hemisphere ranges of these species at all seasons of the year.

Endemism: occurs (regularly, as a native taxon) in multiple nations

U.S. & Canada State/Province Distribution	
United States	AL, AR, AZ, CA, CO, CT, DE, FL, GA, IA, IL, IN, KS, KY, LA, MA, MD, ME, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NY, OH, OK, RI, SC, SD, TN, TX, VA

Range Map

Note: Range depicted for New World only. The scale of the maps may cause narrow coastal ranges or ranges on small islands not to appear. Not all vagrant or small disjunct occurrences are depicted. For migratory birds, some individuals occur outside of the passage migrant range depicted. For information on how to obtain shapefiles of species ranges see our Species Mapping pages at **www.natureserve.org/conservation-tools/data-maps-tools.**



Range Map Compilers: NatureServe, 2002

U.S. Distribution by County	
State	**County Name (FIPS Code)**
AL	Baldwin (01003)*
AR	Arkansas (05001), Chicot (05017), Conway (05029), Crawford (05033), Crittenden (05035), Desha (05041), Faulkner (05045), Hempstead (05057), Jefferson (05069), Johnson (05071), Lafayette (05073), Lee (05077), Lincoln (05079), Little River (05081), Logan (05083), Miller (05091), Mississippi (05093), Perry (05105), Phillips (05107), Pope (05115), Pulaski (05119), Sebastian (05131), Yell (05149)

CA	Alameda (06001), Contra Costa (06013), Los Angeles (06037), Orange (06059), San Diego (06073), San Luis Obispo (06079)*, San Mateo (06081)*, Santa Barbara (06083), Santa Clara (06085), Solano (06095), Ventura (06111)
CO	Bent (08011), Delta (08029)*, Kiowa (08061), Otero (08089)*, Prowers (08099)
CT	Fairfield (09001), Middlesex (09007), New Haven (09009), New London (09011)
DE	Kent (10001), New Castle (10003), Sussex (10005)
FL	Bay (12005), Brevard (12009), Broward (12011), Charlotte (12015), Citrus (12017), Collier (12021), Duval (12031), Escambia (12033), Franklin (12037), Gulf (12045), Hamilton (12047), Hillsborough (12057), Indian River (12061), Lee (12071), Levy (12075), Manatee (12081), Martin (12085), Miami-Dade (12086), Monroe (12087), Nassau (12089), Okaloosa (12091), Palm Beach (12099), Pinellas (12103), Polk (12105), Santa Rosa (12113), Sarasota (12115), St. Johns (12109), St. Lucie (12111), Volusia (12127), Wakulla (12129), Walton (12131)
IA	Fremont (19071), Harrison (19085)*, Polk (19153), Pottawattamie (19155), Woodbury (19193)
IL	Alexander (17003), Jasper (17079)*, Massac (17127)*, Pulaski (17153), Randolph (17157), Wabash (17185), White (17193)
IN	Dearborn (18029), Gibson (18051), Greene (18055), Posey (18129), Spencer (18147)
KS	Barton (20009)*, Clark (20025), Comanche (20033), Geary (20061), Jefferson (20087), Meade (20119), Phillips (20147), Pottawatomie (20149), Reno (20155), Riley (20161), Sedgwick (20173), Shawnee (20177), Stafford (20185), Wabaunsee (20197)
KY	Ballard (21007), Carlisle (21039), Fulton (21075), Hancock (21091), Hickman (21105), Jefferson (21111)*, Livingston (21139), Marshall (21157), Union (21225)
LA	Bossier (22015), Caddo (22017), Concordia (22029), East Carroll (22035), Madison (22065), Natchitoches (22069), Red River (22081), Tensas (22107)
MA	Barnstable (25001), Bristol (25005), Dukes (25007), Essex (25009), Nantucket (25019), Plymouth (25023), Suffolk (25025)
MD	Anne Arundel (24003), Baltimore County (24005), Calvert (24009)*, Dorchester (24019), Harford (24025)*, Kent (24029), Queen Annes (24035), Somerset (24039)*, St. Marys (24037), Talbot (24041), Worcester (24047)
ME	Cumberland (23005), Sagadahoc (23023), York (23031)
MO	Cape Girardeau (29031), Chariton (29041), Mississippi (29133), New Madrid (29143), Pemiscot (29155), Perry (29157), Scott (29201)
MS	Bolivar (28011), Claiborne (28021)*, Coahoma (28027), DeSoto (28033), Harrison (28047), Jackson (28059)*, Tunica (28143), Warren (28149), Washington (28151)
MT	Custer (30017), Dawson (30021), Garfield (30033), McCone (30055), Prairie (30079), Richland (30083), Roosevelt (30085), Valley (30105), Wibaux (30109)
NC	Brunswick (37019), Carteret (37031), Craven (37049), Currituck (37053), Dare (37055), Hyde (37095), Jones (37103), New Hanover (37129), Onslow (37133), Pender (37141)
ND	Burleigh (38015), Emmons (38029), Kidder (38043)*, McKenzie (38053), McLean (38055), Mercer (38057), Morton (38059), Mountrail (38061), Oliver (38065), Sioux (38085), Williams (38105)
NE	Arthur (31005), Blaine (31009), Boone (31011), Boyd (31015), Brown (31017), Buffalo (31019), Butler (31023), Cass (31025), Cedar (31027), Colfax (31037), Cuming (31039), Custer (31041), Dawson (31047), Dixon (31051), Dodge (31053), Douglas (31055), Hall (31079), Hamilton (31081), Holt (31089), Howard (31093), Keith (31101), Keya Paha (31103), Knox (31107), Lincoln (31111), Madison (31119), Merrick (31121), Nance (31125), Phelps (31137), Platte (31141), Polk (31143), Rock (31149), Sarpy (31153), Saunders (31155), Sherman (31163), Stanton (31167), Valley (31175)
NJ	Atlantic (34001), Bergen (34003)*, Burlington (34005)*, Cape May (34009), Cumberland (34011), Essex (34013)*, Hudson (34017)*, Monmouth (34025), Ocean (34029), Union (34039)
NM	Chaves (35005), Otero (35035)
NY	Nassau (36059), Queens (36081), Suffolk (36103)
OK	Alfalfa (40003)*, Beaver (40007), Blaine (40011), Bryan (40013), Canadian (40017), Choctaw (40023), Cleveland (40027), Creek (40037)*, Ellis (40045), Grady (40051), Harper (40059), Haskell (40061), Hughes (40063), Jefferson (40067), Kay (40071), Kingfisher (40073), Logan (40083), Love (40085), Major (40093), McClain (40087), McCurtain (40089), McIntosh (40091), Muskogee (40101), Oklahoma (40109)*, Osage (40113), Pawnee (40117), Payne (40119), Pittsburg (40121), Pontotoc (40123), Pottawatomie (40125), Roger Mills (40129), Seminole (40133), Sequoyah (40135), Texas (40139), Tulsa (40143), Wagoner (40145), Washington (40147)*, Woods (40151), Woodward (40153)
RI	Newport (44005), Washington (44009)
SC	Beaufort (45013), Berkeley (45015), Charleston (45019), Colleton (45029), Dorchester (45035), Georgetown (45043), Horry (45051), Jasper (45053), Sumter (45085)

