



United States Department of the Interior

FISH AND WILDLIFE SERVICE

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December 17, 2004

Dr. Larry D. Butler, State Conservationist
United States Department of Agriculture
Natural Resources Conservation Service
101 South Main
Temple, Texas 76501

Dear Dr. Butler:

This document transmits the U.S. Fish and Wildlife Service's (FWS) Biological Opinion (BO) based on our review of U.S. Department of Agriculture (USDA), Natural Resource Conservation Service's (NRCS) activities associated with implementation of the 2002 Farm Bill conservation programs and effects on federally listed species. The specific actions under consultation include brush management treatment practices targeting control of honey mesquite (*Prosopis glandulosa*), salt cedar (*Tamarix* spp.), Ashe juniper (*Juniperus ashei*) and redberry juniper (*Juniperus smallii*) in approximately the western half of Texas. Through the various 2002 Farm Bill programs, NRCS can provide private landowners technical and financial assistance to implement brush management treatment practices which are intended to improve the quality and quantity of water, range conditions, and the value of wildlife habitat in Texas. Your October 12, 2004, request for formal consultation was received by this office on October 14, 2004.

This BO has been prepared in accordance with Section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.) The BO is based on the Biological Assessment (BA) prepared by NRCS, with input from the "Brush Consultation Workgroup", NRCS developed *Black-capped Vireo and Golden Cheeked Warbler Habitat Identification/Treatment Criteria for the NRCS Brush Management Consultation* (Enclosures 1 and 2), and other sources of information. A complete administrative record of this consultation is on file at the Arlington, Texas, Ecological Services Field Office.

Consultation History

April 6, 2004: Representatives from the NRCS, Texas Parks and Wildlife Department (TPWD), Texas Department of Agriculture, Texas A&M University,

Environmental Defense, Texas Audubon, U. S. Department of the Interior, The Nature Conservancy, Texas Farm Bureau, Texas Cooperative Extension, Central Texas Cattleman's Association, Texas Southwestern Cattle Raisers Association, Texas Wildlife Association, and the Leon River Restoration Project met with the FWS to discuss USDA funding to be utilized for brush management practices in Texas. At the meeting, the NRCS determined that some of their brush management practices, as described, had the potential to affect several listed species. The concept of formulating a workgroup to assist NRCS with the development of a BA was proposed with the intent to produce a BA so complete that the transition to a BO could be done by the FWS in a timely manner. Therefore, under this scenario, the FWS agreed to expedite the review process once the BA was received and to produce a BO in a relatively short time frame (within a few weeks). Each agency, including the FWS, and organization appointed a person(s) to participate on the "Brush Consultation Workgroup" (hereafter, Workgroup).

- April 16, 2004: The Workgroup (Enclosure 3) met and formulated a workplan for the development of the BA. The action was specifically determined to be the management of four "problem" brush species (described under Section B of the BO); the action area was defined to be approximately the western half of Texas (all of Texas west of Interstate Highway-35 [IH-35]); and the list of species which could be affected by NRCS brush management activities was developed. An outline for the BA was proposed and specific tasks were assigned.
- April-October 2004: Workgroup met several times to work on the BA, including assessing potential adverse and beneficial effects to listed species and developing measures to minimize any adverse effects.
- October 14, 2004: The FWS received a letter from the NRCS, dated October 12, 2004, submitting the final BA and requesting that formal consultation be initiated. On October 27, 2004, the FWS acknowledged the initiation of formal consultation as of October 14, 2004.

BIOLOGICAL OPINION

I. Description of Proposed Action

The following discussion was taken from NRCS's BA. The Farm Security and Rural Investment Act of 2002 (The 2002 Act) (Pub. L. 107-171), henceforth referred to as "2002 Farm Bill," authorized and funded conservation programs to address natural resources concerns related to soil, air, water, plant, and animals, including wildlife. NRCS is responsible for implementation of seven of these programs:

Conservation Security Program (CSP)
 Environmental Quality Incentives Program (EQIP)
 Farm and Ranch Lands Protection Program (FRPP)
 Grassland Reserve Program (GRP)
 Grazing Lands Conservation Initiative (GLCI)
 Wetland Reserve Program (WRP)
 Wildlife Habitat Incentives Program (WHIP)

NRCS in Texas has received the following funding for each 2002 Farm Bill conservation program since the signing of the 2002 Farm Bill. Overall funding is expected to increase each year for the remainder of the 2002 Farm Bill through fiscal year (FY) 2007.

Program	State Allocations		
	FY 2002	FY2003	FY2004
EQIP	\$29,000,000	\$58,000,000	\$79,000,000
WRP	\$ 8,200,000	\$ 7,600,000	\$ 7,000,000
WHIP	\$ 330,00	\$ 430,000	\$ 680,000
FRPP	0	\$ 1,100,000	\$ 1,500,000
GRP	0	0	\$ 9,000,000
CSP	0	0	0

As of October 1, 2003, the conservation practices included in this consultation have been planned or applied in the following amounts with 2002 Farm Bill funds:

Practice (and Code)	Unit	Amount
Brush Management (314)	acres	997,256
Fence (382)	feet	6,825,268
Grazing Land Mech. Treatment (548)	acres	55,460
Pipelines (516)	feet	3,330,263
Pond (378)	number	770
Prescribed Burning (338)	acres	54,223
Prescribed Grazing (528A)	acres	991,270
Range Planting (550)	acres	120,372
Upland Wildlife Habitat Management (645)	acres	2,660
Watering Facility(614)	number	970

Therefore, since overall funding for 2002 Farm Bill programs is anticipated to increase, NRCS through its various 2002 Farm Bill programs, can be expected to assist private landowners in the management of at least 1 million acres of brush each year.

Section 7 (a)(2) of the Act requires federal agencies to ensure that their programs and actions are not likely to jeopardize the continued existence of federally listed endangered and threatened species, or adversely modify designated critical habitats by consulting with the FWS. This consultation process differs from the normal process in the following way. Normally, if the proposed federal action were of sufficient magnitude and/or if effects to species or critical habitat were anticipated, NRCS would submit a BA to FWS as part of the initiation of formal section 7 consultation. The BA would describe the program and the anticipated effects on listed species

and designated critical habitat. The BA would quantify the anticipated federal action, usually in terms of area within the scope of the federal action, and determine the effects of the action on listed species and critical habitat by, first, determining the extent of a listed species' range (or area of critical habitat) within the project area and then, secondly, ascertain the probable adverse effects, if any, on the species or designated critical habitat. This information would be essential to the FWS's task of making jeopardy or adverse modification determinations, determining levels of incidental take that might occur as a result of the action, and developing reasonable and prudent measures and terms and conditions to minimize take.

However, the scope of this BA requests consultation on multiple programs funded through federal FY 2007. Because the programs provide annual funding to private landowners and the identity of these landowners is not known until they have applied for the funding and been awarded funding by NRCS, it is impossible to identify the project locations and determine the possible effects to listed species or critical habitat in advance. An alternative would be for NRCS to request consultation, when needed, on an individual landowner basis. However, this strategy would not work for two reasons: (1) the time frame for identifying landowners and entering into cost-share agreements would not accommodate the time it would take to do individual consultations, and (2) neither NRCS nor the FWS have the personnel and funding resources to consult on each cost-share agreement. Another alternative, as has been used in the past, is to restrict cost-share agreements to ensure that no listed species or critical habitat experiences any adverse effects as a result of the funding. However, this alternative can reduce the effectiveness of the programs in achieving their intended purposes and, for some species, may hamper recovery of the species by preventing habitat management actions that promote the species in the longer term. Also, this alternative does not provide for the possibility of accidental error, that is, funding from one of the programs results in accidental harm or harassment to a listed species not covered by an incidental take statement from the FWS.

For these reasons, at the initiation of this consultation process, NRCS and the FWS decided to use a different method to quantify the action area and determine the effects of the actions on listed species and designated critical habitats. This information was used to estimate incidental take and will be used by the FWS when making jeopardy and adverse modification determinations. NRCS led the Workgroup (see Consultation History) that first detailed the biology of the listed species of plants and animals that occur within the proposed action area in Texas as described by NRCS. The Workgroup then determined whether the proposed actions would be beneficial, have no effect, or possibly have an adverse effect on the species. For the species where some of the actions in the funded programs could have adverse effects, the Workgroup quantified the range of the species within the action area in terms of acres of possible occupied suitable habitat. The Workgroup helped NRCS predict the possible adverse effects that implementation of the programs could have on listed species. For example, some actions, such as the correct use of fire, could result in a short-term harm but long-term benefit to a species. Next, the Workgroup, based on the professional experience of species experts, estimated the proportion of possible occupied suitable habitat that could be impacted by the program actions without long-term consequences to the recovery of the species. This proportion, in terms of acres, was then cross-referenced to the USDA programs to ensure that the purpose of the programs would not be significantly lessened with an imposed "cap" of acres of possible occupied suitable habitat.

Once that determination was made, the Workgroup helped NRCS compile the program actions that would be implemented to help minimize adverse effects to the possible occupied suitable habitats and the species and helped predict the impacts to species and habitats. The result of this collaborative approach is this BO which describes the USDA programs, NRCS's implementation of the programs, possible effects to listed species and designated critical habitats, and program actions that will be taken to minimize adverse impacts to the species and habitats.

The following summaries briefly describe the seven programs included in this consultation. Additional information can be found at <http://www.nrcs.usda.gov/programs/>.

A. Conservation Assistance Programs

1. The **Grazing Lands Conservation Initiative** provides technical, educational, and related assistance to those who own private grazing lands. It is not a cost share program. This technical assistance offers opportunities for: better grazing land management; protecting soil from erosive wind and water; using more energy-efficient ways to produce food and fiber; conserving water; providing habitat for wildlife; sustaining forage and grazing plants; using plants to sequester greenhouse gases and increase soil organic matter; and using grazing lands as a source of biomass energy and raw materials for industrial products.

2. The **Conservation Security Program** is a voluntary program that provides financial and technical assistance to promote the conservation and improvement of soil, water, air, energy, plant and animal life, and other conservation purposes on Tribal and private working lands. Working lands include cropland, grassland, prairie land, improved pasture, and range land, as well as forested land that is an incidental part of an agriculture operation.

3. The **Environmental Quality Incentive Program** is a voluntary conservation program for farmers and ranchers that promotes agricultural production and environmental quality as compatible national goals. EQIP offers financial and technical help to assist eligible participants install or implement structural and management practices on eligible agricultural land.

EQIP offers contracts with a minimum term that ends one year after the implementation of the last scheduled practices and a maximum term of ten years. These contracts provide incentive payments and cost-shares to implement conservation practices. Persons who are engaged in livestock or agricultural production on eligible land may participate in the EQIP program. EQIP activities are carried out according to an EQIP plan of operations developed in conjunction with the producer that identifies the appropriate conservation practice or practices to address the resource concerns. The practices are subject to NRCS technical standards adapted for local conditions.

4. The **Farm and Ranch Lands Protection Program** provides matching funds to help purchase development rights to keep productive farm and ranchland in agricultural uses. Working through existing programs, USDA partners with State, Tribal, or local governments and non-governmental organizations to acquire conservation easements or other interests in land from landowners. USDA provides up to 50 percent of the fair market easement value.

5. The **Grassland Reserve Program** is a voluntary program offering landowners the opportunity to protect, restore, and enhance grasslands on their property. NRCS, Farm Service Agency and Forest Service coordinate implementation of GRP in order to help landowners restore and protect grassland, rangeland, pastureland, shrub land and certain other lands and provide assistance for rehabilitating grasslands. The program conserves vulnerable grasslands from conversion to cropland or other uses and conserves valuable grasslands by helping maintain viable ranching operations.

6. The **Wetlands Reserve Program** is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. NRCS provides technical and financial support to help landowners with their wetland restoration efforts. The NRCS goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program. This program offers landowners an opportunity to establish long-term conservation and wildlife practices and protection.

7. The **Wildlife Habitat Incentives Program** is a voluntary program for people who want to develop and improve wildlife habitat primarily on private land. NRCS provides both technical assistance and up to 75 percent cost-share assistance to establish and improve fish and wildlife habitat. WHIP agreements between NRCS and the participant generally last from five to 10 years from the date the agreement is signed.

B. Four Brush Species

NRCS's Texas State Technical Committee, which includes representatives from landowner organizations, non-governmental conservation organizations, commodity producer groups, and governmental agencies, along with county local work groups comprised of representatives from NRCS, Farm Services Agency, Texas Cooperative Extension, soil and water conservation districts and other governmental agencies as appropriate, have identified honey mesquite (*Prosopis glandulosa*), salt cedar (*Tamarix* spp.), Ashe juniper (*Juniperus ashei*) and redberry juniper (*Juniperus smallii*) as species of concern (problem species) because of their possible detrimental impact on water quantity and water quality. A number of federally-listed threatened and endangered species may occur in areas where these species have been targeted for treatment.

The ensuing generalized range maps for the four brush species (Figures 1-4) which were prepared by the Texas Cooperative Extension Service, approximate the distribution of these four brush species in Texas. IH-35 has been selected as the eastern boundary of the consultation area because most of the acreage of the four brush species is found west of this easily identifiable land feature (see following brush distribution maps for location of IH-35).

Listed species that occur entirely east of IH-35 are not included in this assessment. NRCS will evaluate each cost-share agreement. If evaluations show that cost-share agreements may affect listed species, the cost-share agreements will be applied either in accordance with TPWD's "no take" guidelines (Campbell, 1995) or following individual Section 7 consultations.

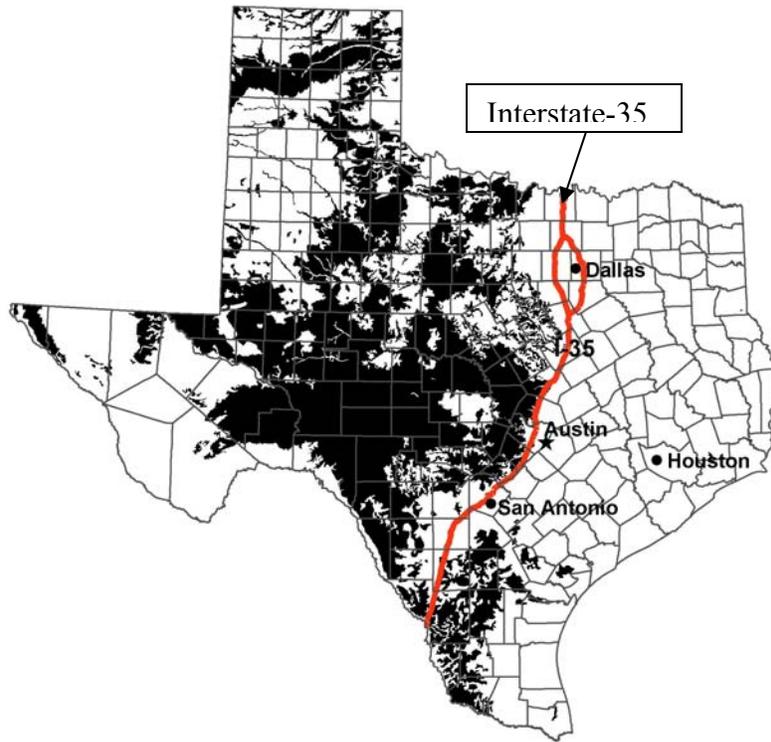


Figure 1. Honey Mesquite, 56 Million Acres

Honey mesquite and associated species have increased on much of the grasslands in the rolling plains and south Texas brushlands and other semi-arid rangelands. Managing mesquite and restoring these grasslands is commonly believed to conserve water. Mesquite-infested habitat is less suitable for grassland-associated species – many of which are in decline. Control of mesquite, when combined with prescribed fire and grazing management has the potential to improve habitat for several species of grassland obligate birds (Magness 2003).

