



United States Department of the Interior

FISH AND WILDLIFE SERVICE

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Memorandum

To: Refuge Manager, Bitter Lake National Wildlife Refuge, Roswell, New Mexico

From: Field Supervisor, New Mexico Ecological Services Field Office, Albuquerque, New Mexico

Subject: Biological Opinion for 2006 Ditch Rehabilitation Project on the Middle Tract of Bitter Lake National Wildlife Refuge, Chaves County, New Mexico

This document transmits the U. S. Fish and Wildlife Service's New Mexico Ecological Service Field Office's (NMESFO) concurrence and biological opinion (BO) on the proposed ditch rehabilitation project on the middle tract of the Bitter Lake National Wildlife Refuge (Refuge) and its effects on the threatened Pecos sunflower (*Helianthus paradoxus*) (sunflower), bald eagle (*Haliaeetus leucocephalus*) and interior least tern (*Sterna antillarum*) (tern); and the endangered Pecos gambusia (*Gambusia affinis*), Koster's springsnail (*Tryonia kosteri*), Noel's amphipod (*Gammarus desparatus*), Roswell springsnail (*Pyrgulopsis roswellensis*), and Pecos assiminea (*Assiminea pecosensis*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your Intra-Service Section 7 Biological Assessment (BA) was submitted to our office on April 19, 2006, with a revision submitted on May 18, 2006, personal communication with the Refuge biologist on July 17, 2006, and an email with additional information submitted on July 18, 2006.

The proposed action is to dredge an old drainage ditch from Bitter Lake to Unit 3, to deepen existing ditches that move water from Units 3, 5, 6, and 7, and to create a new ditch and lower the elevation of the existing water control structure to drain Hunter Oxbow. The ditch cleaning and construction will allow better control of water levels in the lake and impoundments, conserve water that would otherwise evaporate from the lake, permit greater control of the native and non-native fish communities, and improve management of native and non-native plants in the impoundments.

The NMESFO concurs with the Refuge staff's determination that the proposed action "may affect, is not likely to adversely affect" the bald eagle, interior least tern, and Koster's springsnail; and "no effect/no critical habitat modification for Noel's amphipod, Roswell springsnail, Pecos assimineia, and Pecos gambusia based on the following information provided in the BA or otherwise available to the NMESFO:

1. Bald eagle: Bald eagles seldom occur on the Refuge, and the project is expected to have little or no affect on bald eagle use of the Refuge. An increased ability to manage water levels in some impoundments will probably result in fewer large carp on the Refuge, but eagles have not been noted taking carp in the past. Naturally occurring winter waterfowl deaths will continue to provide a potential food source. Increased ability to dewater impoundments and solidify lake bottoms will decrease turbidity, increase wetland productivity and potentially increase wintering waterfowl populations. Reduced turbidity could improve fishing efficiency for any eagles that visit the Refuge.
2. Interior least tern: Terns nest on the Refuge in the summer, with nearly all nests located from intensive surveys and monitoring by Refuge staff. As nests become established and are located by Refuge staff, those areas are designated as off-limits to all Refuge staff and equipment. Any construction activity that takes place during the nesting season would take place at least 200 yards from nesting terns. Scolding and repeated "fly-overs" by adult terns would indicate a disturbance is occurring, and project activities would be terminated until after the nesting season is over.

The project has been planned to benefit terns by permitting the lowering of Bitter Lake to provide additional nesting habitat around the lake edges when the lake would otherwise be relatively full. The lake could also be lowered to protect established nests next to Bitter Lake from flooding in the event of heavy monsoonal rains. From 1997-2001, least tern nesting success on the Bitter Lake playa showed a strong negative correlation with the lake's surface acreage. Discharging water from Bitter Lake should lower the salinity making it more productive for native fish (most years it is too saline). When the lake supports fish, terns have an abundant food supply within a hundred yards of their nests. Discharging Bitter Lake water through Unit 3 will also contribute water to Unit 5, allowing Unit 5 to be more precisely managed for Pecos pupfish and the least terns that forage upon them.