SD	Bon Homme (46009), Campbell (46021), Charles Mix (46023), Clay (46027), Corson (46031), Dewey (46041), Gregory (46053), Haakon (46055), Hughes (46065), Meade (46093), Pennington (46103), Potter (46107), Stanley (46117), Sully (46119), Union (46127), Walworth (46129), Yankton (46135), Ziebach (46137)
TN	Dyer (47045), Lake (47095), Lauderdale (47097), Shelby (47157), Tipton (47167)
TX	Baylor (48023), Childress (48075), Coke (48081), Dallas (48113), Freestone (48161), Grayson (48181), Hall (48191), Hemphill (48211), Leon (48289), Red River (48387), Roberts (48393), Starr (48427), Tom Green (48451), Val Verde (48465), Webb (48479), Wilbarger (48487), Zapata (48505)
VA	Accomack (51001), Hampton (City) (51650), Mathews (51115), Norfolk (City) (51710), Northampton (51131), Northumberland (51133), Portsmouth (City) (51740), Virginia Beach (City) (51810)

* Extirpated/possibly extirpated

U.S. Distribution by Watershed

Watershed Region	Watershed Name (Watershed Code)
01	St. George-Sheepscot (01050003)+, Presumpscot (01060001)+, Piscataqua-Salmon Falls (01060003)+, Merrimack (01070002)+, Lower Connecticut (01080205)+, Charles (01090001)+, Cape Cod (01090002)+, Narragansett (01090004)+, Pawcatuck-Wood (01090005)+, Thames (01100003)+, Quinnipiac (01100004)+, Housatonic (01100005)+*, Saugatuck (01100006)+
02	Hackensack-Passaic (02030103)+*, Sandy Hook-Staten Island (02030104)+, Northern Long Island (02030201)+, Southern Long Island (02030202)+, Long Island Sound (02030203)+, Brandywine-Christina (02040205)+, Cohansey-Maurice (02040206)+, Broadkill-Smyrna (02040207)+, Mullica-Toms (02040301)+, Great Egg Harbor (02040302)+, Chincoteague (02040303)+, Eastern Lower Delmarva (02040304)+, Upper Chesapeake Bay (02060001)+, Chester-Sassafras (02060002)+, Gunpowder-Patapsco (02060003)+, Severn (02060004)+, Choptank (02060005)+, Patuxent (02060006)+*, Lower Potomac (02070011)+*, Great Wicomico-Piankatank (02080102)+, Lynnhaven-Poquoson (02080108)+, Eastern Lower Delmarva (02080110)+*, Pokomoke-Western Lower Delmarva (02080111)+*, Hampton Roads (02080208)+
03	Albemarle (03010205)+, Pamlico Sound (03020105)+, Middle Neuse (03020202)+, Lower Neuse (03020204)+, White Oak River (03020301)+, New River (03020302)+, Lower Cape Fear (03030005)+, Northeast Cape Fear (03030007)+, Black (03040205)+, Waccamaw (03040206)+, Carolina Coastal-Sampit (03040207)+, Coastal Carolina (03040208)+, Santee (03050112)+, Cooper (03050201)+, South Carolina Coastal (03050202)+, Four Hole Swamp (03050206)+, Salkehatchie (03050207)+, Bulls Bay (03050209)+, St. Helena Island (03050210)+, Lower Savannah (03060109)+, Canoochee (03060203)+, Ogeechee Coastal (03060204)+, Altamaha (03070106)+, Ohoopee (03070107)+, Cumberland-St. Simons (03070203)+, St. Marys (03070204)+, Nassau (03070205)+, Upper St. Johns (03080101)+, Lower St. Johns (03080103)+, Daytona - St. Augustine (03080201)+, Cape Canaveral (03080202)+, Vero Beach (03080203)+, Kissimmee (03090101)+, Everglades (03090202)+, Florida Bay-Florida Keys (03090203)+, Big Cypress Swamp (03090204)+, Caloosahatchee (03090205)+, Florida Southeast Coast (03090206)+, Charlotte Harbor (03100103)+, Sarasota Bay (03100201)+, Alafia (03100204)+, Hillsborough (03100205)+, Tampa Bay (03100206)+, Crystal-Pithlachascotee (03100207)+, Withlacoochee (03100208)+, Upper Suwannee (03110201)+, Apalachee Bay-St. Marks (03120001)+, Lower Ochlockonee (03120003)+, New (03130013)+, Apalachicola Bay (03130014)+, St. Andrew-St. Joseph Bays (03140101)+, Choctawhatchee Bay (03140102)+, Pensacola Bay (03140105)+, Perdido Bay (03140107)+, Mobile - Tensaw (03160204)+*, Mississippi Coastal (03170009)+
05	Lower Great Miami (05080002)+, Middle Ohio-Laughery (05090203)+, Lower Wabash (05120113)+, Little Wabash (05120114)+*, Lower White (05120202)+, Patoka (05120209)+, Silver-Little Kentucky (05140101)+*, Lower Ohio-Little Pigeon (05140201)+, Highland-Pigeon (05140202)+, Lower Ohio-Bay (05140203)+, Lower Ohio (05140206)+
06	Lower Tennessee (06040006)+