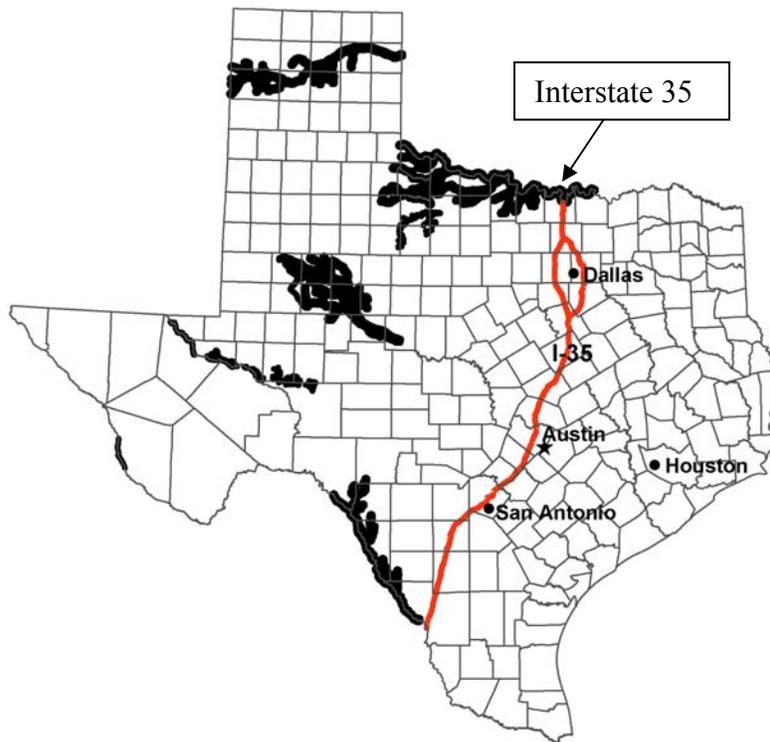


Figure 2. Salt Cedar, 400,000 Acres

Saltcedar has the potential to reduce streamflow through transpirational use of shallow groundwater adjacent to water courses. When considering the water loss to saltcedar infested areas along the Colorado, Pecos and Canadian rivers in Texas over a two year period, Hays (2003) found that saltcedar used water that would have otherwise contributed to base flow – the effect was realized during April through October growing season. Water use by saltcedar varies depending upon plant density, with more than a doubling between medium and high density stands – and a seven-fold difference between sparse and high-density stands (Davenport et al. 1982). On the three river systems studied by (Hays 2003) transpirational loss was reduced by 50%-75% during the first year following control – this resulted in a potential water savings of 0.5, 2.7, and 6.3 acre-feet per acre of control for the Colorado, Pecos and Canadian Rivers, respectively (White et al. 2003).

The amount of water use also varies significantly by year and is influenced by depth of water table and soil texture – for example, Hays (2003) found that water loss due to saltcedar along the Canadian river was almost twice that on the Pecos, and eight times that on the Colorado. Also, transpirational loss to saltcedar tends to decrease with distance from a water course (Hays 2003). In an analysis of potential water yield from saltcedar control along the Pecos River, Faruqui (2003) reported an annual water salvage of five acre-feet for every acre of saltcedar control – and treatment life is at least four years (Hart 2004).

Thus, in many situations saltcedar control has the potential to increase streamflow, and enhance the associated ecological benefits; particularly where dense stands have formed adjacent to

watercourses. Texas Department of Agriculture has lifted restrictions on the herbicide imazapyr (Arsenal) on Salt Creek in Culberson County to facilitate treatment of the spring run area to maintain water flows for the federally listed Pecos gambusia at the request of the TPWD.

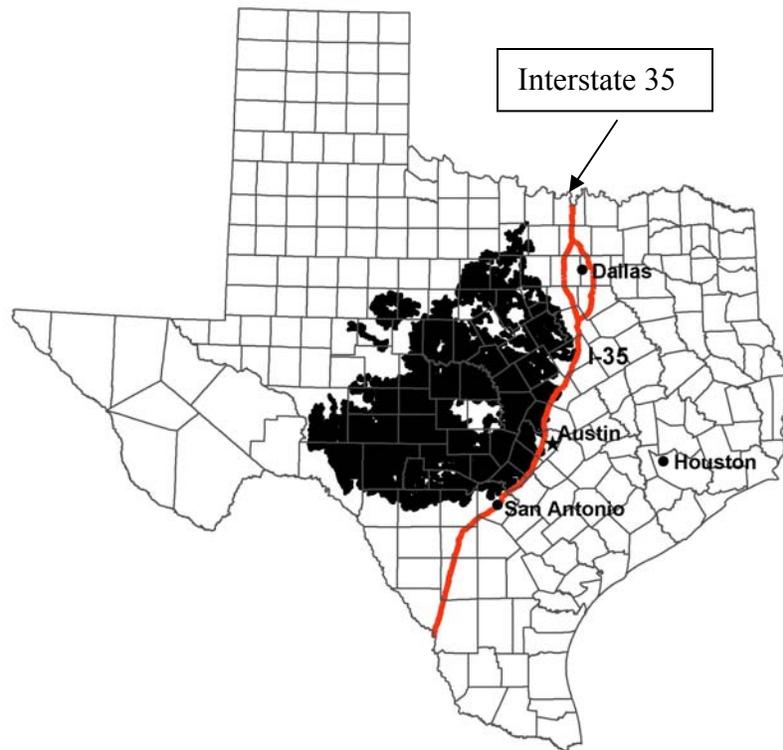


Figure 3. Ashe Juniper, 18 Million Acres

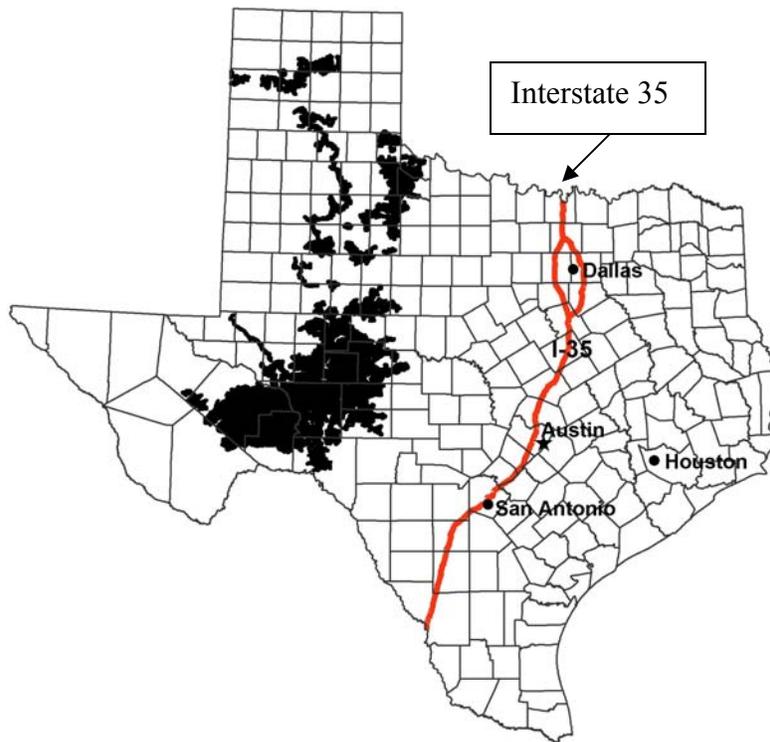


Figure 4. Redberry Juniper, 10 Million Acres

Both Ashe Juniper and redberry Juniper are native shrubs that have increased on native rangelands. Both species have the potential to form dense stands that out-compete native grasses and change the structural characteristics of native rangelands. Ashe and redberry juniper have the potential to reduce water yield in rangeland watersheds through canopy interception and transpirational water use. In certain situations, juniper control may contribute to increased streamflow. But precipitation, soils, and geology influence the effectiveness of controlling juniper for increased streamflow (Wilcox 2002). Where precipitation exceeds approximately 19 inches annual rainfall, juniper control may be effective in increasing stream flow – however, this effect likely depends upon the presence of springs or groundwater flow into streams (Wilcox 2002). Areas of shallow soils overlying fractured parent geology appear to be the best candidates for increasing streamflow through control of juniper (Wilcox 2002).

C. Conservation Practices

Conservation practices are specific treatments, including structural measure, vegetative measure or management technique, commonly used to meet specific needs in planning and implementing conservation work. Conservation practices are contained in Section IV of the Field Office Technical Guide (FOTG).

Purposes and selected excerpts from NRCS conservation practices that are most frequently used in developing plans and contracts to manipulate brush species identified in Section I.B. are included in this section.

1. Brush Management (Code 314)

- This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes: Restore natural plant community balance.
- Create the desired plant community.
- Reduce competition for space, moisture, and sunlight between desired and unwanted plants.
- Manage noxious woody plants.
- Restore desired vegetative cover to protect soils, control erosion, reduce sediment, improve water quality and enhance stream flow.
- Maintain or enhance wildlife habitat including that associated with threatened and endangered species.
- Improve forage accessibility, quality and quantity for livestock.
- Protect life and property from wildfire hazards.

a. Mechanical Brush Control. Species, approved control methods, time of treatment, and technical application is described in Table 1.

Table 1. Brush species, control methods, time of treatment, and technical application.			
Brush Species	Practice	Time of Year	Technical Application
Ashe Juniper	Chain one way	Anytime	Applicable where juniper is the dominant species. The ground must be moist to give effective control. Reapply chaining in opposite direction 30 months or later as needed. Use heavy naval anchor chain with a minimum weight of 50 pounds per link.
	Axe, saw, and power equipment such as hydro-axe, shears, or power grubbing (tree -dozing)	Anytime	Removal of all green growth and aboveground foliage are essential for control. Very effective techniques to be used on non re-sprouting species. Techniques such as flat blading are effective on non-sprouting species, but care should be given when working in areas which may contain other species which are root sprouters.
	Chain two ways (opposite direction)	Anytime	Applicable where juniper is so thick that two-way chaining is needed to obtain adequate initial control (dense stands).
	Power grubbing (tree dozing)	Anytime	Trees must be uprooted below the bud zone. This is best accomplished with a "stinger". Flat blades are not acceptable. Corners of blades are not as desirable as "stingers" and will destroy the seed source of desirable grass species.
Redberry Juniper	Power grubbing (tree dozing)	Anytime	Trees must be uprooted below the bud zone. This is best accomplished with a "stinger". Flat blades are not acceptable. Corners of blades are not as desirable as "stingers" and will destroy the seed source of desirable grass species.
	Chain	Anytime	Chaining is applicable with good soil moisture. Sprouts must be controlled by goats, chemicals, or fire.
Mesquite	Rootplow	Anytime	Stack and/or burn top growth as needed. Plow to at least a 14" depth. Root plow blades must be equipped with fins to bring roots to the surface. Fins should be attached at a 22-degree angle, not over 30" apart, and be long enough to project into and move through the soil. If the stand is dominantly seedling mesquite, plow 8" to 10" deep. All treatments must uproot trees below the bud zone.
	Power grubbing (tree doze), Hand grubbing	Anytime	Accomplish in a manner that assures complete removal of bud zone from the soil. Adaptive for larger plants, scattered and in motts. Stack and/or burn top growth as needed. Grub to at least a 14" depth. This is best accomplished with a "stinger". Flat blades are not acceptable. Corners of blades are not as desirable as "stingers" and may destroy the seed source of desirable grass species. Sprouts should be controlled utilizing chemical or mechanical individual plant treatments (IPT).
	Chain	Anytime, soil moisture is adequate	Applicable to tree-type (single stem) mesquite with at least 75% of trunks 8" or more diameter. Apply only when soil has good moisture to a depth of at least 12". Chain two ways. Use naval anchor chain within minimum weight of 50 lbs. per link. Chaining is only applicable where the brush is such that it requires additional treatment prior to root plowing to remove heavy brush. This practice is not to be used as a stand-alone practice. This practice may spread prickly pear.
Saltcedar	Rootplow	June July August	Plow at least 12" deep. Root plow must be equipped with kickers or fins spaced 30" apart; 30" long, and connected at the blade at a 22 degree angle. Root rake as needed to remove all roots.
	Power grubbing (tree doze)	Anytime	Trees must be uprooted below the bud zone. This is best accomplished with a "stinger". Flat blades are not acceptable. Corners of blades are not as desirable as "stingers" and will destroy the seed source of desirable grass species.

b. Chemical Brush Control. Refer to EXSEL program or B-1466, Chemical Weed and Brush Control, for selected species and recommended herbicides, rates, and time of year to treat.

1) EXCEL Web Site: <http://cnrit.tamu.edu/rsg/exsel/>

2) B-1466 Publication: McGinty, A. et.al. 2000. Chemical weed and brush control: suggestions for rangeland. B-1466, Texas Agricultural Extension Service, College Station. 32 pp.

Page 12: Ashe Juniper

Page 18 - 22: Mesquite

Page 12, 24: Redberry Juniper

Page 25: Saltcedar

2. Prescribed Burning (Code 338)

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes:

- To control undesirable vegetation. To prepare sites for harvesting, planting or seeding.
- To control plant disease.
- To reduce wildfire hazards.
- To improve wildlife habitat.
- To improve plant production quantity and/or quality.
- To remove slash and debris.
- To enhance seed and seedling production.
- To facilitate distribution of grazing and browsing animals.
- To restore and maintain ecological sites.

Warm Season Burn: 95-20-15-6

The critical limit for warm season burning is the 95-20-15-6 prescription. This prescription is used to manipulate vegetation types during the summer months while warm season vegetation is semi-dormant due to limited moisture and high temperature.

Prescribed burning under the warm season prescription (95 20-15-6) can be utilized under the following guidance:

- 1) Air temperatures equal to or less than 95° F,
- 2) Relative humidity is equal to or greater than 20%,
- 3) Maximum wind gust velocities (measured at eye level) equal to or less than 15 mph, and
- 4) The ten-hour time-lag fuel moisture is equal to or greater than 6% for dead juniper.

Criteria specific to warm season burn for control of Ashe and redberry junipers:

- 1) Burn season: May to September,
- 2) Wind velocity: 6 – 15 mph,

- 3) Relative humidity optimum: 20 – 40%,
- 4) Relative humidity maximum: 70%,
- 5) Air temperature: 80 -95 F. degrees, and
- 6) Fuel load: 750 – 2000 pounds per acre.

Criteria specific to warm season burns for mixed brush communities:

- 1) Burn season: May to September,
- 2) Wind velocity: 6 – 15 mph,
- 3) Relative humidity optimum: 20 – 40%,
- 4) Relative humidity maximum: 70%,
- 5) Air temperature: 80 -95 F. degrees, and
- 6) Fuel load: >750 pounds per acre.

Cool Season Burn: 80-20-20

The critical limit for cool season burning is the 80-20-20 prescription. Cool season burning is typically conducted during the winter months while warm season vegetation is dormant. The prescription parameters are as follow:

- 1) Air temperatures equal to or less than 80° F,
- 2) Maximum wind gust velocities (measured at eye level) equal to or less than 20 mph, and
- 3) Relative humidity is equal to or greater than 20%.

Criteria specific to cool season burning for Ashe juniper control and redberry juniper suppression:

- 1) Green juniper leaf moisture: < 70%,
- 2) Burn season: winter to green-up,
- 3) Wind velocity: 6 – 20 mph,
- 4) Relative humidity: 20 – 80%,
- 5) Air temperature: 30 -80 F. degrees, and
- 6) Fuel load: >2000 pounds per acre.

3. Prescribed Grazing (Code 528)

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes.

- Improve or maintain the health and vigor of plant communities.
- Improve or maintain quantity and quality of forage for livestock health and productivity.

- Improve or maintain water quality and quantity.
- Reduce accelerated soil erosion, and maintain or improve soil condition.
- Improve or maintain the quantity and quality of food and/or cover available for wildlife.
- Promote economic stability through grazing land sustainability.

Deferred Grazing Following Brush Management

Chemical Control

The area will be deferred for the time shown by the approved label of the herbicide used or longer as required by the following:

- Where the rangeland similarity index is 50 percent and less or the forage value rating is moderate or lower, the area will be deferred from the time of chemical application through the remainder of the growing season.
- Where the rangeland similarity index is 51 percent or greater or the forage value rating is high or greater, the area will be deferred for a minimum of 90 consecutive days during the growing season following treatment.
- When slow acting soil applied herbicides are used, the area will be deferred from the time of the first visual signs of chemical activity through the remainder of the first growing season. A deferment period during the second growing season will be based on the physiological needs of the plant community. It is highly probable that a deferment period will be needed the second growing season to allow vegetation to respond to reduced competition.
- Where chemical control is applied after August 15th, the area will receive a deferment for the remainder of the growing season as well as 90 consecutive days during the spring of the succeeding year.
- Where chemical control is used on 10 percent or less brush canopy, a deferment period is desirable but will not be required unless required by the approved label of the herbicide used.