In addition, terns will benefit from lowering the elevation of the water control structure that drains Hunter Oxbow. The ability to completely drain Hunter Oxbow will prevent terns from feeding on fish likely to be contaminated by pollutants discharged in the past into the oxbow by the City of Roswell.

In 2005, no terns nested within 200 yards of the planned construction area. Thus far, in 2006, terns appear to be initiating nests about 300 yards southwest of the Bitter Lake playa portion of the project.

3. Koster's springsnail: There are scattered populations of Koster's springsnail restricted to the west side of Refuge impoundments and west of Bitter Lake. The project would modify ditches on the east side of impoundments; therefore, there should be little affect to this endangered species. Furthermore, the species does not occur downstream from any of the project activities. There are no springs and no springsnails on the east side of the impoundments or near the ditches that are targeted for cleaning or construction.

The water control structure on the south side of Bitter Lake, which formally served to discharge water into Unit 3 at times of unusually high water in the lake, will be abandoned and stop-logs placed in it to prevent movement of water through it in the future. The discharge of salty waters and radically higher flows probably had a negative effect on the Koster's springsnails. Eliminating the discharges from Bitter Lake into their habitat should significantly benefit Koster's springsnail, as they are dependant on fresh, stable spring-flows, and not irregular discharges of saline water. Finally, cleaning out above and below the south Unit 3 water control structure will allow Unit 3 to be managed at a lower level on average, with a lower maximum water level, thus potentially extending the Unit 3 spring-run habitat further downstream than was formerly possible and expanding Koster's springsnail habitat downstream to near the edge of the impounded water. However, the greater the distance from the spring-vents the more unfavorable the habitat for the snail.

4. Noel's amphipod, Roswell springsnail, and Pecos assiminea: There are scattered populations of these species restricted to the west side of certain Refuge impoundments and west of Bitter Lake. The project would modify ditches on the east side of impoundments; therefore should be no affect to these endangered species. Furthermore, the species do not occur downstream from any of the project activities.
5. Pecos gambusia: Because of the restricted range of Pecos gambusia in Bitter Creek and Sago Springs, and perhaps on the west side of Unit 5 and 6, and the fact that the project will modify ditches on the east side of impoundments, there should be no affect to this endangered species. Furthermore, the species does not occur downstream from any of the project activities. There are no springs and no Pecos gambusia on the east side of the impoundments or near the ditches that are targeted for cleaning or construction.

BIOLOGICAL OPINION

CONSULTATION HISTORY

Consultation began with the receipt of the April 19, 2006, request for formal consultation, with additional information provided in the revised BA dated May 17, 2006. This BO is based on information provided in the BA, telephone conversations with the Refuge biologist, and a site visit

by NMESFO biologists on June 21, 2006. A complete administrative record of this consultation is on file at the NMESFO.

DESCRIPTION OF THE PROPOSED ACTION

The Refuge was established in 1937, "as a refuge and breeding ground for migratory birds and other wildlife." The approximately 1,100 acres of Refuge impoundments, consisting of seven individually managed units, were constructed between 1945 and 1955, in an abandoned (dry) Pecos River channel, at the base of the western bluff-line on the Middle Tract of the Refuge. Bitter Lake lies north and west of the impoundments, separated from the uppermost unit (Unit 3) by an alkali flat that floods infrequently. Dozens of relatively freshwater (salinity: 1-4 parts per thousand) springs and seeps emerge from the base of the bluff, whose waters originate from the Roswell Artesian Basin. The seeps are capable of slowly filling the impoundments. Impoundments are arranged from north to south, down the gradient of the floodplain, allowing transfer of water from one to the other through stop-log structures, dikes and ditches. The seven units, from upstream to downstream, are U-3, U-5, U-6, U-7, and U-16, with U-17 to the east of U-16, and U-15 to the west of U-16 (see attached map).