07	Middle Des Moines (07100004)+, Upper Mississippi-Cape Girardeau (07140105)+, Lower Kaskaskia (07140204)+
08	Lower Mississippi-Memphis (08010100)+, Bayou De Chien-Mayfield (08010201)+*, Obion (08010202)+, Horn Lake-Nonconnah (08010211)+, Lower Mississippi-Helena (08020100)+, New Madrid-St. Johns (08020201)+, Lower Arkansas (08020401)+, Lower Mississippi-Greenville (08030100)+, Coldwater (08030204)+, Tensas (08050003)+, Lower Mississippi-Natchez (08060100)+, Lower Big Black (08060202)+*
10	Fort Peck Reservoir (10040104)+, Big Dry (10040105)+, Lower Milk (10050012)+, Prarie Elk-Wolf (10060001)+, Redwater (10060002)+, Poplar (10060003)+, Charlie-Little Muddy (10060005)+, Big Muddy (10060006)+, Lower Powder (10090209)+, Lower Yellowstone-Sunday (10100001)+, Lower Yellowstone (10100004)+, O'fallon (10100005)+, Lake Sakakawea (10110101)+, Middle Cheyenne-Elk (10120111)+, Lower Cheyenne (10120112)+, Painted Woods-Square Butte (10130101)+,

	Upper Lake Oahe (10130102)+, Apple (10130103)+*, Lower Lake Oahe (10130105)+, Fort Randall Reservoir (10140101)+, Middle Niobrara (10150004)+, Lower Niobrara (10150007)+, Lewis and Clark Lake (10170101)+, Lower North Platte (10180014)+, Lower South Platte (10190018)+, Middle Platte-Buffalo (10200101)+, Wood (10200102)+, Middle Platte-Prairie (10200103)+, Lower Platte-Shell (10200201)+, Lower Platte (10200202)+, Salt (10200203)+, Dismal (10210002)+, Lower Middle Loup (10210003)+, Lower North Loup (10210007)+, Loup (10210009)+, Cedar (10210010)+, Upper Elkhorn (10220001)+, Lower Elkhorn (10220003)+, Blackbird-Soldier (10230001)+, Big Papillion-Mosquito (10230006)+, Keg-Weeping Water (10240001)+, Upper North Fork Solomon (10260011)+, Lower North Fork Solomon (10260012)+, Upper Kansas (10270101)+, Middle Kansas (10270102)+, Delaware (10270103)+, Lower Grand (10280103)+
11	Horse (11020008)+*, Upper Arkansas-John Martin (11020009)+, Big Sandy (11020011)+, Rattlesnake (11030009)+, Gar-Peace (11030010)+, Cow (11030011)+*, Middle Arkansas-Slate (11030013)+, North Fork Ninnescah (11030014)+, Upper Cimarron-Liberal (11040006)+, Upper Cimarron-Bluff (11040008)+, Lower Cimarron-Eagle Chief (11050001)+, Lower Cimarron-Skeleton (11050002)+, Lower Cimarron (11050003)+, Kaw Lake (11060001)+, Lower Salt Fork Arkansas (11060004)+*, Black Bear-Red Rock (11060006)+, Caney (11070106)+*, Middle Canadian-Spring (11090106)+, Lower Canadian-Deer (11090201)+, Lower Canadian-Walnut (11090202)+, Little (11090203)+*, Lower Canadian (11090204)+, Coldwater (11100103)+, Middle North Canadian (11100301)+*, Lower North Canadian (11100302)+*, Deep Fork (11100303)+*, Polecat-Snake (11110101)+, Dirty-Greenleaf (11110102)+, Robert S. Kerr Reservoir (11110104)+, Frog-Mulberry (11110201)+, Dardanelle Reservoir (11110202)+, Lake Conway-Point Remove (11110203)+, Lower Arkansas-Maumelle (11110207)+, Lower Prairie Dog Town Fork Red (11120105)+, Farmers-Mud (11130201)+, Wichita (11130206)+, Southern Beaver (11130207)+, Lake Texoma (11130210)+, Bois D'arc-Island (11140101)+, Kiamichi (11140105)+, Pecan-Waterhole (11140106)+, Mckinney-Posten Bayous (11140201)+, Middle Red-Coushatta (11140202)+, Red Chute (11140204)+, Bayou Pierre (11140206)+, Lower Red-Lake Iatt (11140207)+
12	Upper Trinity (12030105)+, Lower Trinity-Tehuacana (12030201)+, Navasota (12070103)+, Upper Colorado (12080008)+, North Concho (12090104)+
13	Amistad Reservoir (13040212)+, Lower Devils (13040302)+, Tularosa Valley (13050003)+, Upper Pecos-Long Arroyo (13060007)+, Elm-Sycamore (13080001)+, San Ambrosia-Santa Isabel (13080002)+, International Falcon Reservoir (13080003)+
14	Lower Gunnison (14020005)+*
18	Suisun Bay (18050001)+, San Francisco Bay (18050004)+, Central Coastal (18060006)+*, Santa Maria (18060008)+, San Antonio (18060009)+, Santa Ynez (18060010)+, Calleguas (18070103)+, Santa Monica Bay (18070104)+, San Gabriel (18070106)+*, Seal Beach (18070201)+, Santa Ana (18070203)+, Newport Bay (18070204)+, Aliso-San Onofre (18070301)+, Santa Margarita (18070302)+, San Luis Rey-Escondido (18070303)+, San Diego (18070304)+, Cottonwood-Tijuana (18070305)+