Mechanical Control

Rootplowing

The area will be deferred the remainder of the growing season starting when the seed is planted. If the stand is weak in vigor at the end of the first growing season, a deferment period during the second growing season will be required as needed to ensure a stand develops in the seeded area.

Treedoing

When seeding is not applied and the rangeland similarity index is 50 percent or less or the forage value rating is moderate or lower, the area will receive a deferment the remainder of the growing season from the time of the start of mechanical control. If control is done after Aug. 15, the area will also receive a spring growing season deferment the next year.

Where the rangeland similarity index is 51 percent and greater or the forage value rating is high or greater, but the plant vigor is low, apply the same treatment as above. Where the vigor is good, the area will be deferred for a minimum of 90 consecutive days during the growing season following treatment. If control is completed after Aug. 15, the area will receive a spring growing season deferment the next year. Where individual plant treatment techniques are used on 10 percent or less brush canopy, a deferment period is desirable but will not be required.

4. Fence (Code 382)

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes:

- Improve or maintain the health and vigor of plant communities.
- Improve or maintain quantity and quality of forage for livestock health and productivity.
- Improve or maintain water quality and quantity.
- Reduce accelerated soil erosion, and maintain or improve soil condition.
- Improve or maintain the quantity and quality of food and/or cover available for wildlife.
- Promote economic stability through grazing land sustainability.

Where applicable, cleared right-of-ways should be established which will facilitate fence construction and maintenance. Maintenance and repairs will be performed as needed to facilitate the intended operation of the installed fence. This includes the prevention of growth or removal of woody vegetation in the fence.

5. Firebreak (Code 394)

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes:

- To prevent the spread of wildfire
- To control prescribed burns

Firebreaks will be of sufficient width and length to contain the fire. The minimum width will be 10 times the height of the vegetation (fine fuel) being burned for all purposes and types. The width of the firebreak includes the natural, burned, and constructed portions. Each of these can be used in combination.

Plowed, disked and bladed firebreaks will be wide enough to control the fire. Vegetation will be removed or covered with soil to achieve an effective barrier for ground fires. Constructed firebreaks will be planned, located, and installed to minimize erosion. Needed water control devices will be installed to accomplish this end.

Removal of vegetation by fire to create a firebreak will be according to a *Burn Plan* and the *Prescribed Burning Standard*. The burn will be between two parallel lines that may be constructed, natural (such as a road), wet lines, or any combination. The width between the lines will be at least 20 feet, and the lines will be of a sufficient width and condition to control the burn.

6. Grazing Land Mechanical Treatment (548)

This practice should be applied as part of a conservation management system to support one or more of the following purposes:

- Fracture compacted soil layers and improve soil permeability.
- Reduce water runoff and increase infiltration.
- Break up sod bound conditions and thatch to increase plant vigor.
- Renovate and stimulate plant community for greater productivity and yield.
- Reduce nutrient runoff and increase infiltration of animal wastes.

7. Pipeline (Code 516)

Disturbed areas shall be established with vegetation or otherwise stabilized as soon as practical after construction.

8. Pond (378)

Reservoir area: The topography and soils of the site shall permit storage of water at a depth and volume that ensure a dependable water supply, considering beneficial use, sedimentation, season of use, and evaporation and seepage losses. If surface runoff is a primary source of water for a pond, the soils shall be impervious enough to prevent excessive seepage losses or shall be of a type that sealing is practicable.

9. Range Planting (550)

This practice should be applied as part of a conservation management system to support one or more of the following purposes:

- Prevent excessive soil and water loss and improve water quality.
- Produce more forage for livestock.
- Improve the visual quality of rangeland.
- Provide or improve forage, browse, or cover for wildlife.
- Restore historic plant communities.

Reseeding Native Range or Woodlands Following Brush Management

Seeding is generally not recommended as long as there are 15 percent of the important grasses well distributed over the site. Seeding may be needed where there is significant ground disturbance.

Mechanical methods to remove brush, such as dozing, Rootplowing, raking, chaining and/or burning can be a part of the seedbed preparation. See Brush Management (314) standard and specifications. Additional seedbed preparation may be needed with heavy or farm type equipment so that seeding equipment can get over the area.

It may be necessary to plant cover crops for two consecutive years prior to seeding to reduce reporting of brush species, especially the oak species. A technical determination will be made on the need for additional years of cover crops.

Drill or broadcast to adapted species. Seed must have mineral contact with the soil. Seed into a firm seedbed. Use aerial application only when conventional equipment or broadcasting is impractical.

Pits left from individual Treedoing can be an excellent seedbed as long as the Treedoing is done during the normal seeding time. In these cases, pro-rate the seeding rate based on the percent ground disturbance. Hand application before the soil has crusted is permissible. On soils subject to wind erosion, cover needs should be planned to keep erosion rates down to the tolerance level of the soil to be seeded.

10. Upland Wildlife Habitat Management (Code 645)

This practice should be applied as part of a conservation management system to support one or more of the following purposes:

- To provide an adequate amount and proper quality of food for desired wildlife species;
- To provide the cover types needed for desired wildlife species, such as nesting, fawning, brooding, roosting, loafing, escape, thermal, and travel;
- To provide water as needed for desired wildlife species;
- To provide food, cover and water in the proper arrangement for desired wildlife species.

Habitat management consists of the application of a combination of other conservation practices or habitat improvement measures applied in a specific manner to meet habitat requirements (all practices from Section I. included except Grazing Land Mechanical Treatment).

11. Watering Facility (Code 614)

A watering facility (tank, trough or other watertight container) for providing access to water. This practice applies to all land uses where there is a need for new or improved watering facilities.

D. Anticipated Time Frame of Biological Opinion

Funding of the programs Conservation Assistance Programs identified in Section I.A. is expected to continue through 2007 when the 2002 Farm Bill is expected to expire and be replaced by another federal farm bill. Some, or all, of these programs may be reauthorized with little change, while an entirely new conservation program may be initiated.

Because some of the currently authorized programs involve permanent easements, 30-year easements and cost-share agreements for up to 15 years, NRCS has requested that the BO include all contracts funded prior to the expiration or any extension of the 2002 Farm Bill.

E. Proposed Action

While 2002 Farm Bill conservation program funding for Texas is unknown for fiscal years 2005, 2006 and 2007, the expectation is that funding for EQIP, GRP and CSP will continue to increase significantly, while funding for WRP, WHIP and FRRP will remain about the same. The amount of practices applied from the list above could potentially increase 5-fold by the end of FY 2007.

The basis for this estimate is taken from authorized funding levels for the EQIP program from FY 2002 through FY 2007 --- 5.8 billion dollars. Authorized EQIP funding for FY 2002 and 2003 was 1.1 billion dollars --- 18% of total authorized funding for EQIP during the life of the 2002 Farm Bill. Assuming that Texas continues to receive EQIP funds in the same proportion and applies the above conservation practices in the same proportional amounts, the amounts planned/applied by the end of FY 2007 might increase by a multiplier of more than five.

The practices (described in Section I A.) with their respective amounts were planned/applied statewide while the scope of this consultation is confined to the portion of Texas west of IH-35. Without knowing how many acres of brush management will be applied within the consultation area, it is expected that EQIP funds for brush management will primarily target the 18 million acres of Ashe juniper and 10 million acres of redberry juniper that occur entirely within the consultation area.

The following measures will be undertaken by NRCS to minimize the likelihood that federally listed species will be adversely affected by brush management practices:

1. Participants in the USDA programs listed in Section I.A. will ensure that individuals who operate brush manipulation equipment to remove any of the brush species in Section I.B., while in the performance of a USDA contract, will (1) attend a Texas Cooperative Extension course on brush management and (2) be certified as having attended and completed the course by the Texas Department of Agriculture. Course content will minimally include:

- Identification and life history of each listed species
- Habitat identification for each listed species
- ESA regulations
- Actions to minimize adverse effects
- Species conservation practices

2. USDA contracts must be accompanied by (1) a wildlife management plan prepared or approved by TPWD wildlife biologists or (2) a conservation plan prepared or approved by NRCS zone wildlife biologists.

A TPWD management plan addresses multiple facets of habitat management and population management. Components of a management plan include an objective as established by the land manager, the past history of hunting and other land use, and a description and appraisal of the habitat. Specific recommendations are given concerning habitat management practices, wildlife considerations in livestock management, availability of water, food plot development, management of concerned wildlife populations, and harvest of game species. The importance of keeping good records to aid in determining the status of wildlife populations and evaluating

management program progress is demonstrated.

A NRCS conservation plan is a record of the program participant's decisions and supporting documentation that meets FOTG quality criteria for each natural resource - soil, water, air, plants and animals. The plan describes the schedule of operations and activities needed to solve identified natural resource problems at a resource management system (RMS) level. Plans ensure compliance with federal, state and local statutes/regulations/ordinances.

In addition to being accompanied by either a wildlife management plan or conservation plan, each contract will include an item explaining how conservation practices from Section I.C. have been planned to minimize adverse impacts to listed species.

3. Specific guidelines will be used by TPWD and NRCS personnel when preparing their respective plans to minimize adverse effects to BCVs (Enclosure 1) and GCWs (Enclosure 2).
4. As a complement to these treatment guidelines for both species, NRCS will cooperate, and encourage landowners with 2002 Farm Bill contracts to participate in the brown-headed cowbird trapping program administered by TPWD.
5. If the above criterion are not satisfied, contracts must be implemented in accordance with "no take" guidelines for listed species prepared by the TPWD.

II. Status of the Species/Environmental Baseline

Currently, there are 84 federally listed species in Texas including mammals, passerine birds, wading birds, shorebirds, birds of prey, a gallinaceous bird, reptiles, amphibians, fish, invertebrates, and plants. The term "listed species" means that a species has been federally designated under the Act as either endangered or threatened. In addition to listed species, 21 species in Texas have candidate status. Candidate species are plants and animals for which the FWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the Act, but for which development of a listing regulation is precluded by other higher priority listing activities. Candidate species are not afforded Federal protection under the Act; however, the FWS recommends that potential impacts to these species be considered during project planning. Avoiding adverse impacts to these candidate species now may prevent these species from being listed under the Act in the future.

After reviewing which federally listed species may occur within the action area, the NRCS has determined that the species shown in Tables 2 (animals) and 3 (plants) may be affected by the proposed actions. Descriptions of critical habitat (when designated) for these listed species can be found in 50 CFR § 17.94-17.96. The brush species (targeted for treatment in Section I) that occur within the range of each listed species are also given in Tables 2 and 3.

Table 2. Federally listed (threatened or endangered) animal species in the action area that could be affected by the proposed actions.			
Common name	Scientific name	Status¹	Brush species of concern²
Arkansas river shiner	<i>Notropis girardi</i>	T	SC, M, AJ, RJ
Black-capped vireo	<i>Vireo atricapilla</i>	E	M, AJ, RJ
Comal Springs dryopid beetle	<i>Stygoparnus comalensis</i>	E	AJ
Comal Springs riffle beetle	<i>Heterelmis comalensis</i>	E	AJ
Comanche Springs pupfish	<i>Cyprinodon elegans</i>	E	SC
Concho water snake	<i>Nerodia paucimaculata</i>	T/CH	SC, M, RJ
Devils River minnow	<i>Dionda diaboli</i>	T	SC, M, AJ, RJ
Fountain darter	<i>Etheostoma fonticola</i>	E	SC, AJ
Golden-cheeked warbler	<i>Dendroica chrysoparia</i>	E	SC, AJ
Leon Springs pupfish	<i>Cyprinodon bovinus</i>	E	SC
Pecos gambusia	<i>Gambusia nobilis</i>	E	SC
San Marcos salamander	<i>Eurycea nana</i>	T	AJ
Texas blind salamander	<i>Typhlomolge rathbuni</i>	E	SC, AJ

¹ Status: E = Endangered, T = Threatened, CH = Critical Habitat

² Brush: M = Mesquite, SC = Salt Cedar, AJ = Ashe Juniper, RJ = Redberry Juniper

Table 3. Federally listed (threatened or endangered) plant species in the action area that could be affected by the clearing of the four brush species.			
Common Name	Scientific name	Status¹	Brush Species of Concern²
Ashy dogweed	<i>Thymophylla tephroleuca</i>	E	M
Bunched cory cactus	<i>Coryphantha ramillosa</i>	T	SC, M
Chisos Mountain hedgehog cactus	<i>Echinocereus chisoensis</i> var. <i>chisoensis</i>	T	M
Davis' green pitaya	<i>Echinocereus viridiflorus</i> var. <i>davisii</i>	E	M
Hinckley's oak	<i>Quercus hinckleyi</i>	T	M
Johnston's frankenia	<i>Frankenia johnstonii</i>	E, PD	M
Little Aguja pondweed	<i>Potamogeton clystocarpus</i>	E	SC
Lloyd's mariposa cactus	<i>Sclerocactus mariposensis</i> [<i>Echinomastus</i>]	T	M
Nellie cory cactus	<i>Escobaria minima</i> [<i>Coryphantha</i>]	E	M
Pecos (=puzzle) sunflower	<i>Helianthus paradoxus</i>	T	SC, M
Sneed pincushion cactus	<i>Escobaria sneedii</i> var. <i>sneedii</i> [<i>Coryphantha</i>]	E	M,
Terlingua Creek cats-eye	<i>Cryptantha crassipes</i>	E	SC, M
Texas poppy-mallow	<i>Callirhoe scabriuscula</i>	E	SC, M
Texas snowbells	<i>Styrax platanifolius</i> ssp. <i>texanus</i>	E	AJ
Texas wild-rice	<i>Zizania texana</i>	E/CH	AJ
Tobusch fishhook cactus	<i>Sclerocactus tobuschii</i> [<i>Ancistrocactus</i>]	E	AJ

¹ Status: E = Endangered, T = Threatened, CH = Critical Habitat, PD = Proposed Delisting

² Brush: M = Mesquite, SC = Salt Cedar, AJ = Ashe Juniper, RJ = Redberry Juniper

A. Species that may be affected by the proposed actions.

The following species accounts of the twenty-nine federally listed species which may be affected by the proposed action are abbreviated. Additional information on habitat requirements, life history, status, threats, etc. may be found at many other sources including the FWS's Region 2 website: <http://ifw2es.fws.gov/EndangeredSpecies/> or in the following two publications:

“Endangered and Threatened Animals of Texas: Their Life History and Management.” 1995. Linda Campbell, Texas Parks and Wildlife Department, Endangered Resources Branch. Austin, Texas.

Species Review, Texas Plant Conservation Conference. 2002. Species review of globally and state rare plants of Texas. Prepared for the annual Texas Plant Conservation Conference by the Lady Bird Johnson Wildflower Center, Texas Department of Transportation, the Texas Parks & Wildlife Department, and the U.S Fish and Wildlife Service. Austin, TX.

ANIMALS

Arkansas River Shiner

The Arkansas River shiner (ARS) was listed as threatened on November 23, 1998 (63 FR 64772). It is a small fish, with a maximum length of approximately 2-inches, found in the Canadian River in New Mexico, Oklahoma, and Texas. It occurs in turbid waters of shallow, primary channels of sandy streams and rivers in the Arkansas River drainage (Gilbert 1980). In Texas, the ARS inhabits the Canadian River where suitable habitat exists, which includes Oldham, Potter, Hutchinson, Roberts, and Hemphill Counties. Critical habitat was designated for the ARS in April, 2001 (66 FR 18002) and includes Oldham, Potter, and Hemphill Counties in Texas. However, through a recent court settlement, the ARS critical habitat has been vacated pending the FWS’s remand. The Service release a revised proposed rule to designate critical habitat for the Arkansas River population of the ARS on October 6, 2004 (69 FR 59859). A recovery plan for the ARS has not yet been developed.

Historically, the ARS occurred throughout the western portion of the Arkansas River basin in Kansas, New Mexico, Oklahoma, and Texas. Currently, the ARS is thought to exist only within approximately 508 miles of the Canadian River in Oklahoma, Texas, and New Mexico. The primary reasons for the decline of the species in its historical range include inundation and modification of stream discharge by impoundments, channel desiccation from water diversion and groundwater pumping, stream channelization, and introduction of non-native species.

Black-capped Vireo

On October 6, 1987, the BCV was listed as endangered (52 FR 37423). The recovery plan for the BCV was finalized on September 30, 1991. The BCV is a 4.5-inch long, insect-eating songbird which arrives in Texas from mid-March to mid-April, while BCV’s in Oklahoma arrive there approximately 10 days later (FWS 1991). They nest from Oklahoma south through central Texas to the Edwards Plateau, then south and west to central Coahuila, Mexico (Campbell 1995).