The impoundments were maintained near capacity between 1977 and 1993. This resulted in highly saline water and bare substrate in the impoundments. Siltation upstream of water control structures, and siltation and plant encroachment in the ditches below the structures impeded water movement and prevented dewatering of the impoundments. Since 1993, units have generally been dewatered in the spring and slowly flooded in the fall to approximate the natural hydrology, and to discharge salty water that would otherwise result in hypersaline conditions. This management exposes mudflats for spring-migrating shorebirds, substrates for nesting shorebirds and annual plant growth, and helps to control exotic carp. The Pecos sunflower finds more substrates upon which to germinate and grow as a result of late winter and early spring dewatering, but as the water levels are lowered through the summer, they are exposed to dry conditions and reduced growth. Incremental flooding of the impoundments, beginning in the early fall, provides waterfowl with food resources (mostly annual plants) gradually through the fall migration period and into the winter. Deeper water in winter provides resting and roosting areas for waterfowl and sandhill cranes that spend most of the winter on the Refuge.

Most wildlife associated with the impoundments benefit from this general water management strategy. However, some species may not, or it is not clear what the long-term affect may be. Native fish may be partially deprived of spawning habitat in the spring, and are exposed to increased predation. Additionally, Pecos pupfish may experience greater competition since they are poor competitors, waters are less saline, and other fish are not as tolerant of high salinities. There are one or two impoundments left partially or nearly full, to provide a greater diversity of habitats during the spring and summer. As a result of this management strategy, Pecos pupfish may increase in numbers, as may some other native fish; puddle ducks, coots, grebes and other birds may nest over or in association with the deeper water; duck brood habitat is provided; dragonflies find more breeding habitat; and salt cedar may be flooded and killed. Nesting

interior least terns forage in both deep waters and shallow waters where the fish may become concentrated. After over 10 years of this aggressive water management strategy it appears to be a general success, however, some unexpected issues and opportunities have arisen.

With the likely listing of four small invertebrates endemic to the Refuge in 2002, and a greater appreciation for their needs and documentation of areas of occurrence on the Refuge, staff set out to improve habitat for the invertebrates through what was referred to as the dike rehabilitation project. The main feature of the project, which was implemented in 2004, was to separate and isolate the spring-systems on the west side of Units 5, 6 and 7, from the main body of the wetland impoundments, so that the springs would no longer be partially flooded when the impoundments were filled in the fall. This was accomplished by building a dike between each spring system and its adjacent impoundment, and diverting the water from the springs into the next impoundment below, instead of into the adjacent impoundment. This also necessitated construction of new ditches to carry the spring-water from the south terminus of the spring-ditches, and into the impoundments below. Water control structures were also replaced or repaired, and parts of several water delivery ditches were cleaned/deepened to permit more complete de-watering of impoundments so that carp and undesirable growth of native plants could be controlled.

The project was considered successful. The lower part of the spring channels down-cut and are now becoming stabilized. Cattail, bulrush and phragmites are stabilizing the banks and providing shade. The increased gradients provide more natural, stream-like habitat for Noel's amphipod, greenthroat darter and Mexican tetra. These species appear to have dispersed down the spring-systems as a result of discontinuation of annual winter inundation. Some have even dispersed into the newly created ditches below the pre-existing spring-ditches. Koster's springsnail has probably benefited because now it can disperse further downstream (has much more habitat) without being inundated as was formerly the case. However, because of the difficulty in surveying for these tiny organisms, documentation of any habitat expansion has not occurred. Pecos gambusia may have been found in the Unit 5 spring-ditch and may be dispersing downstream as a result of discontinuation of annual flooding. Genetic testing is needed to distinguish it from western mosquitofish. Unit 5 was completely dewatered and dried as a result of ditch cleaning; carp and red shiner were eliminated. Over 7,000 Pecos pupfish were stocked in the unit after filling, and a fish barrier erected to exclude other fish. After the upcoming breeding season, the unit should be teeming with pupfish, and least terns may find improved foraging opportunities in the unit. Additional species may be added after the pupfish become established.