+ Natural heritage record(s) exist for this watershed
* Extirpated/possibly extirpated

Ecology & Life History

Basic Description: Least tern.

General Description: The smallest North American tern (length 21-24 cm); breeding adult is mainly gray above, with a black cap and nape, white forehead, black line running from the crown through the eye to the base of the bill, orange-yellow bill often with a dark tip, white or grayish underparts, short deeply forked tail, and yellow-orange legs and feet; a black wedge on the outer primaries is conspicuous in flight (NGS 1983). Adult in winter plumage has a dingy cap, dark nape, a black line through the eye, a dark bill, and yellowish feet and legs (NGS 1983, Peterson 1990). Juvenile is pinkish-buff above, with brownish U-shaped marks on the back; crown is dusky; dark bar is present on the front part of the folded wing. First-summer birds resemble adults but retain the dark bar on the wing and have a dark bill and dark feet and legs, dusky primaries, a dark nape, and a black line through the eye (NGS 1983, Forbush 1927, Farand 1983).

VOCALIZATIONS: a shrill "zreep" and a harsh "kip, kip, kip."

EGGS: pale or olive buff with dark purplish-brown or blue-gray speckles and streaks. Seventeen eggs from Illinois averaged 31.2 X 23.8 mm (Hardy 1957).

Diagnostic Characteristics: Differs from other sympatric terns in being much smaller (averages 23 cm long vs. 37 cm in common tern [STERNA HIRUNDO]). No other sympatric tern has, in breeding plumage, a combination of a white forehead, yellowish legs, and pale gray mantle. In winter plumage, differs from winter Forster's tern (STERNA FORSTERI) in being much smaller, differs from winter black

tern (CHLIDONIAS NIGER) in having yellowish feet and legs (dark in the black tern).
Reproduction Comments: Courtship behavior includes chases, vocalizations, and sometimes presentation of a fish to the female by the male. Lays eggs mostly in May-June (July-August nests probably are renests). Renesting may occur after egg loss associated with heavy rains and/or flooding (Jernigan et al. 1978, Blus and Prouty 1979). Clutch size usually is 2-3 (most often 2 in California, New York, and Mississippi), rarely up to 4-5 (Hardy 1957, Swickard 1974, Houde 1977, Hays 1980, Faanes 1983). Incubation usually lasts 20-25 days (also reported as 21-22 days), by both sexes but mostly by female. Hatching success varies greatly and is affected by factors such as weather, tides, predation, and human disturbance; may be high under optimal conditions. Young are tended by both parents, leave nest after a few days, brooded for several days, fly at about 3-4 weeks, dependent for a few weeks more. Reproductive success rarely exceeds one chick per pair (Kress et al. 1983). First breeds generally when about one year old, sometimes not until two years old (Massey and Atwood 1981). Maximum known natural longevity 21 years (Massey and Atwood 1978, Clapp et al. 1982). In recent years, colonies generally have included not more than 20 pairs, sometimes up to about 75 pairs (Ehrlich et al. 1992), rarely up to several hundred pairs. Colony may be divided into subcolonies (Massey 1974).
Ecology Comments: In California, usually nests in same area in successive years; tends to return to natal site to nest (Atwood and Massey 1988). On Long Island, New York, tends to nest in same area in successive years if physical conditions are conducive to nesting (MacLean et al. 1991).

NON-BREEDING: usually singly or in small loose groups; in larger flocks when migrating. Foraging may occur singly, in pairs, or in small flocks (Erwin 1978).
Non-Migrant: N
Locally Migrant: N
Long Distance Migrant: Y
Mobility and Migration Comments: Breeders from the U.S. Atlantic coast migrate through the Caribbean region (van Halewyn and Norton 1984). Arrives in northeastern U.S. mainly in May; departs in August or generally not later than mid-September (Bull 1974, Dorr 1976).