Although BCV habitat throughout Texas is quite variable with respect to plant species, soils, and rainfall, all habitat types have a similar overall appearance. BCV’s typically inhabit shrublands and open woodlands with a distinctive patchy structure. The shrub vegetation generally extends from the ground to about 6 feet above ground and covers about 30% to 60% of the total area. Open grassland separates the clumps of shrubs. In the eastern portion of the BCV’s range, the

shrub layer is often combined with an open, sparse to moderate tree canopy. In the Edwards Plateau and Cross Timbers regions, common plants in BCV habitat include Texas oak (*Quercus buckleyi*), Lacey oak (*Quercus glaucoides*), white shin oak (*Quercus sinuata* var. *breviloba*), Durand oak (*Quercus durandii*), live oak (*Quercus fusiformis*), mountain laurel (*Sophora secundiflora latifolia*), evergreen sumac (*Rhus virens*), skunkbush sumac (*Rhus trilobata*), flameleaf sumac (*Rhus copallina*), redbud (*Cercis canadensis*), Texas persimmon (*Diospyros texana*), mesquite, and agarita (*Berberis trifoliolata*). Densities of Ashe junipers are usually low. In the western Edwards Plateau and Trans-Pecos regions, BCVs are often found in canyon bottoms and slopes containing plants such as sandpaper oak (*Quercus pungens*), white shin oak, Texas kidneywood (*Eysenhardtia texana*), Mexican walnut (*Juglans microcarpa*), fragrant ash (*Fraxinus cuspidata*), mountain laurel, and guajillo (*Acacia berlandieri*). BCV habitat is generally related to disturbance, and believed to have been created by natural disturbances (e.g., fire) in areas with rocky substrates and shallow soils, which generates successional habitat (Kolozsar et. al. 2000).

Threats to the BCV include habitat loss and degradation due to residential and commercial development, habitat succession, grazing practices not conducive to BCV recovery, brown-headed cowbird (*Molothrus ater*) parasitism, and fire suppression. BCVs may live for more than five years, and usually return year after year to the same territory. The birds begin to migrate to wintering grounds on Mexico's western coast in July, and are gone from Texas by mid-September (Campbell 1995).

Comal Springs Dryopid Beetle

On December 18, 1997, the Comal Springs dryopid beetle was listed as endangered without critical habitat (62 FR 66295-66304). The Comal Springs dryopid beetle is known from Comal Springs and Fern Bank Springs in Hays County (Arsuffi 1993, Barr 1993, Barr and Spangler 1992.). The primary threat to the species is the decrease in water quantity and quality due to water withdrawal and other human activities throughout the San Antonio segment of the Edwards Aquifer. Non-point source pollution and other actions that affect (i.e., decrease) the quality and quantity of groundwater could adversely impact the karst system harboring this species. A recovery plan for the Comal Springs dryopid beetle has not yet been developed.

Comal Springs Riffle Beetle

On December 18, 1997, the Comal Springs riffle beetle was listed as endangered without critical habitat (62 FR 66295-66304). The Comal Springs riffle beetle is known from Comal Springs and San Marcos Springs in Hays County (Arsuffi 1993, Bosse et al.1988). The Comal Springs riffle beetle is not a subterranean species. It occurs in the gravel substrate, leaf litter, and shallow riffles in spring runs of Comal Springs. The primary threat to the species is a decrease in water quantity and quality due to water withdrawal and other human activities throughout the San Antonio segment of the Edwards Aquifer. Non-point source pollution and other actions that affect (i.e., decrease) the quality and quantity of groundwater could adversely impact the karst system harboring this species. A recovery plan for the Comal Springs riffle beetle has not yet been developed.

Comanche Springs Pupfish

On March 11, 1967, the Comanche Springs pupfish was listed as endangered without critical habitat (32 FR 4001). In 1981, a recovery plan for the species was completed (FWS 1981). Since then several updates of the recovery plan have been drafted but not yet completed. Comanche Springs pupfish are small fish, attaining a maximum size of approximately two inches (Itzkowitz 1969, Echelle and Hubbs 1978, FWS 1981).

Comanche Springs pupfish historically inhabited two isolated spring systems approximately 56 miles apart in the Pecos River drainage of western Texas (Baird and Girard 1853). The type locality, Comanche Springs, inside the city limits of Fort Stockton, Pecos County, Texas, is now dry and the population at this locality is extinct. The other population is restricted to a small series of springs, their outflows, and a system of irrigation canals historically interconnecting Phantom Lake Springs (located in easternmost Jeff Davis County, Texas), San Solomon Springs, Giffin Springs and Toyah Creek near Balmorhea, Reeves County, Texas (Echelle et al. 2003). The number of fish in the San Solomon Spring outflow has greatly increased in recent years as a result of the increased habitat availability from the San Solomon Ciénega.

Concho Water Snake

The Concho water snake was listed as threatened on September 3, 1986 (51 FR 31412-31422). Critical habitat was designated on June 29, 1989 (54 FR 27377 27384) and includes portions of the Concho and Colorado Rivers in Runnels, Tom Green, Concho, Coleman, and McCulloch Counties, Texas. The recovery plan for the Concho water snake was finalized on September 27, 1993. This non-venomous snake is small compared to most other water snakes, with adults rarely exceeding three feet in total length. Historically, the Concho water snake occurred over about 276 river miles of the Colorado and Concho Rivers in central Texas. Today, the Concho water snake occupies a restricted geographic range in the Concho and Colorado River Basins. This includes a relatively continuous occupation of riverine habitat of the Colorado River below the town of Bronte (Coke County), of Elm, Coyote, and Bluff creeks below the town of Winters (Runnels County), and of the Concho River from San Angelo (Tom Green County) downstream to its confluence with the Colorado River, and then downstream to the FM 45 bridge over the Colorado River (Mills and San Saba Counties). The Concho water snake is endemic to Texas and has one of the smallest distributions of any North American snake (FWS 1993).

Optimal habitat for the Concho water snake consists of free-flowing streams over rocky substrates, abundant rock debris and crevices for shelter, and shallow riffles. Periodic scouring by floods is important in providing relatively sediment-free rock rubble and open banks. Habitat loss and degradation has been identified as the greatest general threat to Concho Water Snake populations. Reservoir construction has flooded many miles of former stream habitat above the dams. Below the dams, restriction of stream flow and prevention of floodwater scouring have resulted in siltation of rocky streambeds, encroaching vegetation, and loss of riffle habitat required by young snakes. Loss of adequate instream flow due to natural conditions (drought) and water diversion is also a concern. Pollution and degradation of water quality in the Concho and Colorado Rivers or their tributaries is another potential threat in certain portions of the snake's range.

Devils River Minnow

The Devils River minnow was listed as threatened on October 20, 1999, without critical habitat (64 FR 56596-56609). A recovery plan for the Devils River minnow has not yet been developed. It is a small fish, with adults reaching approximately 2 inches in length. The Devils River minnow is found in channels of fast-flowing, spring-fed waters over gravel substrates (Harrell 1978). Although the species is closely associated with spring systems, it most often occurs where spring flow enters a stream, rather than in the spring outflow itself (Hubbs and Garrett 1990). The Devils River minnow was known to occur in Texas in Las Moras Creek in Brackettville, in Sycamore Creek, in San Felipe Creek in Del Rio and in the Devils River from near the confluence with the Rio Grande upstream to Beaver Lake near Juno. In 2002, they were discovered in the headwaters of Pinto Creek, Kinney County. In Mexico, the Devils River Minnow was reported to occur (pre-1980) in the Río San Carlos and in the Río Salado drainage (Río Sabinas, Río San Juan, and Río Alamo), but now appear to be rare. The most recent collections of Devils River Minnow can only confirm populations in San Felipe Creek, Pinto Creek and in the upper portions of the Devils River.

The primary threats to the species include habitat loss and degradation (water quantity and quality) and impacts from non-native species. Devils River Minnow depends on constant, clean flowing spring waters. Spring flows are under significant threat of failure when groundwater levels decline, particularly in drought-prone areas like western Texas.

Fountain Darter

The fountain darter was listed as endangered on October 13, 1970 (35 FR 16047-6048) with critical habitat designated on July 14, 1980 (45 FR 47355-47364). Critical habitat extends from Spring Lake and its outflow, through the San Marcos River downstream to about 0.5 miles below the IH- 35 bridge. The recovery plan for the fountain darter was finalized on February 14, 1996.

The fountain darter is a small fish, with adults reaching approximately one inch in length. Historic distribution includes the Comal River and the San Marcos River to the confluence of the San Marcos and Blanco Rivers. The drawdown of the Edwards Aquifer due to severe drought, loss of springflow, and other factors eliminated the fountain darter from the Comal River in the mid 1950's, but it was reintroduced in the mid 1970's. It currently occurs in the Comal River and the upper San Marcos River. Habitat requirements include undisturbed stream floor; a mix of submergent plants; clear, clean water; food supply of living organisms; constant water temperatures within the natural and normal river gradients; and adequate spring flows (FWS 1996). Fountain darters use and may prefer a mix of submergent plants and mats of filamentous algae (Schenck and Whiteside 1976; Linam et al. 1993). Decline of the species is due to a number of factors (FWS 1996). The most serious threat is the decline of spring flows. Other threats include habitat degradation from stormwater runoff, pollution, siltation, and contamination from chlorinated wastewater effluent. Non-native/exotic species also can degrade the quality of available habitat (FWS 1996).

Golden-cheeked Warbler

The GCW was emergency listed as endangered on May 4, 1990 (55 FR 18844) and the final rule was published on December 27, 1990 (55 FR 53160). Critical habitat has not been designated. The recovery plan for the GCW was finalized on September 30, 1992.

The GCW is a small, insectivorous songbird, 4.5 to 5 inches long, with a wingspan of about 8 inches. The GCW nests in the juniper-oak woodlands of the Texas Hill Country and winters in the pine-oak woodlands of southern Mexico, Guatemala, Honduras, and Nicaragua. Its entire nesting range is confined to 33 counties in central Texas. Typical nesting habitat is found in tall, dense, mature stands of Ashe juniper mixed with deciduous trees such as Texas oak, Lacey oak, white shin oak, live oak, post oak (*Quercus stellata*), Texas ash (*Fraxinus texensis*), cedar elm (*Ulmus crassifolia*), hackberry (*Celtis occidentalis*), bigtooth maple (*Acer grandidentatum*), sycamore (*Platanus occidentalis*), Arizona walnut (*Juglans major*), escarpment cherry (*Prunus serotina*), and pecan (*Carya illinoensis*). This type of woodland is often found in relatively moist areas such as steep-sided canyons and slopes. GCWs are also occasionally found in drier, upland juniper-oak, i.e., live oak, post oak, blackjack oak (*Quercus marilandica*) woodlands over flat topography. Although the composition of deciduous woody vegetation may vary from place to place, Ashe juniper is always present.

The males arrive in central Texas around March 1st and begin to establish breeding territories, which they defend against other males by singing from visible perches within their territories. The females arrive a few days later but are more difficult to detect in the dense woodland habitat. By early August, GCW's begin their migration south (FWS 2002).

The primary threats to the GCW are habitat loss and urban encroachment. Other factors include the loss of deciduous oaks (used for foraging) to oak wilt, nest parasitism by brown-headed cowbirds, and predation and competition by blue jays (*Cyanocitta cristata*) and other urban-tolerant birds (FWS 1992).

Leon Springs Pupfish

The Leon Springs pupfish was listed as an endangered species on August 15, 1980 with critical habitat (45 FR 54678-54681). Critical habitat for this small fish (adults reaching approximately two inches in length) is Diamond Y Spring and its outflow stream, Leon Creek/Diamond Y Draw. Critical habitat extends from the spring head pool downstream to the Texas Highway 18 crossing. The recovery plan for the species was finalized on August 14, 1985.

Historically this species was known from only Leon Springs (several miles upstream from Diamond Y). The species was considered extinct after this spring system was lost due to significant habitat alteration and dewatering. However, in 1965 it was rediscovered from Diamond Y Spring and the short portion of Leon Creek. This area remains the only known habitat for the species (FWS 1985).

Pecos Gambusia

The Pecos gambusia was listed as endangered on October 13, 1970, without critical habitat (35 FR 16047-16048). The recovery plan for this small fish (adults reaching lengths of approximately 2 inches) was finalized in 1983. Historically this species occurred in the Pecos River drainage in western Texas and southeastern New Mexico and currently occurs in Texas in Phantom Lake Springs in Jeff Davis County; San Solomon, Griffin, and East Sandia Springs, and irrigation canals in the Balmorhea area; in Reeves County; and the Diamond Y Springs and the Leon Creek Diamond Y Draw confluence in Pecos County. It also occurs in several localities in southeastern New Mexico. Decline of the species is due to habitat loss as a result of groundwater pumping/loss of spring flow, damming and irrigation, and competition and hybridization with introduced non-native exotic species. Other threats include contamination from oil/gas well field development, oil/gas pipelines, and pesticides (FWS1983).

San Marcos Salamander

The San Marcos salamander was listed as threatened on July 14, 1980, with critical habitat designated in the San Marcos River from its origin in Spring Lake downstream approximately 150 feet from the Spring Lake Dam (45 FR 47355-47364). Historic and current habitat is the same as its critical habitat. A recovery plan for the species was finalized on February 14, 1996. Decline of the species is primarily due to decrease in flows from the San Marcos Springs caused by increasing water usage demands from the Edwards Aquifer. Threats to the species include decreased spring flows, point source discharges affecting the water quality of the San Marcos River and Springs, and an overabundance of predators (FWS 1996b).

Texas Blind Salamander

The Texas blind salamander was listed as endangered on March 11, 1967, without critical habitat (32 FR 4001). A recovery plan for the species was finalized on February 14, 1996. Historically known only from Hays County, today the salamander is known to occur only in the San Marcos Pool of the Edwards Aquifer (Tupa and Davis 1976). Decline of the species is caused by changes in the Edwards Aquifer from increased water usage, urban growth and pollution (FWS 1996). Threats to the species include point source discharges and other factors affecting the water quality and quantity of the San Marcos River and Springs.

PLANTS

Ashy Dogweed

On July 19, 1984, ashy dogweed was listed as endangered (49 FR 29232-9234). Globally, ashy dogweed is known only from Texas in Webb and Zapata counties and historically from Starr County. Occurring in patches, ranging from one to one hundred plants per acre, most known sites are on sands or sandy loams on level or very gently rolling topography over Eocene strata of the Laredo Formation which include the Catarina and Maverick soil series (FWS 1987 a).

Flowering from March through May or after significant rainfall, it is an erect perennial up to one foot tall and covered with hair, ranging from woolly and long tangled hairs, to soft and matted. The

stems are somewhat woody at the base, while the upper stems are covered with white dense wool. Various parts of the plant emit a pungent odor when crushed.

Habitat for ashy dogweed is grassland with scattered shrubs, including honey mesquite, cenizo (*Leucophyllum frutescens*), goatbush (*Castela erecta*), anacahuita (*Cordia boissieri*) and yucca (*Yucca* sp.). Common herbaceous associates include threeawn (*Aristida* sp.), grama (*Bouteloua* sp.), leafy heliotrope (*Heliotropium confertifolium*), and the exotic buffelgrass (*Pennisetum ciliare*).

Threats to the species include invasive grasses such as buffelgrass. Possible reasons for its decline include habitat degradation. Few populations are known, and it has yet to be discovered from adjacent Mexico.

Bunched Cory Cactus

On November 6, 1979, the bunched cory cactus was listed as endangered (44 FR 64247-64250). It is known only from Brewster and Terrell Counties in Texas, and from Coahuila, Mexico.

Habitat includes rocky slopes, ledges, and flats in the Chihuahuan Desert, most frequently on exposures of Santa Elena Limestone or the Boquillas Formation between 2500-3500 feet elevation (Heil et al 1985). Associated species include whitethorn acacia (*Acacia constricta*), chino grama (*Bouteloua breviseta*), lechuguilla (*Agave lechuguilla*), creosote bush (*Larrea tridentata*), boquillas silverleaf (*Leucophyllum candidum*), candelilla (*Euphorbia antisiphilitica*), leatherstem (*Jatropha dioica*), spikemoss (*Selaginella* sp.), range ratany (*Krameria glandulosa*), ocotillo (*Fouquieria splendens*), and numerous other cacti (Heil et al 1985).