However, the work was not completed due to staff shortages, and other opportunities and issues have come to light. More ditch cleaning is necessary to more completely dewater Units 6 and 7. The Refuge's Federal reserved water right may be depleted by evapotranspiration from Bitter Lake unless the Refuge is able to dewater it in the summer. Unit 3 could be more completely dewatered, allowing Koster's springsnail to spread down the spring-system into formerly inundated areas. Better water control of impoundments will conserve water, and permit better management of the fish communities therein and better control growth of native and non-native

plants in the impoundments. Generally better and more complete control of water levels would increase the benefits that result from the current water management strategy.

Action Area

Specifically, the following actions are proposed:

1. Bitter Lake: An old, barely visible silted-in ditch that extends from the east shoreline of Bitter Lake to the ditch on the east side of Unit 3 will be deepened and widened. The Refuge's excavator will be used to complete this work. This ditch will be about 0.55 miles in length and run through relatively bare alkali flats, bare playa substrate and alkali sacaton/iodine bush plant communities. Pecos sunflowers occur only at the extreme eastern end of the old ditch, where it connects with the ditch on the east side of Unit 3. This ditch and the others that would be deepened as part of this project will be about 5 feet wide and 2-4 feet deep, generally whatever is minimally necessary to move the maximum volume of water expected to flow through the ditch. A new water control structure will be installed at a point where this newly deepened ditch crosses the road on the east side of Bitter Lake in the northeast portion of Unit 3. This will allow discharge from Bitter Lake during "wet" summers, and perhaps at other times of the year, conserving the Refuge's Federal reserved water right from high evaporative loss. The water control structure on the south side of Bitter Lake, which formerly served to discharge water into Unit 3 at times of unusually high water in Bitter Lake, will be abandoned and stop-logs placed in it to prevent movement of water through it in the future.
2. Unit 3: The ditch above and below Unit 3's south water control structure will be deepened so that the unit can be completely dewatered, carp controlled, and water consumption saved. In order for the excavator to access the deepest point in the unit, a short finger of fill material may be placed 20 or 30 yards north into the unit from the shoreline. Some of this spoil will likely be placed over Pecos sunflower habitat and growing Pecos sunflowers.
3. Unit 5: Below the Unit 3 south water control structure, the ditch in the northeast corner of Unit 5 may also need to be deepened in order to fully dewater Unit 3. Some of this work was accomplished in 2003 immediately below the water control structure, but the deepening may need to proceed further south. Some of this spoil will likely be placed over Pecos sunflower habitat and growing Pecos sunflowers. The two small silt-retention ponds connected to this ditch may be partially or completely filled so that the fish community can be more easily controlled.
4. Ditch along east side of Unit 6: Portions of the ditch along the east side of Unit 6, running from the Unit 5 water control structure to the Unit 6 water control structure, will

be deepened to enhance the ability to dewater Unit 5 and to facilitate the movement of water into the Unit 6 impoundment. The north end of the ditch was cleaned in 2003, but did not satisfy the Refuge's objectives. The ditch water currently spreads before reaching the impounded water, evaporates, and contributes to the expansion of bulrush. Only a few inches of water remains in Unit 6 with all the stop-logs removed in the water control structure. In order to suppress carp and stress encroaching bulrush during the summer when the unit is at its lowest, a small channel may be needed from the deepest part to the water control structure. It would not likely be constructed with the excavator, but perhaps by hand. If a dike is constructed for excavator access, a small number of sunflowers would be impacted on the shoreline.