Arrives in northern breeding areas on west coast mostly in April; most have departed for south by November (or as early as August); wintering area is unknown but probably is in western Mexico.

Wintering area for the breeding population in the interior U.S. is unknown (perhaps coastal Central America/northern South America?) (Matthews and Moseley 1990). Most arrive in Iowa/Nebraska in May.

Migrates in Costa Rica late-August to late October, and April (Stiles and Skutch 1989).
Marine Habitat(s): Near shore
Estuarine Habitat(s): Bay/sound, Lagoon, River mouth/tidal river, Tidal flat/shore
Riverine Habitat(s): BIG RIVER, MEDIUM RIVER
Lacustrine Habitat(s): Deep water, Shallow water
Palustrine Habitat(s): Riparian
Terrestrial Habitat(s): Sand/dune
Habitat Comments: BREEDING: Seacoasts, beaches, bays, estuaries, lagoons, lakes, and rivers (AOU 1983). Rests and loafs on sandy beaches, mudflats, and salt-pond dikes (Stiles and Skutch 1989). In California, may roost at night on sandy beaches away from nesting areas for several weeks before nesting. Nests usually in shallow depression on level ground on sandy or gravelly beaches and banks of rivers or lakes, typically in areas with sparse or no vegetation (usually less than 20% vegetation cover, often 10% or less; Bent 1921, Craig 1971, Jernigan et al. 1978, Thompson and Slack 1982, Faanes 1983, Gochfeld 1983, USFWS 1990); also on dredge spoils; on mainland or on barrier island beaches; and on flat gravel-covered rooftops of buildings (especially in the southeastern U.S.) or other similarly barren artificial sites (AOU 1983). Good nesting areas tend to be well beyond the high tide mark, have shell particles/stones /debris for egg camouflage (Burger and Gochfeld 1990), be out of the way of off-road vehicles and public recreation areas, not subject to unusual predation pressure, and adjacent to plentiful sources of small fishes. Colonies on small islands usually experience less mammalian predation (Burger 1984). Good roof-top sites provide some shade for chicks.

Adults do not require cover during the breeding season, but chicks may use sparse vegetation and debris for shade and protection (Hardy 1957, Blodgett 1978). Parents may lead chicks toward the periphery of the colony into more heavily vegetated areas (Akers 1975), where the young utilize debris and vegetation for cover (Hardy 1957). In coastal areas, beach grass (AMMOPHILA

BREVILIGULATA) is the commonly associated vegetation. Along river systems, willow (SALIX spp.) is the common vegetation adjacent to sites (Sidle, pers. comm.). On Oklahoma salt flats, almost 60% of the nests were within 5 cm of debris (Grover and Knopf 1982).

Interior populations nest mainly on riverine sandbars or salt flats that become exposed during periods of low water (Hardy 1957). As a result of vegetational succession and/or erosion, preferred nesting habitat typically is ephemeral. Hardy (1957) implied that breeding in riverine situations depends on the presence of sandbars, favorable water levels during nesting season, and sufficient food. Nests are usually located at higher elevations and away from the water. Water levels determine the size of sand bars and the extent of nesting areas (USFWS 1990). Dams above colonies generally lower habitat quality by eliminating the spring floods that are necessary for alluvium deposition and the scouring of vegetation. Ducey (1982) reported successful breeding at two privately-owned sand and gravel companies along the Platte River in Nebraska. As old breeding sites became unsuitable due to vegetation encroachment, the terns simply moved to more recently created sand deposits. See also Ziewitz et al. (1992) for information on nesting habitat in the Platte River in Nebraska. Populations in Kansas have nested on oil well sites (Schulenberg and Ptacek 1984).

Since least terns always nest near water, they are vulnerable to flood inundation and seem to seek high ground. In coastal Texas, Thompson and Slack (1982) documented that the densest nesting area in 67% of the colonies was above the midpoint of available elevations. Gochfeld (1983) found that terns on Long Island avoid beaches that have less than 32.8 feet (10 m) of width beyond the hightide mark. Interior least tern nests on salt plains in Oklahoma were located an average of 110.5 m away from the nearest water (Grover and Knopf 1982). However, nests on the Platte River in Nebraska, were located at an average of 18.9 m away from the nearest river channel on sand bars that averaged 58.9 m wide (Faanes 1983).

NON-BREEDING: flocks have been found at sea, often far from land, in southeastern Caribbean and adjacent Atlantic off Guianas (van Halewyn and Norton 1984).
Adult Food Habits: Invertivore, Piscivore
Immature Food Habits: Invertivore, Piscivore
Food Comments: Eats mainly small fishes (generally less than 9 cm long), sometimes crustaceans or insects, obtained by diving from air into shallow water usually less than 4 m deep (Moseley 1976). Interior populations depend almost entirely on cyprinids. Feeding in newly plowed fields has been observed in Texas; apparently beetle larvae were being captured (McDaniel and McDaniel, 1963, Auk 80:544).