This plant is a perennial succulent with stems usually solitary, 2-3½ in. tall long and 2– 4 in. across. It is often rounded and dark grayish-green in color. Bunched cory cactus flower from July-August (Heil et al. 1985); perhaps as early as April according to Weniger (1984). Often difficult to distinguish from *Coryphantha macromeris* in the field, *C. ramillosa* has a groove the full length of the tubercle, entire outer petals, and egg-shaped fruits less than .8 inches long. *C. macromeris* as a groove only half the length of the tubercle, frilled outer petals, and elongate fruits more than 1.2 inches long (Heil et al. 1985).

Threats include 1) habitat disturbance by off-road vehicles in the Lajitas-Terlingua region, 2) collecting, and 3) modification/destruction of habitat from future residential development including vacation homes and ranchettes. According to the federal register (listed above), ranching practices were not considered as threats to the plants at the time; however, future ranching practices were mentioned as potential effects.

Chisos Mountain hedgehog cactus

On September 30, 1988, Chisos Mountain hedgehog cactus was listed as threatened (53 FR 38453-38456). Restricted to the Chihuahuan Desert in Brewster County, the only location in Texas is inside Big Bend National Park.

Flowering usually between March and June, it can be found in desert grasslands or open shrublands on unconsolidated gravelly fan and terrace deposits on desert flats and low hills at

moderate elevations (2000-2500 feet) . There are no similar species and it is easily distinguished from other cacti by the solitary large, ribbed, tuberculate stems, the large pink flowers with white throats and dark crimson centers, the floral tube (fruits) with a covering of wool and bristly, hair-like spines, and the number and length of radial spines.

Since it is protected within the National Park boundary, threats are minimal. However, invasive grasses such as buffelgrass may cause competition for space, moisture, etc. within its native habitat, and plants are occasionally poached by cactus collectors.

Because all populations of this cactus occur within Big Bend National Park and mesquite is not a significant component of this habitat, NRSC brush management programs are not likely to target the management of mesquite in or near areas where this plant could occur.

Davis' Green Pitaya

On November 07, 1979, Davis' green pitaya was designated as endangered (44 FR 64738-64740). Davis' green pitaya is endemic to a few low mountain ranges in Brewster County.

The dwarf size (.4 – 1.2 inches tall, 0.4- 1 inch wide) and the number of ribs (6-9) distinguish var. *davisii* from the other varieties of *viridiflorus* (Benson 1982). It is a perennial stem succulent with dwarf, usually solitary, dark green, spherical to ovoid or top-shaped stems. The spines (8-14) are needle-like and arranged on either side of the areole pectinately (comb-like). They are all radial and black then gray to white or with red or dark brown tips. The upper ones are slender and round and the lateral ones are stouter and usually flattened. The flowers are yellow-green to straw-yellow and funnel-shaped, and can usually be viewed between March and April. Fruits are green with a reddish tinge and oval-shaped.

Habitat for this species is novaculite outcrops in full sun among sparse Chihuahuan Desert scrub, usually hidden in mats of spikemoss (*Selaginella* sp.). Associated with Davis green pitaya are other rare, but not listed, plant species such as straw-spined glory of Texas (*Thelocactus bicolor* var. *flavidispinus*), Correll's green pitaya (*Echinocereus viridiflorus* var. *correllii*), Wilkinson's whitlow-wort (*Paronychia wilkinsonii*), Hester's cory cactus (*Escobaria hesteri*), and Nellie cory cactus (*Escobaria minima*). Other more common associated species include chino grama (*Bouteloua breviseta*), fluffgrass (*Erioneuron pulchellum*), Peruvian spikemoss (*Selaginella peruviana*), creosote bush (*Larrea tridentata*), lechuguilla (*Agave lechuguilla*), smooth sotol (*Dasyilirion leiophyllum*), skeleton-leaf goldeneye (*Viguiera stenoloba*), whitethorn acacia (*Acacia constricta*), soap tree yucca (*Yucca elata*), Spanish dagger (*Y. torreyana*), *sacahuista* (*Nolina texana*), purple pricklypear (*Opuntia violacea*), strawberry pitaya (*Echinocereus stramineus*), little nipple cactus (*Mammillaria gummifera*), spinyleaf zinnia (*Zinnia acerosa*), and parralena (*Thymophylla pentachaeta*). Note that Davis green pitaya pulls down into the mats of spikemoss during dry weather, becoming almost invisible. Threats include poaching by cactus collectors, an extremely limited range, and very specific habitat parameters.

Hinckley's Oak

On August 26, 1988, Hinckley's oak was designated as threatened (53 FR 32824-32827). Hinckley's oak is restricted to Presidio County in Texas, and to Chihuahua, Mexico. However,

preserved leaves from packrat middens imply that *Quercus hinckleyi* was more abundant and wider-ranging 9,500 to 19,000 years ago (Van Devender 1986).

Flowering in spring and producing acorns by late August, Hinckley's oak is a rhizomatous, thicket-forming, intricately branching, evergreen shrub, up to 5 feet tall. It is easily distinguished from all other oaks in west Texas by its very small, crisped, spiny-toothed, glabrous leaves. This distinct shrub occurs on arid limestone slopes at mid elevations in the Chihuahuan Desert. Dominant associated plant species include white thorn acacia (*Acacia constricta*), mariola (*Parthenium incanum*), and lechuguilla (*Agave lechuguilla*) (Miller & Powell 1982). Other associates include rough mortonia (*Mortonia scabrella*), heath cliffrose (*Cowania ericifolia*), evergreen sumac (*Rhus virens*), spiny greasewood (*Forsellesia spinescens*), smooth sotol (*Dasyllirion leiophyllum*), candelillo (*Euphorbia antisyphilitica*), Wright's threeawn (*Aristida wrightii*), Warnock's grama (*Bouteloua warnockii*), skeleton-leaf goldeneye (*Viguiera stenoloba*), and resurrection fern (*Selaginella lepidophylla*). Threats to the species include habitat alteration, climate change, few populations, and hybridization with more common oak species.

Johnston's Frankenia

On August 07, 1984, Johnston's frankenia was listed as endangered (49 FR 31418-31421). This species was proposed for delisting on May 22, 2003 (68 FR 27961-27961). Although the global range extends into Mexico, it is known only from Starr, Webb, and Zapata counties in southern Texas. The closest known population of Johnston's frankenia is currently located southeast of Laredo, and is not inside the proposed NRCS target area (west of IH-35). However, because of the close proximity to known occurrences and because there are known associated soil types (Mary Orms, FWS, personal communication 2004) northwest of Laredo, NRCS brush management of mesquite could occur in or near areas of this plant. Populations are patchy and usually have no more than 100 plants although several populations with 1000s of plants are known. Known sites are on sandy or clayey soils with high gypsum content, and usually on open or sparsely vegetated rocky gypseous hillsides or saline flats. Soils at several sites are of the Catarina and/or Maverick series, as well as the Copita, Brennan, Zapata, and Montell (Janssen 1999).

Johnston's frankenia flowers throughout the growing season. It is a low, sprawling shrub up to one foot tall, with a woody base composed of dark wiry roots giving rise to several to many ascending or re-curved stems. The entire plant is grayish-bluish-green but will turn crimson red in late fall and winter. Flowers are solitary, less than 0.5 inches long, and have white and occasionally pink-tinged petals. Johnston's frankenia is the only small shrub in Texas with narrow opposite leaves and white flowers.

Habitat for this plant is a dwarf shrubland, often dominated by blackbrush (*Acacia rigidula*) with widely scattered mesquite. Sharing dominance at these sites with Johnston's frankenia are two other shrublets, saladillo (*Varilla texana*) and tornillo (*Prosopis reptans*). Common associates in Texas include parralena (*Thymophylla pentachaeta*), tasajillo (*Opuntia leptocaulis*), Lindheimer pricklypear (*Opuntia engelmannii* var. *lindheimeri*), seepweed (*Suaeda* sp.), goldenweed (*Isocoma coronopifolia*), copper sida (*Billieturnera helleri*), curly mesquite (*Hilaria belangeri*), and whorled dropseed (*Sporobolus pyramidatus*) (Janssen 1999).

Threats to the species include land management practices such as blading and bulldozing for ranchland agricultural development, competition with introduced grasses, roadway and pipeline rights-of-way construction or maintenance, and restricted distribution. The species also has a low reproductive potential. While still protected as endangered, this plant is currently under the delisting process as several more populations have been located.

Little Aguja Pondweed

On November 14, 1991, Little Aguja (= Creek) pondweed was listed as endangered (56 FR 57844-57849). This plant is known only from the Davis Mountains of Jeff Davis County and is considered one of the rarest pondweeds in the world (Whittall et al. 2002). It is a submersed aquatic plant with light green to brown stems and alternate, simple, linear leaves, with a rounded, warty fruit.

Two other species of *Potamogeton* (*P. foliosus* and *P. pusillus*) are similar in appearance with narrow leaves, and all three are located in Little Aguja Creek (Whittall et al. 2002). The fruit are more apparent when dried, and the presence of these tubercles at the base of the fruit separates Little Aguja pondweed from the other two more common pondweeds, as well as its rhizomes, which anchor Little Aguja pondweed during turbulent floods (Fernald 1932, Whittall et al. 2002). The unique fruits are "unlike those of any other American species but strongly suggest those of a western Eurasian and African plant" (Fernald 1932).

Habitat for Little Aguja pondweed is still or slowly-flowing water of pools in intermittent creeks, rooted in sand and gravel derived from igneous rocks of surrounding mountain slopes. These pools are dominated by pondweeds. Little Aguja pondweed flowers between May and October. Threats to the species include both a prolonged drought and/or flooding event, very limited range, and small populations (FWS 1994, Whittall et al. 2002).

Lloyd's Mariposa Cactus

On November 06, 1979, Lloyd's Mariposa cactus was designated as threatened without critical habitat (44 FR 64247-64250). This species is known from the Big Bend Region of southwestern Texas and from adjacent Coahuila, Mexico. Confirmed localities in Texas include the Terlingua-Lajitas area, BBNP, Black Gap Wildlife Management Area (BGWMA), the Lower Canyons of the Rio Grande Wild and Scenic River, and private ranches north of the BGWMA (Anderson and Schmalzel 1997, McKinney 1998). In Mexico, the species occurs as far south as the Cuatro Cienegas Basin and as far east as Cima de la Muralla, located south of Monclova, Coahuila, 233 miles southeast of Big Bend (Anderson and Schmalzel 1997).

Lloyd's Mariposa cactus consists of a single, 1 to 4 inches tall, egg-to-golf ball-shaped, blue-green, ribless stem approximately 1 to 3 inches wide. The 0.25-inch long, broad tubercles protrude 0.12 inch from the stem. The spines, which distinguish this species from its closest relatives, are very thin and hide the stem. The 0-4 tan central spines have chalky blue or brown tips. The lower ones are 0.2 inch long and curve downward, while the upper ones are 0.6 to .8 inches long, needle-like, and curve upward. There are 25-35 white-to-gray, straight, needle-like outer spines, which are 0.2-.4 inches long, spread evenly and parallel to the stem, and are arranged like the teeth of a comb (Poole and Riskind 1987).

Lloyd's mariposa cactus usually occurs among low shrubs and rosette-forming perennials in gravelly or rocky soils of the following series: Chamberino, Lajitas, Lozier, Mariscal, Pantera, Solis, Tornillo, and Upton-Nickel. The species is found on arid limestone hills and slopes, occasionally on valley floors, in the Chihuahuan Desert. Although it is mostly grows on the Boquillas Formation, it is also found on the following formations: Santa Elena, Sue Peaks, Del Carmen, Telephone Canyon, Boquillas, Del Rio Clay, Glen Rose, Aguja, and Pen. Lloyd's Mariposa cactus occurs in relatively high densities on suitable outcrops in the Big Bend area of Brewster County, Texas and southeastward into Coahuila, Mexico usually at elevations between 2500-3500 feet (Anderson and Schmalzel 1997, FWS 1989).

Associated plant species consist of low shrubs and rosette forming perennials which include creosotebush (*Larrea tridentata*), lechugilla (*Agave lechuguilla*), ocotillo (*Fouquieria splendens*), leatherstem (*Jatropha dioica*), candelilla (*Euphorbia antisyphilitica*), boquillas silverleaf (*Leucophyllum candidum*), smooth sotol (*Dasyilirion leiophyllum*), rough falseagave (*Hechtia scariosa*), wooly butterflybush (*Buddleia marrubiiifolia*), chino grama (*Bouteloua breviseta*), plume tequilial (*Tiquilia greggii*), falsemesquite (*Calliandra conferta*), range ratany (*Krameria glandulosa*), fluffgrass (*Erioneuron pulchellum*), spikemoss (*Selaginella* sp.), Boke's button cactus (*Epithelantha bokei*), living rock (*Ariocarpus fissuratus*), and bunched cory cactus (*Coryphantha ramillosa*).

Threats include mining (mercury, coal, petroleum are found in the Boquillas Formations), habitat disturbance by off-road vehicles in the Lajitas-Terlingua region, collecting, and modification/destruction of habitat from future residential development including vacation homes and ranchettes. According to the Federal Register (listed above), ranching practices were not considered as threats to the plants at the time; however, future ranching practices were mentioned as potential effects.

Nellie Cory Cactus

On November 07, 1979, Nellie cory cactus was listed as endangered (44 FR 64738-64740). Globally rare and endemic to a few low mountain ranges in Brewster County, Nellie cory cactus can be found on novaculite outcrops in full sun among sparse Chihuahuan Desert scrub, usually among chips of novaculite. Associated species include chino grama (*Bouteloua breviseta*), fluffgrass (*Erioneuron pulchellum*), Peruvian spikemoss (*Selaginella peruviana*), creosote bush (*Larrea tridentata*), lechuguilla (*Agave lechuguilla*), smooth sotol (*Dasyilirion leiophyllum*), skeleton-leaf goldeneye (*Viguiera stenoloba*), whitethorn acacia (*Acacia constricta*), soap tree yucca (*Yucca elata*), Spanish dagger (*Yucca torreyana*) *sacahuista*, (*Nolina texana*), and purple pricklypear (*Opuntia violacea*).

Flowering from March through June, the unusual spines (dense and strongly flattened), dwarf size, bright pink to reddish purple flowers, and narrow edaphic and geographic range distinguish Nellie cory cactus from all other cacti in Texas. In the field, it resembles desiccated deer scat. Stems are solitary, egg-shaped to short cylindrical, 0.5 to 1 inch long and 0.4 to 0.8 inches wide. Threats include collection pressures from avid cacti collectors.

Pecos (=puzzle) Sunflower

On October 20, 1999, Pecos (=puzzle, =paradox) sunflower was designated as threatened (64 FR 56581-56590). Globally rare, it is found in only two counties, Pecos and Reeves, in Texas. It is also located in New Mexico. An annual, ranging between 3- 6 feet tall, Pecos sunflower is restricted to saline, calcareous, heavy-textured soils in and around cienegas and other desert wetlands. In such landscapes it is usually most abundant on subirrigated terraces just above the wettest sites, which are generally dominated by Olney bulrush (*Scirpus olneyi*), and below the driest sites, which usually support alkali sacaton (*Sporobolus airoides*). Associates in this distinct zone include saltgrass (*Distichlis spicata*), clasping Flaveria (*Flaveria chlorifolia*), scratchgrass (*Muhlenbergia asperifolia*), Trans-pecos sea lavender (*Limonium limbatum*) and limewater brookweed (*Samolus ebracteatus*).

Pecos sunflower is superficially similar to several other sunflower species, but the combination of mostly glabrous stems, strongly three-nerved lanceolate leaves and lanceolate to ovate-lanceolate phyllaries, along with its fall flowering period, distinguish it from other common sunflowers. Most individuals are located within The Nature Conservancy preserve system and are protected from outside threats such as trampling and off-road use. The primary threat to this species is aquifer depletion or diversion of water from its habitat.

Sneed Pincushion Cactus

On November 7, 1979, the Sneed pincushion cactus was designated as endangered (44 FR 64741-64743). Its global range is restricted to the Franklin Mountains of Texas in El Paso County, and adjacent New Mexico. The habitat consists of dry limestone outcrops on rocky, usually steep, slopes in desert mountains, in Chihuahuan Desert succulent shrublands or grassland.