5. Ditch along east side of Unit 7: Only a short length of the ditch along the east side of Unit 7 was cleaned and deepened in 2003. Because the ditch is silted-in, making it wide and shallow, water spreads and evaporates before reaching the main impoundment. The project would also clean/deepen this ditch for most of its length on the east side of the unit, so that water more efficiently flows to the main part of Unit 7 where water control structures allow more precise water level management and habitat management. Some of the spoil from this ditch clean-out would be deposited in Pecos sunflower habitat and would likely bury some individual Pecos sunflowers.
6. Hunter Oxbow: Hunter Oxbow (Oxbow 5) is not designed as an impoundment, but is an old oxbow of the Pecos River that was disconnected from the river when Refuge staff channelized the river 60 or 70 years ago. Water enters the oxbow from small springs in the north end, and from the South Weir where all the water that passes through the Refuge impoundments is ultimately discharged. The City of Roswell discharged wastewater into the southern portion of the oxbow in the past, causing contamination of sediments and subsequent contamination of fish that are a potential food source for interior least terns that nest on the adjacent Unit 16. A water control structure on the downstream end, near the Pecos River, permits some water management capabilities. However, the unit has never entirely drained, even before the water control structure was constructed. Thus, water is consumed from evaporation, carp can not be controlled, potential shorebird habitat can not be exposed, additional waterfowl food plants can not be grown, and other habitat objectives can not be met. This project would create a new ditch along the south bank of the unit and the elevation of the water control structure will be lowered to facilitate complete drainage of the basin in spring and summer. Moving the ditch to the south bank from its current position will avoid impacts to a wetland that has formed from the back up of standing water behind the water control structure. The ability to completely drain Hunter Oxbow will improve tern habitat by eliminating the contaminated food source.

Conservation Measures

A maximum of 100 Pecos sunflower plants are likely to be adversely affected (injured or killed) by the project action. The locations of newly constructed ditches have been chosen partly to avoid areas where sunflowers are likely to be growing (the previous year's stalks indicate potential areas of occurrence). The final location of ditches, dikes, and spoil may be slightly modified to avoid areas of highest sunflower concentration. The Refuge biologist will walk these areas before construction begins and flag areas of sunflower occurrence so that the equipment operator can minimize affect to these areas. Some portions of the project would be constructed outside the growing season after the sunflower has set seed, if in areas of dense sunflower concentration, to avoid any direct affects to sunflowers. In addition, the Refuge actively manages water levels, controls salt cedar, and conducts prescribed burns to promote favorable growing conditions for the Pecos sunflower, and to benefit other threatened and endangered species.

Other listed species considered in the BA would not be directly affected by the proposed action and are expected to be unaffected by any indirect community perturbations that may result from this action. No extra measures are necessary to avoid impacts from this project.

STATUS OF THE SPECIES

Species Description

The Pecos sunflower (sunflower) is an annual that is a member of the sunflower family (Asteraceae). It grows 1.3–2.0 meters (m) (4.25–6.5 feet (ft)) tall and is branched at the top. The leaves are opposite on the lower part of the stem and alternate at the top. The leaves are lance-shaped with three prominent veins, and up to 17.5 centimeters (cm) (6.9 inches (in)) long by 8.5 cm (3.3 in) wide. The stem and leaf surfaces have a few short stiff hairs. The flower heads are 5.0–7.0 cm (2.0–2.8 in) in diameter with bright yellow rays (Service 1999).

Habitat/Life History

The sunflower looks much like the common sunflower seen along roadsides throughout the west, but differs from more common-sunflowers in having narrower leaves, fewer hairs on the stems and leaves, slightly smaller flower heads, and flowers later in the growing season. The sunflowers grow in permanently saturated soils. Areas with these conditions are most commonly desert wetlands (cieneegas) associated with springs, but may also include stream and lake margins. When plants grow around lakes, the lakes are usually impounded natural cienega habitats. Flowering occurs from September to November.

Plants commonly associated with the sunflower include Transpecos sealavender (*Limonium limbatum*), limewater brookweed (*Samolus cuneatus*), *Flaveria chloraefolia*, Olney bulrush (*Scirpus olneyi*), common reed (*Phragmites australis*), saltgrass (*Distichlis* sp.), alkali sacaton *Sporobolus airoides*, alkali muhly (*Muhlenbergia asperifolia*), Mexican rush (*Juncus*

mexicanus), Pursh seepweed (*Suaeda calceoliformis*), and salt cedar (*Tamarix* spp.) (Poole 1992, Sivinski 1995). All of these species are good indicators of saline soils. Van Auken and Bush (1995) conducted studies that show sunflowers grow in saline soils, but seeds germinate and establish best when a high water table reduces the salinity near the soil's surface.