When breeding, usually forages within a few hundred meters of colony, but occoasionally up to 3-12 kilometers away (summarized by Thompson et al. 1997). Coastal breeding populations may forage in marine, estuarine, or nearby freshwater habitats.
Adult Phenology: Diurnal
Immature Phenology: Diurnal
Colonial Breeder: Y
Length: 23 centimeters
Weight: 43 grams

Economic Attributes

Management Summary

Stewardship Overview: Protect occurrences by managing against the effects of human disturbance, predation, and vegetation encroachment. Review future hydrology projects along river systems. Protect prime habitat and experiment with artificial habitat. Locate roof top colonies, and inform building owners.
Restoration Potential: Recent population trends and the tern's ability to relocate due to habitat disturbance or succession indicate the potential for recovery from low population numbers. In Massachusetts, population increases in the 1970s and 1980s were attributed to active management (Blodgett, pers. comm.). The ability of terns to seek alternative colony sites (e.g., roof tops and dredge spoils) is an asset to its recovery. New nesting habitat can be created with dredge spoils (Whitman 1988). New nesting islands have been created in the Platte River in Nebraska (1991, End. Sp. Tech. Bull. 16[5]:14). Islands made from dredge spoils, if isolated from terrestrial predators and human disturbance, have good potential for successful tern reproduction. Expanding populations along the Gulf coast of Florida in the 1980s made use of artificial nesting substrates. Twenty percent of the colonies were on dredged material, land cleared for construction, or other altered habitat, and 56% were on roof tops (Gore 1991). Fifty-nine percent of the colonies in the Florida Keys were on dredge spoils, and 38% on rooftops. Dredge spoil islands are often excellent locations for colonies, exhibiting habitat characteristics that attract terns. However, the substrate composition of dredge spoil has presented problems in Texas. Natural sites largely consist of

sand and shell fragments and less than 10% silt and clay. Most dredge-spoil deposition sites are composed of a mix of a variety of particles and greater than 45% silt and clay. The fine silts and clay in some dredge spoil sites sometimes promote "egg sticking" which occurs during wet periods and causes egg loss. These "artificial" substrates contain sufficient sand to stimulate terns to select the site for nesting, but the finer texture of the silt particles reduces drainage (Thompson and Slack 1982). Furthermore, dredge spoil sites are short-lived and typically undergo rapid succession Burger 1984).

Increases in the California least tern population in recent decades followed listing as an endangered species and active management (USFWS 1984); this subspecies has a strong recovery potential in California with ongoing management.

Conservation recovery plans and the requirement of hydrologic project review should aid in the population recovery of interior populations. In at least one instance, a hydro project actually aided tern recovery: the Arcadia Diversion in Oklahoma caused the formation of sandbars and facilitated renewed tern nesting (USFWS 1984).

The recovery goal for the interior subspecies is as follows (USFWS 1990): (1) Adult birds in the Missouri River system will increase to 2,100 and remain stable for 10 years. (2) Current numbers of adults birds (2,200-2,500) on the lower Mississippi River will remain stable for 10 years. (3) Adult birds in the Arkansas River system will increase to 1,600 and remain stable for 10 years. (4) Adult birds in the Red River system will increase to 300 and remain stable for 10 years. (5) Current numbers of adult birds in the Rio Grande system (500) will remain stable for 10 years.

To mitigate the effects of disturbance, predation, and flooding, decoys with recorded least tern vocalizations have been used as attractants to stimulate least tern colonization at alternative nesting sites (Kotliar and Burger 1984). Decoys have potential to be instrumental in reestablishing colonies and establishing new colonies. Arbuckle (1983) was able to relocate one out of two least tern colonies using decoys. In California, decoys have been successfully used to attract least terns to newly created sites (Massey 1981).
Management Requirements: Least terns need protection through management against the effects of human disturbance, predation, vegetative encroachment, loss of habitat, flooding and foul weather. Terns nesting on publicly owned areas are vulnerable to the effects of public recreational use. The following commonly utilized management procedures, used in combination, are effective in eliminating the majority of disturbances. (1) Psychological fencing. This protective fencing is constructed of fence posts connected by two strands of bailing twine; one strand is near the top of the fence post and the other is in the middle (Caljouw, pers. comm.). If possible, the fence should be placed at least 50 m outside of colony nests. For coastal nesting populations, Buckley and Buckley (1976) suggest restriction of foot travel within 1000 feet of any active colony. Blodgett (1978) suggested a 50 meter distance between a protective fence and actual nests, and a 70 meter distance between ORV trails and nests. In order to solve the problem of maintaining a fence that was high enough to avoid tidal washout, yet low enough on the beach to act as a buffer between terns and people, Maine Audubon erected a double row of fencing; an original buffer zone fence was erected, and then a stake and twine fence with signs a distance away from the inner fence. This system, designed according to the architecture of the beach, proved effective. (2) An education campaign. This would include brochures and media coverage in the local newspapers and on TV stations, as well as signs on fence posts that inform the public about the tern. Wardens may be hired to patrol the area, answer questions, and enforce restrictions when necessary. In instances where a beach is narrow and does not allow for a safe distance between nests and fencing, signs with bold print should be erected, so as not to attract people to the signs near the nests (Caljouw, pers. comm.). (3) ORV traffic lanes at least 20 m from fencing boundary (Blodgett 1978). (4) Strict dog and cat leash laws (Blodgett 1978). Systematic removal of feral cats. (5) A sufficient number of maintained garbage cans for the disposal of predator-attracting trash.

Predation by large mammals, rats, and avian birds takes a heavy toll on least tern colonies. Large mammals can be trapped or excluded by snow fencing, chicken wire, or electric fence (Minsky 1980). The electric fence tends to short circuit on vegetation and requires maintenance. At Gooserocks beach in Maine, where cat tracks were noted near the colony, "Kitty Rope" was erected to deter cat predation. No cat predation occurred during the single season of use of Kitty Rope at this site (Arbuckle, pers. comm.). Rat control can be accomplished by fumigating their burrows (Kotliar 1984). In order to protect chicks from avian predation by kestrels and harriers, Jenks (1980) devised a chick shelter constructed with 11 wooden snow fence slats wired together into a conical shape. On Nantucket Island, Massachusetts, where such shelters were used, chicks sought refuge in them in during instances of disturbances by humans or dogs. In addition to providing protection for chicks, the shelters also provide necessary shade.