A similar species, *Escobaria tuberculosa* (formerly known as *Coryphantha strobiliformis*) occurs with, and is often mistaken for, *E. sneedii* var. *sneedii*. However *E. tuberculosa* has scarlet fruits, smaller seeds (.03 inches long), somewhat larger flowers, 1 to 1.2 inches long, a flowering time predominantly in May, a lack of giant lenticular druses, usually fewer spines per areole (6-8 centrals and 20-30 radials), spines not as white, several rows of naked tubercles at the base, and clumps composed of fewer and larger stems. Although *E. sneedii* var. *leei* does not occur within the range of *E. sneedii* var. *sneedii*, it can be distinguished with its reflexed and more numerous spines (62-95), and its smaller (1.4 to 4 inches in length and .5 to 1.2 inches in diameter) and more numerous (up to 250) stems. Threats include collection pressures, restricted range, and land development.

Terlingua Creek Cat's-eye

On September 30, 1991, Terlingua Creek cat's-eye was designated as endangered (56 FR 49634-49636). Endemic to the Chihuahuan Desert of Trans-Pecos Texas, Terlingua Creek cat's-eye is located in Southern Brewster County. All known occurrences are in the Terlingua Creek watershed just north of Big Bend National Park.

Terlingua Creek cat's-eye is a strong, silvery or cinereous perennial with 1-several stems from a high-domed caudex. The stems are 2 to 10 inches tall and .4 to 1 inch wide, with minute appressed

hairs and less numerous spreading bristles. It is closely related to Palmer's Cryptantha (*Cryptantha palmeri* (*C. coryi*) and Payson's Cryptantha (*C. paysonii*), both of which occur in West Texas. In *C. palmeri*, the inflorescence (at maturity) is an open thyse (compact cylindrical spike) composed of 3-4 scorpioid cymes (round-topped curved ends in which the terminal flowers bloom first), whereas in *C. crassipes* the inflorescence is capitata (head-like).

Terlingua Creek cat's-eye is found in a distinct plant community of sparse vegetation that develops on low, seemingly barren, xeric hills of gypseous clay and chalky shales of the Boquillas Formation. Other components of this plant community include Havard's wild-buckwheat (*Eriogonum havardii*), bushy wild-buckwheat (*E. suffruticosum*), perennial spurge (*Chamaesyce perennans*), Schott acacia (*Acacia schottii*), ringstem (*Anulocaulis* sp.), rough coldenia (*Tiquilia hispidissimum*), bigbend woodyaster (*Xylorhiza wrightii* (*Machaeranthera wrightii*), longstalk greenthread (*Thelesperma longipes*), tubular slimpod (*Amsonia longiflora*), shaggy stenandrium (*Stenandrium barbatum*), creosote bush (*Larrea tridentata*), feather dalea (*Dalea formosa*), range ratany (*Krameria glandulosa*) and damianita (*Chrysactinia mexicana*). Threats include black fungus, prolonged drought conditions, off-road vehicle use, very narrow habitat preference, few populations, extremely restricted range, and adjacent mining activities.

Texas Poppy-Mallow

On January 13, 1981, Texas poppy-mallow was designated as endangered (46 FR 3184-3186). Globally known from only three counties, Coke, Mitchell, and Runnels, it is endemic to the upper Colorado River watershed on ancient and contemporary midslope terraces. Only two populations have more than 100 individuals. Additionally, with the exception of plants occurring on state highway rights-of-way, all populations are on privately owned lands with few formal protection measures in place.

Flowering between April and June, Texas poppy-mallow is a perennial with stiffly erect stems up to 3.3 feet tall from a slender unbranched taproot. The green parts of the plant (stems, petioles, leaves) are densely covered with stellate (star-shaped) hairs. The plant is topped by an inflorescence of large fuschia cup-shaped flowers. In contrast, the more common purple winecup (*Callirhoe involucrata*) is a much smaller plant with normally trailing, rather than erect, stems, and tall winecup (*Callirhoe leiocarpa*) has erect stems but lacks both the involucl (small bracts immediately beneath the calyx) and the stellate pubescence of *C. scabriuscula* (Amos 1979).

Suitable habitat for this plant consists of grasslands with open mesquite or oak woodlands on deep loose sands of the Tivoli Series. These soils are sandy and sometimes as deep as 8 feet. Common associates include Arkansas lazydaisy (*Aphanostephus skirrhobasis*), mala mujer (*Cnidoscolus texanus*), Engelmann's evening-primrose (*Oenothera engelmannii*), fourpoint evening-primrose (*O. rhombipetala*), Drummond's phlox (*Phlox drummondii*), roundleaf scurfpea (*Pediomelum rhombifolium*), fringed signalgrass (*Urochloa ciliatissima*), sandbur (*Cenchrus incertus*), hooded windmill grass (*Chloris cucullata*), sand dropseed (*Sporobolus cryptandrus*), giant dropseed (*S. giganteus*), broadleaf milkweed (*Asclepias latifolia*), Texas cryptantha (*Cryptantha texana*), Texas spreadwing (*Eurytaenia texana*), hoary milkpea (*Galactia canescens*), Georgia sunroae (*Helianthemum georgianum*), camphorweed (*Heterotheca subaxillaris*), yellow woollywhite (*Hymenopappus flavescens*), wild four o'clock (*Mirabilis albida*) and Texas sleepy daisy (*Xanthisma texanum*).

Because it is restricted to approximately ten known populations, threats are high. Population size and vigor have been in decline since monitoring began nearly 20 years ago. It is a short-lived plant and recruitment is low. Threats to seed production include deer browsing, small mammal and insect herbivory. Over the past five years, a lack of precipitation and an increase in flower and fruit predation by whitetail deer (*Odocoileus virginianus*) have greatly accelerated the decline. Additionally, with persistent drought conditions, the vigor of the populations could continue to decline.

Texas Snowbells

On October 12, 1984, Texas snowbells was designated as endangered (49 FR 40038). Globally rare and endemic to the Edwards Plateau of Texas, this species is known to occur in three counties: Edwards, Real, and Val Verde. It has been introduced in Kinney County in the last ten years.

Habitat for this species is usually along perennial streams in canyon bottoms and is now restricted to limestone bluffs, boulder slopes and cliff faces, due to local browsing pressure. Many plants occur on level terrain and some are located on lower gravelly intermittent streambeds which is evident in Val Verde County (D. Bamberger pers. comm. 2003, C. Delmatier pers. comm. 2003, J. Poole pers. comm. 2004). These canyons are usually exposed to full sun or in partial shade of evergreen-deciduous woodlands. Associate plant species include agarita (*Berberis trifoliolata*), Ashe juniper (*Juniperus ashei*), egg-leaf silk tassel (*Garrya ovata*), guajillo (*Acacia berlandieri*), live oak (*Quercus fusiformis*), Spanish oak (*Quercus texana*), Texas mountain laurel (*Sophora secundiflora*), Texas persimmon (*Diospora texana*), and woolly-bucket bumelia (*Bumelia lanuginosa*).

Flowering between late March and late April, Texas snowbells is a slender, spreading, deciduous shrub, as tall as 20 feet. It can be confused with three other Texas subspecies of *Styrax platanifolius*, but differs from them in leaf characters. In subsp. *texanus*, the leaf margin is usually smooth and the lower leaf surface is completely and densely covered with white or silvery pubescence. The upper leaf surface is essentially without hairs (glabrous) and the young twigs have a waxy surface. In comparison, subsp. *platanifolius* and subsp. *stellatus* have irregular leaf margins and the lower leaf surface is either glabrous (in subsp. *platanifolius*) or relatively sparsely stellate-pubescent (in subsp. *stellatus*). Subsp. *youngiae* does have a densely pubescent lower leaf surface, but the upper leaf surface and young twigs have stellate hairs (star-shaped). Common redbud (*Cercis canadensis*) can be easily mistaken for Texas snowbells, but redbud has a glabrous lower leaf surface and a different venation pattern. Threats to this taxon include browsing by introduced exotic ungulates, domestic and feral goats, and overabundant white-tailed deer populations; few populations with few individuals within populations; and flooding.

Texas wild-rice

On April 26, 1978, Texas wild-rice was listed as endangered (43 FR 17910) with critical habitat designated on July 14, 1980 (45 FR 47355-47364). Globally rare and restricted to one river system in central Texas, this submerged aquatic species occurs along a short stretch of the San Marcos River in Hays County and is one of the rarest plant species in Texas. Texas wild-rice was

first collected from the San Marcos River in 1892 by G. C. Nealley, and the population still persists. No other populations, historical or extant, are known.

A perennial, Texas wild-rice occurs as a submersed aquatic plant in flowing water, with only the upper portions emergent. The culms are decumbent and root at the nodes. Flowering specimens are not likely to be confused with any other species. American eelgrass (*Vallisneria americana*) and arrowhead (*Sagittaria* spp.) occur in the San Marcos River and have long linear submersed leaves vaguely similar to those of Texas wild-rice. However, the leaves of those species lack a strong midvein, which is conspicuous on Texas wild-rice.

Habitat for this species is clear, cool, rapidly-flowing water of the spring-fed San Marcos River, primarily in water less than 3 feet deep, usually where substrates are coarse sandy soils rather than finer clays. Threats include aggressive invasive aquatic plants, such as hydrilla (*Hydrilla verticillata*), watercress (*Rorippa nasturtium-aquaticum*), water hyacinth (*Eichhornia crassipes*), and water trumpet (*Cryptocoryne beckettii*), and degradation to the quantity and quality of water in the San Marcos River.

Tobusch Fishhook Cactus

On November 07, 1979, Tobusch fishhook cactus was listed as endangered (44 FR 64736-64738) without critical habitat. Globally rare, Tobusch fishhook cactus occurs in eight counties along the southern part of the Edwards Plateau: Bandera, Edwards, Kerr, Kimble, Kinney, Real, Uvalde, and Val Verde Counties. Only a few of the known populations have a significant concentration of individuals; most populations have single individuals or occur as small scattered populations. Based on field observations, populations with less than ten individuals are not stable, and more than half of the known populations are of this size (Poole and Janssen 2002).

Tobusch fishhook cactus is a small, low-growing, tuberculate (nodules) cactus with one central hooked spine, endemic to the south-western Edward's Plateau (Poole and Calvert 2003, Emmett 1995). Plants reach reproductive age at approximately 0.8 inches tall and have a life expectancy of 10 years. Most plants range between .8 to 2 inches tall, although plants may exceed 4 inches (Poole and Calvert 2003). Flowers are yellow ranging from 1.2 – 1.5 inches and develop at the top of the tubercles (FWS 1987 b). The flowering season begins in late winter and early spring following a south to north gradient. Geographically, flowering begins in the southern portion of the range (Kinney County) between late January and early February; early February in Val Verde County; in the northern portion of the range flowering occurs in mid-February in Real and Bandera counties; late February in Edwards County; and early March in Kerr and Kimble Counties. Periods of cold weather may delay flowering periods and cloudy conditions may cause the flowers to not open. Typically, flowers open at mid-morning and stay open during daylight in sunny weather and are viable for up to one week (Poole and Calvert 2003). Fruiting is also contingent upon stochastic events, but usually fruits develop immediately following pollination. Fruits mature in approximately 10 weeks, at which time dispersal commences. Fruits are green and occasionally have a pink tinge (Emmett 1995) persisting up to 3 months post flowering (Poole and Calvert 2003). Mature seeds are papillate and black with dimensions of .06 inches long, .06 inches broad, and .4 inches thick (Emmett 1995). Tobusch fishhook cactus has a slow rate of growth, relatively long generation times, limited distance dispersal, and a non-substantial seed bank (Poole and Janssen 2002). Healthy plants generally have a green stem with

straw-colored spines. Younger individuals have bright yellow spines. Unhealthy plants typically have reddish or yellowish stems and drab gray spines. These plants may cease producing flowers and if they do produce flowers, the fruits abort (Poole and Calvert 2003).

Once thought to occur only in floodplains and stream terraces, surveys within the last 20 years have revealed that the habitat profile is somewhat wider with discontinuous patches of very shallow, moderately alkaline, rocky loams, clay loams, or clays (primarily of the Tarrant, Ector, or Eckrant series) underlain by massive fractured limestone (usually the Edwards formation). Individual plants may be somewhat protected by rocks, grasses, or spikemosses (*Selaginella* spp.). This habitat is quite patchy, with openings scattered within a mosaic of live oak-juniper woodlands, shrublands, and grasslands (Poole and Janssen 2002). Often on level to slightly sloping hill or ridge tops, Tobusch fishhook cactus is also occasionally located on ledges or other relatively level areas on steeper slopes, and in rocky floodplains. Such sites are usually open with only herbaceous cover such as grasses and forbs.

The flowering period is relatively short, between late January and March (rarely April) depending on local environmental conditions such as temperature. Tobusch fishhook cactus is a small cylindrical cactus with one hooked central spine. While in flower, it can be easily distinguished with its bright clear yellow flowers as compared to a similar, closely related fishhook cactus, *Sclerocactus brevihamatus* spp. *brevihamatus*, which has dusky rose to pale yellow flowers. When not in flower, the closely related fishhook cactus can be identified by its larger size and a greater number of radial spines. The range of these species coincides in Kinney and Val Verde Counties and they can hybridize in the western edge of the Tobusch fishhook cactus range. In addition to flower color, these two species may differ in their habitat preferences. Tobusch fishhook cactus is usually found in Edward's Plateau vegetational communities such as live-oak juniper woodlands and *A. brevihamatus* is found in South Texas Plains vegetational communities, such as cenizo shrublands, although there is overlap between the two habitat types. Smaller Tobusch fishhook cactus has adapted a stress avoidance mechanism, as they may retreat below the soil surface during drought, reemerging when stress is alleviated (Poole and Janssen 2002). Small, solitary halictid bees and honey bees (*Apis mellifera*) (Emmett 1995) and butterflies are suspected to be the primary pollinators. Seed dispersal occurs over short distances and in addition to ants (*Forelius foetidus*); dispersal is affected by rainwater, gravity, and mammal and bird frugivory.

Although most causes of mortality are unknown and population trends are difficult to predict with current available data, threats do include insect predation by a host specific weevil, the Tobusch fishhook cactus weevil (*Gersteckaria* sp. nov.). As the cactus weevil larvae mature, they consume the stem. When the larvae exit, they leave holes or chambers (Poole and Calvert 2003). In contrast to the Tobusch fishhook cactus weevil, the much larger larvae of the longhorn beetle (*Moneilema crassum*) may also cause damage. Up to five *Gersteckaria* larvae have been observed within one stem, whereas only one *Moneilema* larvae can fit in this same area. *Moneilema* larvae hollow out the stem creating a large exit hole. This insect has inflicted up to 10% mortality in certain observation plots. Fly larvae of an unknown species have been located in dead cacti, at three sites (Devils River, Kickapoo, Los Rincones, and Lost Maples) and were responsible for less than 10% mortality. Another unknown small species of ant has been found in various populations including Lost Maples. This small ant generated a 1% mortality by using the cactus as a structure to build mounds. This results in complete coverage of the cactus for up

to two years. Occasionally, the spines, flowers, or fruits may protrude. When the mound dissipates, the cactus is usually eliminated (Poole and Calvert 2003). Other general threats include trampling by humans and animals, fungal infections, herbivory, and prescribed burning during the flowering and fruiting period.

III. Effects of the Action

After consideration of all potential effects on listed species from implementing brush management activities (involving management of the four brush species) through the 2002 Farm Bill Programs, NRCS (with input from the Brush Consultation Workgroup) has made the following “effect” determinations:

A. NRCS has concluded that the proposed action’s potential effects on the following species would be completely beneficial, and therefore, are not likely to adversely affect these species:

Edward’s Aquifer-Dependent Species

2002 Farm Bill conservation actions to remove (control) juniper (in accordance with NRCS conservation practice standards and specifications) over the recharge zone of the Edward’s Aquifer is anticipated to contribute to recharge of the aquifer. The following spring and aquifer-dependent species at New Braunfels and San Marcos will likely benefit from this enhanced aquifer recharge:

- Comal Springs dryopid beetle
- Comal Springs riffle beetle
- Fountain darter
- San Marcos salamander
- Texas blind salamander

Devils River Minnow

2002 Farm Bill conservation actions to remove juniper and salt cedar in the Devils River drainage will likely benefit the Devils River minnow by increasing base flows in the river.