Distribution and Abundance

Until 1990, the sunflower was known from only three sites. Two sites were in Pecos County, Texas, and one site was in Chaves County, New Mexico (Seiler *et al.* 1981). Searches of suitable habitats in Pecos, Reeves, and Culbertson counties, Texas, during 1991 failed to locate any new Texas sites (Poole 1992). However, searches in New Mexico from 1991 through 1994 located a significant number of new sites (Sivinski 1995). The sunflower is presently known from 25 sites that occur in 5 general areas. These areas are Pecos and Reeves counties, Texas, in the vicinity of Fort Stockton and Balmorhea; Chaves County, New Mexico, from Dexter to just north of Roswell; Guadalupe County, New Mexico, in the vicinity of Santa Rosa; Valencia County, New Mexico, along the lower part of the Rio San Jose; and Cibola County, New Mexico, in the vicinity of Grants. There are 3 sites in the Fort Stockton-Balmorhea area, 11 in the Dexter to Roswell area, 8 in the Santa Rosa area, 1 along the lower Rio San Jose, and 2 in the Grants area. Most of the sunflower sites are limited to less than 2.0 hectares (ha) (5.0 acres (ac)) of wetland habitat with some being only a fraction of a hectare. Two sites, one near Fort Stockton and one near Roswell, are considerably more extensive.

Population Dynamics

The number of plants per site varies from less than 100 to several hundred thousand for the two more extensive sites. Because the sunflower is an annual, the number of plants per site can fluctuate greatly from year to year with changes in water conditions. The sunflower is totally dependent on the persistence of wetland habitat. Even large populations will disappear if the wetland dries.

Reasons for Listing/Threats to Survival

The sunflower was listed as threatened on October 20, 1999, without critical habitat (Service 1999). Threats to the sunflower include loss of wetland habitat, urban development, herbicides, and agricultural development. A recovery plan for this species was completed in September 2005.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area; the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation; and the impact of State and private actions that are contemporaneous with the consultation process. The environmental

baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Status of the Species within the Action Area

On the Refuge, the sunflower occurs from Bitter Creek south to Hunter Marsh. It also occurs on the Refuge farm; mostly around the small wetland complex west of the Hondo River. The plants grow in moist, saline soils adjacent to permanent water or in seasonally flooded areas. It grows in association with inland saltgrass, salt-marsh bulrush and alkali sacaton; less commonly on relatively bare areas. It has the capacity (rather unusual for an annual) to germinate and grow successfully from beneath relatively dense mats of accumulated litter, but producing many more seedlings and flowering plants after such an area is burned in winter. Apparently, the seeds can lie dormant for several years, germinating when light penetration and soil temperatures are higher following a fire. If winter moisture is lacking, seeds will likely also remain dormant. Seedlings have been located in the last week of February on a burned site; the first week of March is typical for unburned sites. Seeds can germinate into the first week of April, but the end of the germination period is not known. Removal of salt cedar over-story by burning or cutting has led to the establishment of sunflowers beneath the former canopy. Although Refuge impoundments are generally in decline during the summer, adult plants can withstand a few days of inundation of its roots. Plants senesce and die after flowering in September and setting seed in early October.

Since first discovered on the Refuge in 1991, the estimated area of occupancy of the sunflower has increased by more than three-fold due to water and fire management (Annual Narrative Report, 1996). However, estimating an acreage figure is difficult, as plants occur in nearly pure stands in the most favorable environments, and as scattered individuals in more peripheral areas. An estimate of 1,000,000 plants on the Refuge in an average year may be "in the ballpark." The seed-bank may be 5 or 10 times that amount. Thus the population is secure if the habitat is secure, regardless of the number of plants producing seed in any given year. Drawing down impoundments in late winter has provided additional sites for seed germination, while lowering salinity levels in impoundments. However, higher elevation plants will likely suffer drought effects when a wetland unit is dewatered unless ample summer rains occur. Drought stressed plants remain small and produce fewer seeds than those receiving sufficient moisture. Plants growing near springs are not affected by drought.