Vegetation encroachment degrades least tern habitat. Along river systems, growing willow species destroy nesting grounds. On the Platte river, these trees are mechanically removed with a bushog (Sidle, pers. comm.). Buckley and Buckley (1976) note that fire is a

potential management tool which has been infrequently used, largely because its natural occurrence and significance has not been investigated in mid-western locations. Site specific historical and ecological investigations should be conducted preceding its use. Soots and Landin (1978) note that annual species rapidly colonize burned areas. In many areas vegetation is removed by hand. Addition of dredge spoils on spoil and vegetated beach areas may impede succession (Soots and Landin 1978). However it is important that the substrate not be too silty in order to avoid the egg stick syndrome. A deposition with over 20% shells could interfere with nest construction (Kotliar 1984).

Storms and foul weather can impact a chick population through cold winds and wetness. Adults cannot bring back food during heavy storms. On beaches devoid of vegetation, the provision of shrubs and driftwood can provide important shelter from a storm (Haddon and Knight 1983). Grover and Knopf (1982) compared the number of nesting interior least terns between two types of experimental plots, one with no debris and one with double the average amount of debris. They found no difference between them. However, this experiment was marred by low sample sizes and heavy flooding. Adding debris may increase the attractiveness of a sandbar to breeding terns.

Management techniques that may be effective in reducing the impact of high water include raising nests on shingle and sand-filled boxes, moving nests to higher ground, and collecting eggs for the duration of floods (Haddon and Knight 1983). Another technique involves using concrete manhole pipes, sand bags, rubble, shingle, searlewave screens, and stakes to actually raise the island (Haddon and Knight 1983). Although these techniques are highly intensive and require many man-hours, they save eggs and/or nests that otherwise would be flooded. Arbuckle (1983) believed the potential for successfully moving nests to avoid tidal losses, or vehicle/pedestrian traffic is great. In Maine, adults showed high fidelity to nests and chicks by returning to nest sites after leaving for several hours during adverse conditions. They also searched for and began brooding eggs that were neither their own or in the same location, but were in the same vicinity. In egg movement experiments, after eggs had been moved 10 feet from the original scrapes, the incubating adult returned to the original nest, and then flew off, attacking the observer, unaware of the new nest location (Arbuckle 1984). When eggs were moved to within 7 feet and then 5 feet of the original location, this behavior was repeated until the birds resumed incubation. All terns settled down within six minutes of the time that their eggs were moved to the final location. Sixty-four per cent of the birds settled on their eggs at a distance of 5 feet from the original nest and eighteen percent settled at 7 feet. Another eighteen percent of the birds would not incubate again until the eggs were moved back to the original location. No nests were deserted.

In Kansas, management plans have been formulated to compensate for habitat loss on river systems by using sand to construct raised nesting sites above high water levels (Schulenberg and Ptacek 1984). Ziewitz et al. (1992) recommended the creation of sandbars to provide suitable nesting substrate in the Platte River in Nebraska.

Fencing can be erected to prevent chicks from falling off gravel roof nesting areas (Hovis and Robson 1989, Gore 1991).
Monitoring Requirements: A census of all three subspecies is necessary for long-term information on population trends and for evaluation of management procedures (Blodgett 1978). Continued efforts are needed to determine the overall population trends in the Atlantic region. To help assess population trends across the Atlantic coast, a central base/agency for pooled information is recommended. Censuses can be done on foot, by ORV, or aerially. However, surveying should be avoided during courtship and egg laying when nests are most susceptible to desertion (Buckley and Buckley 1976). Predators may be attracted to human scent, so monitors should consider censusing at a safe distance from the nest; nests should be observed through binoculars instead of by walking through the colony (Caljouw, pers. comm.).

The Maine Audubon Society (Arbuckle 1984) conducted a study to determine the distance at which humans cause a disturbance to least terns. Bird observers approached colonies from a variety of distances and noted at what distance the birds changed their posture, rose off their nests and began to dive bomb the intruder. At Seawall Beach, a fence was erected 30-45 ft away from the nests. The birds' behavior varied: 30% of the time observers located at the fence caused no apparent disturbance, 30% of the time the birds remained calm, and 30% of the time, the birds were agitated and in the air when humans were 35 feet beyond the buffer fence (70 feet from nests). There was no correlation between the bird's behavior and tidal level, weather, time of incubation, or time of day.

Useful data to be recorded during monitoring include dates and patterns of arrival, colony size, presence of nonbreeding birds, number of breeding pairs, number of nesting attempts, date of incubation commenced, hatching date, number of young hatched, progress and movement of chicks, cause of nesting failures, and patterns of departure (Haddon and Knight 1983).

Abundance data should be reported as number of pairs. Litwin (1983) suggested taking an adult count and using a conversion factor of 0.9 to provide a figure for numbers of pairs (e.g., 83 adults X .9 = 75 pairs). The 0.9 conversion factor was successful on Long Island; however, it may not be appropriate to use for populations in other places. It also may vary with time of day, weather, nesting stage, and other variables (Master, pers. comm.).