Arkansas River Shiner

2002 Farm Bill conservation actions to remove salt cedar, honey mesquite and redberry juniper will likely benefit this species by conserving water to the benefit of base river flow. EPA-registered herbicides are applied in accordance with product label instructions. Mechanical brush removal that might contribute to soil erosion and stream sedimentation is not conducted below the cut-banks of rivers and streams. Stream bank activities are setback to avoid erosion and ensure safety of equipment operators. Target brush species are removed by tree dozing, grubbing or hydraulic shears followed by treatment of stumps with EPA-registered herbicides.

Desert Spring Fishes

The following fishes will likely benefit from 2002 Farm Bill conservation actions to remove salt cedar and conserve water:

Comanche Springs pupfish
Leon Springs pupfish
Pecos gambusia

Additionally, NRCS conservation practices applied to cropland to conserve water, including Irrigation Water Conveyance (430 EE), Irrigation Land Leveling (430 DD), Irrigation Land Levelling (464) and Irrigation System, Microirrigation (441), will benefit these species by reducing water withdrawals for irrigation purposes.

Concho Water Snake

2002 Farm Bill funds are expended to control the four targeted brush species in the drainages of the Concho and Colorado Rivers. Application of Arsenal to control salt cedar along the rivers and major tributaries is cost-shared, and the product is applied in accordance with its EPA-registered label. The remaining three brush species are managed throughout the drainages in accordance with NRCS conservation practices, primarily brush management, prescribed burning, range planting, and prescribed grazing. The effect of these NRCS actions would likely be beneficial to the Concho water snake by reducing water usage attributed to salt cedar and improving water quality throughout the drainages entering the rivers and tributary streams.

Texas Wild Rice

2002 Farm Bill conservation funds will not be expended near the upper two miles of the San Marcos River in Hays County, where this species is known to occur. Juniper removal in accordance with NRCS conservation practice standards over the recharge zone of the Edwards Aquifer will contribute to recharge of the aquifer. Texas wild rice at the headwaters of the aquifer-fed San Marcos River will likely benefit from this enhanced aquifer recharge.

Based on the information provided in the BA, the FWS concurs with NRCS's 'not likely to adversely affect' determination for the federally listed species in Section III A.

B. NRCS has concluded the proposed action would have “no effect” for the following species:

Texas Snowbells

2002 Farm Bill funds will not be expended in areas where this species is known to occur - limestone bluffs, boulder slopes, and cliff faces, usually along perennial streams in canyon bottoms, in full sun or in partial shade of diverse evergreen-deciduous woodlands in Edwards, Kinney, Real and Val Verde Counties. NRCS personnel have been trained to identify the habitat where this species may occur and are directed to only provide assistance, including conservation practices listed in Section I, so that there is no effect to the species habitat.

Trans-Pecos Species

2002 Farm Bill funds will not be expended in areas where the following are known to occur:

- Chisos Mountain hedgehog cactus
- Bunched cory cactus
- Davis' green pitaya
- Hinckley's oak
- Little Aguja pondweed
- Lloyd's mariposa cactus
- Nellie cory cactus
- Pecos (= puzzle) sunflower
- Sneed pincushion cactus
- Terlingua Creek cats-eye

NRCS personnel in Brewster, El Paso, Jeff Davis, Pecos, Presidio and Reeves Counties have been trained to identify the habitat where these species may occur and are directed to provide assistance, including conservation practices listed in Section I, so that there is no effect to the species habitat.

Ashy dogweed

To avoid adverse effects to this species, the Grazing Land Mechanical Treatment (code 548) and mechanical Brush Management (code 314) will not be applied in Webb County (west of IH-35) on soils of the Maverick and Catarina Series. However, if a survey, conducted by NRCS or its agents, finds no plants in an area planned for treatment, these practices may be implemented without constraint.

Johnston's frankenia

The closest known population of Johnston's frankenia is currently located southeast of Laredo, and is not inside the proposed NRCS action area (west of IH-35). Because of the close proximity to known occurrences and because there are known associated soil types northwest of Laredo, NRCS brush management of mesquite could occur in or near areas of this plant (Mary Orms, FWS, personal communication 2004). To avoid adverse effects to this species, the Grazing Land Mechanical Treatment (code 548) and mechanical Brush Management (code 314) will not be applied in Webb County (west of IH-35) on soils of the Maverick and Catarina Series. However, if a survey, conducted by NRCS or its agents, finds no plants in an area planned for treatment, these practices may be implemented without constraint.

Texas poppy-mallow

NRCS estimates 24,000 acres of the Tivoli soil series in Coke, Mitchell and Runnels Counties. To avoid adverse effects to the Texas poppy-mallow, NRCS will avoid known populations as determined from the TPWD plant database. On the remaining acreage of Tivoli soils, NRCS or its agents will survey sites during the flowering period to determine presence/absence prior to application of brush management. Training in plant identification will be provided by TPWD

botanists or other species experts. If the species is found, the extent of the population will be determined, and the site will be avoided.

Tobusch fishhook cactus

NRCS estimates 3.6 million acres of the Eckrant, Ector and Tarrant soil series in Bandera, Edwards, Kerr, Kimble, Kinney, Real, Uvalde and Val Verde Counties. To avoid adverse effects to the Tobusch fishhook cactus, NRCS will avoid known populations as determined from the TPWD plant database. On the remaining acreage of these three soil series, NRCS or its agents, will survey sites during the flowering period to determine presence/absence prior to application of brush management. Training in plant identification will be provided by TPWD botanists or other species experts. If the species is found, the extent of the population will be determined, and the site will be avoided.

C. NRCS has determined that the proposed action “may affect” the GCW and BCV

The current population and habitat status of the BCV and the GCW within each Recovery Unit are discussed below. Standards were developed here to enable consistent data summary and analysis. Thus, for each Recovery Unit a table of recent data is provided that identifies sites with known BCV or GCW populations, as well as sites with historic populations that are believed to still contain habitat. Populations in these tables are categorized as major (≥ 100 pairs), medium-sized (between 10 and 100 pairs), or small (≤ 10 pairs). Only data collected since 1998 (Maresh 1998) are presented (hereafter referred to as “recent data”) and used in estimates of overall abundance. In virtually all cases, data come from opportunistic searching with various degrees of thoroughness, the most reliable of which are summarized from territory mapping (e.g., Cimprich 2003). Areas lacking recent data are thus listed, even if a site is believed to have an extant population. Following status assessments for each species is an examination of current potential habitat identified within the action area.

Black-capped Vireo

Status of the species within the action area

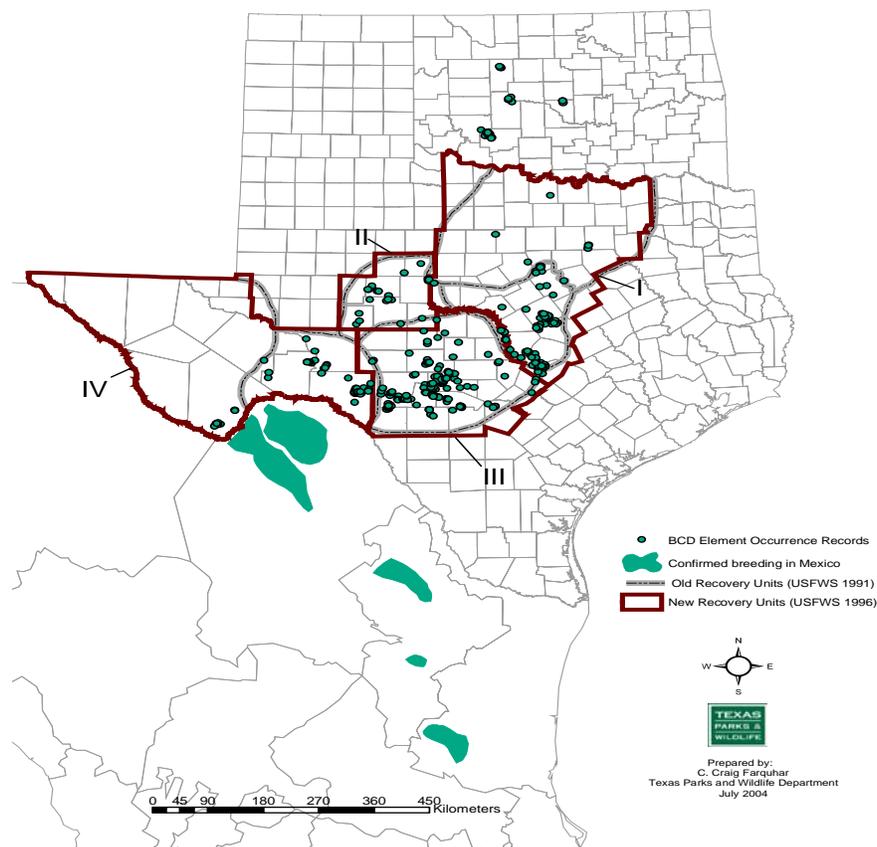
The action area for this species is determined to be all or part of 54 counties in Texas with current or historical BCV occurrence records (Figure 5). Data on the occurrence and distribution of BCVs in Texas is limited and incomplete. There have been few well-supported efforts to perform comprehensive surveys on the distribution and abundance of the BCV across the breeding range in Texas. Historically, access for surveys has been limited to managed areas, public roadways and a handful of privately owned lands.

Beginning in the early 1980s data on BCV occurrences have been entered sporadically into the TPWD’s Biological Conservation Database (BCD). Over a period of about 20 years a total of 304 Element Occurrence Records (EOR) were entered into the BCD. The overwhelming majority of these records are from managed areas such as military installations, state parks, and wildlife management areas. These data have some value in that they represent at least a partial distribution of the BCV and they show trends at locations that have been sampled repeatedly

over a number of years. In addition, these data can provide initial insight into a potential correlation between BCV occurrence and underlying soils and geology.

A compilation of earlier extant statewide survey data from private, state and federal managed areas (Farquhar 1998) revealed a total of 1,656 individual BCVs had been counted across all Recovery Units. Additional detail on the population status and history at individual managed areas is available as a result of ongoing survey and monitoring efforts on a few of these sites. Current information from these sites, for the most part, has not been entered into the BCD. In fact, with the exception of the annual report by The Nature Conservancy for Fort Hood, very little documentation is available on the current status of the BCV on managed areas. This information is primarily available through personal communication with individual site managers.

Figure 5. Recovery Unit boundaries and occurrence data for BCVs in Texas (BCD data) and Mexico (Farquhar et al., 2003).



Recovery Unit 1 – North-central Texas – Current Status

This unit consists of 20 counties that are all, or partially in the action area: Bell, Bosque, Brown, Burnet, Coleman, Comanche, Coryell, Dallas, Erath, Hamilton, Hood, Johnson, Lampasas, Mills, Palo Pinto, Parker, Somervell, Stephens, Travis, and Williamson. Based on the data presented in the Table 5 at least 2,015 males are using habitat in this Recovery Unit.

Table 5. BCV population estimates for Recovery Unit 1.		
Area of Habitat	Population	Source of Information
Major Populations		
Fort Hood Military Post (Bell and Coryell counties)	1,847 pairs ¹	Cimprich 2003
Balcones Canyonlands National Wildlife Refuge (Burnet, Travis, and Williamson counties)	At least 100 pairs	Chuck Sexton pers. comm. 2004
Medium-sized Populations		
LCRA Canyon of the Eagles (Burnet Co.)	23 males	Melanie Pavlas pers comm. 2004
Quail Ridge Ranch (Somervell Co.)	16 pairs	Gray and Maresh 2004
Balcones Canyonlands Preserve Sites (Travis County/City of Austin)	12 pairs	Patty Ramirez pers. comm. 2004
Small Populations		
County Road 419 (Coleman Co.)	6 males	Maresh and Rowell 2000
Fossil Rim Wildlife Center (Somervell Co.)	3 males	Pinkston et al. 2002
Dinosaur Valley State Park (Somervell Co.)	No recent data available for the park. 2 pairs observed on adjacent private property.	Pinkston et al. 2002
Spring Gap Road (Callahan Co.)	2 males	Texas BCD 2004
State Highway 16 (Palo Pinto Co.)	1 pair	Texas BCD 2004
County Road 2130 (Bosque Co.)	1 pair	Maresh and Rowell 2000
County Road 158 (Coryell Co.)	1 male	Maresh and Rowell 2000
Private Ranch near Forestburg (Montague Co.)	1 pair (not observed in 2003 or 2004)	Hugh Garnett pers. Comm... 2004
Possum Kingdom State Park (Palo Pinto Co.)	No recent data available for the park.	

Recovery Unit 2- Edwards Plateau – Current Status

This unit consists of 21 counties that are all in the action area: Bandera, Bexar, Blanco, Comal, Edwards, Gillespie, Hays, Kendall, Kerr, Kimble, Kinney, Llano, Mason, McCulloch, Medina, Menard, Real, San Saba, Schleicher, Sutton, and Uvalde. Based on the data Table 6 at least 1,084 males are using habitat in this Recovery Unit.

¹ Cimprich (2003) reported that field crews detected 1,847 male BCV's during surveys in the spring and summer of 2002 and 2003. Surveys covered 74,879 ha (most of the installation) and mapped 6,971 ha of habitat (9.3% of the surveyed area).

Table 6 . BCV population estimates for Recovery Unit 2.		
Area of Habitat	Population	Source of Information
Major Populations		
Kerr Wildlife Management Area (Kerr Co.)	435 males	Craig Farquhar pers. comm. 2004
RM 674 (Edwards Co.)	135 males	Doug Booher pers. Comm... 2004
Kickapoo Caverns State Park (Edwards Co.)	115 males	Craig Farquhar pers. comm. 2004
Medium-sized Populations		
Private Ranch near Campwood (Real Co.)	85 males	Patty Ramirez pers. comm. 2004
Mason Mountain Wildlife Management Area (Mason Co.)	76 males	Craig Farquhar pers. comm. 2004
Dobbs Run Ranch (Edwards Co.)	59 males	Environmental Defense 2004
Buck Wildlife Management Area (Kimble Co.)	35 males	Craig Farquhar pers. comm. 2004
City of San Antonio Rancho Diana (Bexar Co.)	32 males	Eric Lautzenheiser pers. comm.. 2004
Dobbs Mountain Ranch (Edwards Co.)	15 pairs	Maresh 2003
Private Ranch near Johnson City (Blanco Co.)	14 males	Texas BCD 2004
US Highway 83 (Real Co.)	13 males	Texas BCD 2004
Colorado Bend State Park (San Saba Co.)	11 males	Lockwood and Hernandez 2001
Love Creek Preserve	10 males	Elliott 2004
Cedar Creek Road/County Road 201 (Edwards Co.)	10 males	Maresh and Rowell 2000
Camp Bullis Military Reservation (Bexar Co.)	No recent data available	
Lost Maples State Park (Bandera Co.)	No recent data available	
Small Populations		
Private Ranch near San Saba River (Menard Co.)	8 males	Texas BCD 2004
Hill Country State Natural Area (Bandera Co.)	7 males	Lockwood and Hernandez 2000
US Highway 83/Texas Highway 41 (Kerr, Edwards and Real Co.'s)	6 males	John Maresh pers. Comm... 2004
James River Road (Mason Co.)	4 males	Texas BCD 2004
County Road 204 (Edwards Co.)	3 males	Maresh and Rowell 2000
Private Ranch near Montell (Uvalde Co.)	2 males	Texas BCD 2004
FM 1826 and FM 967 (Hays Co.)	2 males	Texas BCD 2004
Heuermann Road (Bexar Co.)	2 males	Texas BCD 2004
FM 503 (McCulloch Co.)	1 male	Texas BCD 2004
FM 1311 (McCulloch Co.)	1 male	Maresh and Rowell 2000
US 377 at South Llano River overlook (Edwards Co.)	1 male	Texas BCD 2004
Private property near Oxford (Llano Co.)	1 male	Texas BCD 2004
US Highway 277 (Sutton Co.)	1 male	Maresh and Rowell 2000

Recovery Unit 3 - Concho Valley – Current Status

This unit consists of eight counties that are all in the action area: Coke, Concho, Irion, Nolan, Runnels, Sterling, Taylor, and Tom Green. Based on the data in Table 7, at least 32 males use habitat in this Recovery Unit.