EFFECTS OF THE ACTION

The effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, as well as the effects of interrelated and interdependent activities. Interrelated actions are actions that are part of a larger action and depend on the larger action for their justification. Interdependent actions are actions having no independent utility apart from the proposed action. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Beneficial Effects

Beneficial effects are effects of an action that are wholly positive without any adverse effects to listed species or designated critical habitat. Sunflower habitat will be enhanced by mechanical disturbance resulting from movement of construction equipment, removal of perennial vegetation, including salt cedar, and deposition of sediment. Most annual species are dependant on disturbance and the sunflower is no exception. Increased efficiency of water movement and management may enhance sunflower habitat by making more water available to seasonally flood their habitat. Seasonal flooding suppresses perennial vegetation and provides favorable conditions for sunflower seed germination and seedling growth.

Direct Effects

In the short term, mortality or injury of no more than 100 growing plants may occur during implementation of the proposed action.

Indirect Effects

Over the long term, improved water management, and reduced competition from other water-loving plants will result in a benefit to the sunflower.

Interrelated and Interdependent Actions

Interrelated actions are actions that are part of a larger action, and are dependent on the larger action for their justification. The use of access roads and vehicles in the project areas are considered interrelated with the implementation of the current project. Although the majority of vehicles will likely stay on roads and trails, effects of the project from interrelated actions may result in sunflowers being harmed or killed by trampling or crushing of individual plants by vehicles that do not use roads or trails.

Summary

1. Bitter Lake - Cleaning ditch from Bitter Lake east to Unit 3: The area of the old ditch to be dredged running east from Bitter Lake to Unit 3 is too dry or too salty for the sunflower, except possibly at the very east end. It is possible that up to 10 or 20 plants may be affected by ditch cleaning at the east end. Mortality could occur from excavation of entire plants, burial, and from crushing by the excavator or other equipment. In the long-term, after sunflowers colonize ditch banks and other disturbed areas, the number of sunflowers will probably be similar to the recent past.
2. Unit 3: It is possible that 10 to 20 plants could be injured or killed through the placement of dredged material on the bank to form the beginning of the finger.
3. Ditch work in the northeast corner of Unit 5 (the existing ditch below the Unit 3 water control structure): Some plants will be killed during construction and some sunflowers

will find new habitat along a portion of the new ditch bank favorable for growth in subsequent years. However, impacts to many plants can be avoided by reaching over them with the excavator bucket from the dry bank top and into the bottom of the ditch where standing water precludes sunflower germination. As many sunflowers will be avoided as possible while accomplishing the goals of ditch clean-out. Perhaps as many as 25 may be affected or killed. Resultant disturbed habitat may result in a greater increase in the number of plants in the following years.

4. Cleaning out existing ditches in Units 5, 6 and 7: This action will have identical effects on growing sunflowers. Some will be crushed, excavated and buried. The Refuge will avoid the highest concentrations of sunflowers as much as possible. Sunflower numbers in a year or two post-construction will probably be similar to the pre-construction numbers, or numbers will exceed pre-construction for a few years, then fall back, as perennial vegetation crowds and competes with the annual sunflower.
5. Hunter Oxbow: Because of the limited number and location of sunflowers in Hunter Oxbow, the new ditch can be constructed without affecting more than 25 plants. The ditch rehabilitation and lowering the elevation of the water control structure will likely improve habitat, as above, in future years.
6. The entire project will not radically change water management schemes, but simply allow periodic dewatering of some impoundments to control carp and undesirable quantities of native vegetation, such as bulrush, that tends to form a monoculture. In some impoundments dewatering will permit mechanical disturbance (disking) to retard bulrush, and should enhance habitat for sunflowers.