Censuses should not be conducted during bad weather, heat of the day, or periods of high human activity.

Least terns commonly renest following initial nest failures, and this behavior complicates census results (French, pers. comm.). Behavior of newly fledged young terns can contribute considerable error to counts made in large colonies, as chicks may disperse as soon as they are capable of sustained flight. Beginning July 20th, many banded young believed to be from Sandy Point began to show up at Griswold Point in Old Lyme (CT), 44 miles eastward. Such movement needs to be considered in censuses (Zickefoose 1985).

See Massey et al. (1988) for discussion of adverse effect of radio transmitters on nesting terns. See Hill and Talent (1990) for information on the effects of capture, handling, banding, and radio-marking on breeders.
Biological Research Needs: Winter range needs to be delineated and characterized. Accurate estimates of post-fledging survival rates are needed to help assess population trends (Kirsch and Sidle 1994). Research is also needed on the amount of interchange between interior and Gulf populations. Potential problems associated with pesticide and heavy metal accumulation should be examined (Williams, pers. comm.).

Population/Occurrence Delineation

Group Name: Gulls and Terns

Use Class: Breeding
Minimum Criteria for an Occurrence: Evidence of historical breeding, or current and likely recurring breeding, at a given location, minimally a reliable observation of one or more breeding pairs in appropriate habitat. Be cautious about creating EOs for observations that may represent single breeding events outside the normal breeding distribution.
Separation Barriers: None.
Separation Distance for Unsuitable Habitat: 5 km
Separation Distance for Suitable Habitat: 5 km
Separation Justification: Occurrences include nesting areas and associated nesting-season foraging areas (regardless of how far apart they are), but separation distance pertains to nesting areas (breeding colonies). Thus different breeding occurrences may overlap if birds from different nesting areas forage in the same area. Separation distance is not intended to delineate demographically independent populations or metapopulations (such units would be quite large). Instead, separation distance is a compromise between the high mobility of these birds (see following) and the need for occurrences that are of practical size for conservation/management use.

California Gulls foraged an average of 17.4 kilometers from colony (Baird 1976); maximum foraging distances ranged from 32 to 61 kilometers (Rothweiler 1960, Baird 1976). Ring-billed Gulls foraged an average of 11 km from colony (Baird 1977). Least Terns foraged up to 3-12 kilometers from nests (summarized in Thompson et al. 1997). Forster's Terns has a reported feeding radius of 3.2 kilometers (Van Rossem 1932). Black Terns foraged up to 10 kilometers from nests, over continuous suitable but unoccupied habitat (M. A. Stern, pers. comm. 1998). Caspian terns in a colony at the mouth of the Columbia River: 90% of adults foraged within 21 kilometers (Collis et al. 1999).
Date: 21Jul2004
Author: Cannings, S., and G. Hammerson

Use Class: Migratory stopover
Minimum Criteria for an Occurrence: Evidence of recurring presence of migrating flocks (including historical); and potential recurring presence at a given location, minimally a reliable observation of 50 birds in appropriate habitat. Occurrences should be locations where the species is resident for some time during the appropriate season; it is preferable to have observations documenting presence over at least 7 days annually. Be cautious about creating EOs for observations that may represent single events.
Separation Barriers: None.
Separation Distance for Unsuitable Habitat: 5 km
Separation Distance for Suitable Habitat: 5 km

Separation Justification: Separation distance somewhat arbitrary; set such that occurrences are of managable size for conservation purposes. Occurrences are defined primarily on the basis of areas supporting concentrations of foraging birds, rather than on the basis of distinct populations.
Date: 26Apr2004

Use Class: Nonbreeding
Subtype(s): Foraging Concentration Area
Minimum Criteria for an Occurrence: Evidence of recurring presence of wintering flocks (including historical); and potential recurring presence at a given location, minimally a reliable observation of 25 birds in appropriate habitat. Occurrences should be locations where the species is resident for some time during the appropriate season; it is preferable to have observations documenting presence over at least 20 days annually. Be cautious about creating EOs for observations that may represent single events.
Separation Barriers: None.
Separation Distance for Unsuitable Habitat: 5 km
Separation Distance for Suitable Habitat: 5 km
Separation Justification: Separation distance somewhat arbitrary; set such that occurrences are of managable size for conservation purposes. Occurrences are defined primarily on the basis of areas supporting concentrations of foraging birds, rather than on the basis of distinct populations.
Date: 16Apr2002
Author: Cannings, S.
Notes: Includes all inland-nesting gulls and terns, in the genera LARUS, STERNA, and CHLIDONIAS.

Population/Occurrence Viability

Justification: Use the Generic Guidelines for the Application of Occurrence Ranks (2008).
The Key for Ranking Species Occurrences Using the Generic Approach provides a step-wise process for implementing this method.
Key for Ranking Species Element Occurrences Using the Generic Approach (2008).

U.S. Invasive Species Impact Rank (I-Rank)

Authors/Contributors

NatureServe Conservation Status Factors Edition Date: 22Feb1995
NatureServe Conservation Status Factors Author: Whittaker, J. C., & G. Hammerson
Management Information Edition Date: 22Jan1996
Management Information Edition Author: MARKS, M.; REVISIONS BY G. HAMMERSON AND D.W. MEHLMAN
Element Ecology & Life History Edition Date: 13May1996
Element Ecology & Life History Author(s): Hammerson, G.

Zoological data developed by NatureServe and its network of natural heritage programs (see Local Programs) and other contributors and cooperators (see Sources).

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