In summary, fewer than 100 plants will be negatively affected or killed in the course of project completion, and the sunflower ultimately will likely benefit from this project. Small portions of this project may be completed in winter when the sunflower exists only as seed, but the majority of the project requires the driest conditions possible, which occur in the summer. The sunflower will be easy to recognize during summer when the project is to be completed, and will be avoided as much as project completion permits.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Because the action area is fully contained within the Refuge, ongoing or future actions that may impact the sunflower must be authorized by the Service or Bureau of Land Management, which manages some mineral leases adjacent to and within the Refuge. As a result, most projects will

be reviewed under section 7 of the Act for their impacts to sunflower prior to their authorization. There are no known non-Federal actions likely to occur that might affect the sunflower within the action area at this time.

CONCLUSION

After reviewing the current status of the sunflower, the environmental baseline for the action area, the effects of the proposed impoundment rehabilitation, and the cumulative effects, it is the Service's biological opinion that impoundment rehabilitation, as proposed, is not likely to jeopardize the continued existence of the sunflower. No critical habitat has been designated for this species, therefore none will be affected.

We reached this conclusion for the following reasons: 1) the relatively low level of anticipated harm to the sunflower; and 2) the minor effects to sunflower habitat.

The conclusions of this biological opinion are based on full implementation of the project as described in the "Description of the Proposed Action" section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-Federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law (19 NMAC 21.2).

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The recommendations provided here relate only to the proposed action and do not represent complete fulfillment of the agency's section 7(a)(1) responsibility for this species.

1. To the maximum extent possible implement ground disturbing projects during the sunflower dormant season.

2. Continue to manage impoundments and water conveyance structures to benefit listed and imperiled species that use the Refuge; include specific management goals in the Refuge water management plan that address the needs of the Pecos sunflower.
3. Implement an education program for Refuge visitors regarding the status of the sunflower and threats to its continued existence and their value as biodiversity.
4. In areas frequently visited by Refuge visitors, erect signs indicating the presence of the sunflower and areas that should be avoided for their conservation.
5. Monitor impacted areas to determine long term effects of surface disturbance and water management on the sunflower population.
6. Continue to monitor and study sunflower populations throughout the Refuge.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the effects of ditch rehabilitation on the Pecos sunflower. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation; (2) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat not considered in this consultation; or (3) a new species is listed or critical habitat designated that may be affected by the action.

In future communication regarding this project, please refer to consultation #2-22-05-F-0501. Please contact Denise Smith at the letterhead address or at (505) 761-4746, if you have any questions.

Sincerely,



Wally Murphy
Field Supervisor

LITERATURE CITED

- Bitter Lake National Wildlife Refuge Annual Narrative Report. 1996. Refuge files. 164 p.
- Poole, J.M. 1992. Puzzle sunflower (*Helianthus paradoxus*), a status report update. Performance Report for Section 6 Grant No. E-1-3, Job No. 2.3, Texas Parks and Wildlife Department, Austin.
- Seiler, G.J., L. Cuk, and C.E. Rogers. 1981. New and interesting distribution records for *Helianthus paradoxus* (Asteraceae). *Southwestern Naturalist* 26:431-432.
- Sivinski, R.C. 1995. New Mexico status of *Helianthus paradoxus*. Performance Report for Section 6 Grant No. E9, Segment 10, New Mexico Forestry Division, Santa Fe.
- U.S. Fish and Wildlife Service. 1999. Endangered and Threatened Wildlife and Plants; Listing *Helianthus paradoxus* (Pecos Sunflower), Devils River Minnow and *Astragalus desereticus* (Deseret Milkvetch) as Threatened; Final Rules. October 20, 1999. *Federal Register* 64:56582-56590.
- Van Auken, O.W. and J.K. Bush. 1995. Factors affecting the growth and distribution of *Helianthus paradoxus*. Performance Report for Section 6 Grant No. E-1-7, Project No. 60, Texas Parks and Wildlife Department, Austin.