Table 7. BCV population estimates for Recovery Unit 3.		
Area of Habitat	Population	Source of Information
Major Populations		
None known		
Medium-sized Populations		
None known		
Small Populations		
Texas Highway 208 (Coke Co.)	8 males	Maresh and Rowell 2000
Camp Berkeley (Taylor Co.)	7 pairs	Scott Turner pers. comm. 2004
FM 2034 (Tom Green Co.)	4 males	Maresh and Rowell 2000
Private ranch near Hylton (Nolan Co.)	3 males	Scott Turner pers. comm. 2004
FM 2034 (Coke Co.)	3 males	Maresh and Rowell 2000
County Roads 189 and 194 (Runnels Co.)	2 males	Maresh and Rowell 2000
Susan Peck Road (Tom Green Co.)	2 males	Maresh and Rowell 2000
Buffalo Gap/Face Mountain (Taylor Co.)	1 male	John Maresh pers. comm. 2004
US Highway 83 (Concho Co.)	1 pair	Texas BCD 2004
Mountain Road (Coke Co.)	1 male	Maresh and Rowell 2000
Walnut Creek Ranch (Coke Co.)	None observed in 2004	John Maresh pers. comm., 2004

Recovery Unit 4 - Southwest and Trans-Pecos – Current Status

This unit consists of five counties that are all in the action area: Brewster, Crockett, Pecos, Terrell, and Val Verde. Based on the data in Table 8 at least 265 males are using habitat in this Recovery Unit.

Table 8 . BCV population estimates for Recovery Unit 4.		
Area of Habitat	Population	Source of Information
Major Populations		
None known		
Medium-sized Populations		
Devils River State Natural Area (Val Verde Co.)	78 males	Craig Farquhar pers. comm. 2004
Oasis and Cañon Ranches (Terrell County)	60 pairs	Lee Elliott pers. comm. 2004
US Highway 277 (Val Verde Co.)	43 males	Texas BCD 2004
Dolan Falls Ranch Preserve (Val Verde Co.)	40 males	Craig Farquhar pers. comm. 2004
Chandler Independence Creek Preserve (Terrell Co.)	26 males	Maresh 2004
Big Bend National Park	16 pairs	John Maresh pers. comm. 2004
Small Populations		
Texas Highway 290 (Crockett Co.)	1 male	John Maresh pers. comm. 2004
FM 2083/Howard Draw Road (Crockett Co.)	1 male	Maresh and Rowell 2000

Habitat Assessment

To date there have been no published range-wide investigations of potential or occupied BCV habitat. Remote sensing efforts have generally been avoided due to the limitations the current technology has on distinguishing canopy-to-ground foliage cover suitable for nesting and foraging requirements.

BCV roadside survey data collected from 53 counties included in the action area between July 1996 and August 1998 (Maresh and Rowell, 2000) was relied upon as part of the assessment technique. The purpose of the Maresh and Rowell (2000) study was to assess the availability and occupancy of BCV habitat along public roadways in each county known or suspected to contain breeding BCVs. Secondary roadways were targeted to minimize the influence of disturbance. In each of the counties two 30 mile transects were located in areas of known or suspected BCV habitat. Areas with well documented, recent observations of BCVs (*e.g.* Fort Hood Military Reservation) were generally avoided. If no historic record or local knowledge was available for a given county, topographic and soils maps were studied and transects were placed through areas with potential for occupied habitat. No survey was performed in Dallas County, although BCVs have been recorded there. To estimate habitat in Dallas County for this assessment 1:24,000 USGS topographic maps of areas known to have BCV occurrence records were examined and potential habitat was estimated.

Using the percentage of potential habitat area estimated from road transects and USGS topographic maps an extrapolation to the land area of each county was performed. The table below gives values of Texas county land area, suitable habitat area, percent suitable habitat area, and 3.5% of suitable habitat area values. If no roadside habitat segments were recorded from Maresh and Rowell (2000) then an evaluation of recent site visits combined with examination of USGS topographic maps of the area were utilized to estimate potential habitat area.

In the opinion of the experts in the Workgroup, annual impacts to 3.5% of potential suitable BCV habitat within each recovery unit would not impair the recovery of the species. The information contained in Table 9 indicates the amount of potential suitable habitat which occurs within each county and recovery unit and the 3.5% acreage total per county and recovery unit.

Table 9 . Approximate land area by county within each BCV recovery unit, estimated acreage of potential suitable BCV habitat, percent estimated habitat within county, and 3.5% of potential suitable BCV habitat.

RECOVERY UNIT/COUNTY	County Land Area (ac)	Potential Suitable Habitat (ac)	Potential Suitable Habitat (% of County)	3.5% of Potential Suitable Habitat (ac)
Unit 1				
BELL	611,325	11,004	1.8%	385
BOSQUE	632,814	7,594	1.2%	266
BROWN	603,915	36,235	6.0%	1,268
BURNET	637,260	11,683	1.8%	409
COLEMAN	806,208	20,155	2.5%	705
COMANCHE	599,963	10,999	1.8%	385
CORYELL	672,828	4,486	0.7%	157
DALLAS	580,549	900 ¹	0.2%	32
ERATH	695,058	15,060	2.2%	527
HAMILTON	534,508	9,799	1.8%	343
HOOD	269,724	3,147	1.2%	110
JOHNSON	466,583	0	0.0%	0
LAMPASAS	455,468	4,555	1.0%	159
MILLS	478,686	1,596	0.3%	56
MONTAGUE	590,662	100 ¹	0.2%	4
PALO PINTO	609,596	11,176	1.8%	391
PARKER	577,980	963	0.2%	34
SOMERVELL	119,795	1,198	1.0%	42
STEPHENS	572,299	7,631	1.3%	267
TRAVIS	632,814	6,328	1.0%	221
WILLIAMSON	718,276	9,577	1.3%	335
Unit 1 Total	11,866,311	174,185	1.47%	6,096
Unit 2				
BANDERA	506,597	7,599	1.5%	266
BEXAR	797,563	47,854	6.0%	1,675
BLANCO	454,974	2,275	0.5%	80
COMAL	359,138	3,591	1.0%	126
EDWARDS	1,356,030	70,062	5.2%	2,452
GILLESPIE	678,756	58,826	8.7%	2,059
HAYS	433,732	23,855	5.5%	835
KENDALL	423,852	4,945	1.2%	173
KERR	707,655	53,074	7.5%	1,858
KIMBLE	800,033	36,001	4.5%	1,260
KINNEY	872,157	62,505	7.2%	2,188
LLANO	597,987	1,993	0.3%	70
MASON	596,258	35,775	6.0%	1,252
MCCULLOCH	684,190	62,717	9.2%	2,195
MEDINA	849,433	62,292	7.3%	2,180
MENARD	582,920	30,118	5.2%	1,054
REAL	447,811	31,347	7.0%	1,097
SAN SABA	725,686	6,047	0.8%	212

RECOVERY UNIT/COUNTY	County Land Area (ac)	Potential Suitable Habitat (ac)	Potential Suitable Habitat (% of County)	3.5% of Potential Suitable Habitat (ac)
SCHLEICHER	838,318	1,397	0.2%	49
SUTTON	929,955	46,498	5.0%	1,627
UVALDE	995,657	29,870	3.0%	1,045
Unit 2 Total	14,638,702	678,641	4.6%	23,752
Unit 3				
COKE	575,016	25,876	4.5%	906
CONCHO	634,296	10,572	1.7%	370
IRION	672,581	0	0.0%	0
NOLAN	583,414	37,922	6.5%	1,327
RUNNELS	672,087	8,961	1.3%	314
STERLING	590,577	11,812	2.0%	413
TAYLOR	585,637	9,761	1.7%	342
TOM GREEN	973,674	17,851	1.8%	625
Unit 3 Total	5,287,282	122,753	2.3%	4,296
Unit 4				
BREWSTER	3,961,633	1,100 ¹	0.03%	39
CROCKETT	1,795,937	125,716	7.0%	4,400
PECOS	3,047,486	750 ¹	0.00%	26
TERRELL	1,508,182	2,514	0.2%	88
VAL VERDE	2,028,117	344,780	17.0%	12,067
Unit 4 Total	12,341,355	474,859	3.85%	16,620
TOTAL	44,133,650	1,450,438	3.29%	50,765

¹Habitat area determined from site visits and examination of USGS 1:24,000 topographic maps (J. Maresh, pers. comm.).

In the implementation of its 2002 Farm Bill conservation programs, NRCS will not fund projects on more than 50,765 acres (3.5%) of potential suitable habitat to ensure the recovery of the species is not impaired. This conservation effort will be further distributed among the 4 recovery units in proportion to the estimated amount of known suitable occupied habitat.

NRCS believes that the combination of practices normally incorporated into NRCS cost-share agreements (brush management, prescribed burning, prescribed grazing, range planting) and approved wildlife management plan will be self-mitigating through stimulating vegetation by disturbances and subsequently generating BCV habitat through succession. By assisting landowners with removal of junipers followed by application of management practices that discourage regrowth of these species, a long term increase in the approximate 1.5 million acres of potential suitable habitat of BCVs is anticipated.

The resource management systems planned by TPWD and NRCS in accordance with the NRCS guidelines (Enclosure 1) are expected to result in an increase of BCV habitat. Selective juniper removal, when combined with grazing management and prescribed fire, can be used to maintain and even create suitable habitat in the eastern and central portions of the range (Campbell 1995). While selective juniper control in BCV habitat may result in short-term adverse impacts, the long-term benefits are likely to result in improved habitat conditions on a landscape level when delivered through the 2002 Farm Bill conservation programs.

Practices such as fencing, livestock water pipeline construction, water storage facility construction, pond construction, water diversion construction, prescribed burning, prescribed grazing, and herbicidal brush management will be implemented in accordance to the NRCS developed guidelines for the BCV and the revised BCV management guidelines. BCV take as a result of these practices is not anticipated.

The following actions deviate from TPWD “no take” guidelines and may result in some adverse effects or “take” to the species, primarily in the form of harassment which could impair normal behavior patterns such as maintaining nesting territories, feeding, resting, etc.:

- 1) season of operation (August 1st - March 15th) for mechanical brush management (hydraulic shearing, chain sawing, tree-grubbing, and/or tree-dozing); and,
- 2) year-round hand-cutting utilizing hand tools in BCV habitat.

BCVs arrive in Texas from mid-March to mid-April and begin to migrate to wintering grounds on Mexico’s western coast in July, and are gone from Texas by mid-September (Campbell 1995). The BCV management guidelines recommend selective brush removal by mechanical means during the non-breeding season to keep BCV habitat in favorable condition and avoid disturbance of the birds. The season of operation proposed within the NRCS guidelines, beginning the last 31 days (August 1st - August 31st) of the nesting season and continuing through the first 15 days (March 1st- March 15th) of the onset of the nesting season, may have an effect on the BCV. The season of operation has the potential to temporally disrupt territory defense, breeding, and foraging (Campbell 1995). Since mechanical brush management should be a single event during the life of a cost-share agreement, it is anticipated that only temporal effects related to disruption, displacement, and/or harassment of the BCV will occur. Additionally, the management actions planned are expected to create and/or improve existing BCV habitat, self-mitigating initial disturbances of mechanical brush management during the life of contract.

BCV nesting habitat is usually associated with disturbance to vegetation, resulting in an earlier successional stage of growth. It has been speculated that BCV habitat, in the past, was presumably created by large natural disturbances (e.g., fires, tornadoes) to large areas on rocky substrates with shallow soils (Grzybowski 1995). Tree-grubbing and tree-dozing creates heavy disturbances to the topsoil and selectively clears vegetation from an area. The BCV recovery plan recognizes that such disturbances may create habitat for the species (FWS 1991). Hydraulic shearing, chain-sawing, and hand-cutting removes vegetation at ground level without seriously disturbing the topsoil (Ball and Taylor 2003); however, these practices may create the low, shrubby plants preferred by BCVs. The effects of mechanical brush management, stimulating vegetation by disturbances and subsequently generating habitat through succession (Koloszar et al. 2000), are self-mitigating and temporary in nature and should be followed by compatible land treatment practices.

Hand-cutting Ashe juniper and mesquite with hand tools, during the nesting season, may temporally disrupt territory defense, breeding, and foraging of the BCV (Campbell 1995). It is anticipated that this form of brush management will not be widely used due to the intensity of labor required. BCVs have been documented to nest in Ashe juniper; however, it is not a preferred nesting shrub (John Cornelius pers. comm. 2004). Therefore, although extremely

unlikely, destruction of a BCV nest and/or eggs could occur as a result of this work. Given that territory sizes range from one to 10 acres, mostly two to four acres (FWS 1991), it is believed that the BCV should have ample area to disperse in a secluded part of its territory to avoid disturbance. Additionally, areas containing BCVs have relatively few mature Ashe juniper and mesquite (Leyva et al. 2002). In fact, it has been documented that BCVs select Ashe juniper less than what would be expected, based on availability of Ashe juniper, for nesting (J. Cornelius pers. comm. 2004). Therefore, it is anticipated that in almost all cases only short-term effects in the form of harassment to the species will occur.

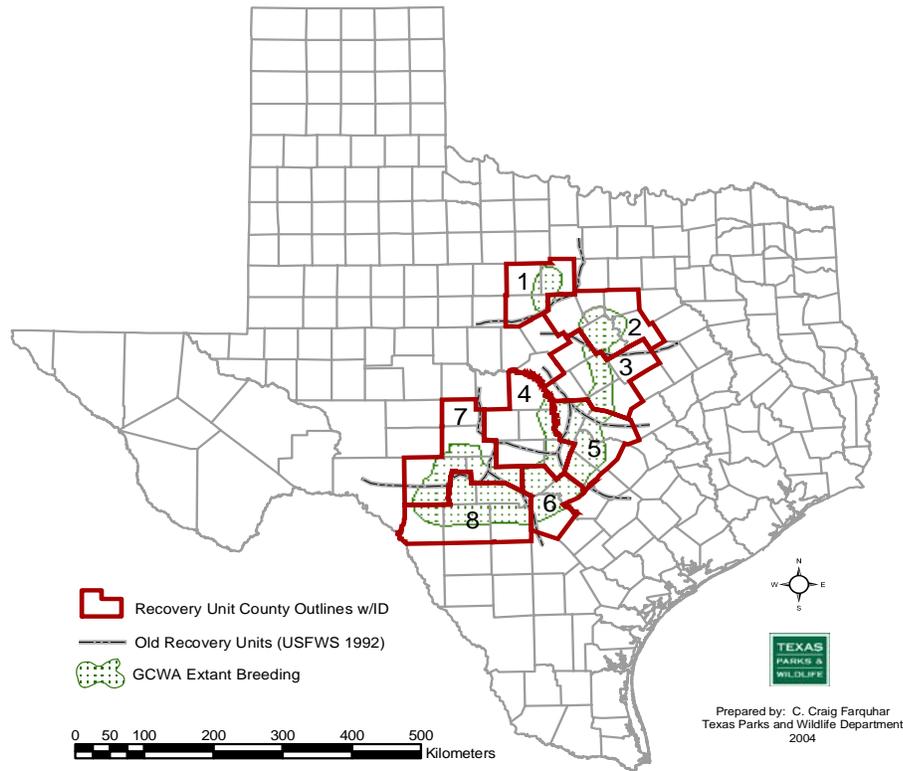
Golden-cheeked Warbler

Status of the GCW within the Action Area

The action area for this species is determined to be all or part of 35 counties in Texas with current or historical GCW occurrence records (Figure 6). In order to facilitate analysis and discussion, the boundaries of the eight Recovery Units identified in the Recovery Plan (FWS 1992) have been adjusted to conform to county boundaries as shown in Table 10.

Table 10. GCW recovery units and counties as adjusted to conform to recovery unit boundaries.	
Recovery Unit	Counties
1	Eastland, Palo Pinto, Stephens
2	Bosque, Erath, Hill, Hood, Johnson, Somervell
3	Bell, Coryell, Hamilton, Lampasas, McLennan
4	Blanco, Gillespie, Llano, Mason, San Saba
5	Burnet, Hays, Travis, Williamson
6	Bexar, Comal, Kendall
7	Edwards, Kerr, Kimble, Menard
8	Bandera, Kinney, Medina, Real, Uvalde

Figure 6. Recovery Unit boundaries and breeding range of GCW's in Texas.



Recovery Unit 1 – Current Status

This unit consists of three counties that are entirely within the action area: Eastland, Palo Pinto, Stephens. Only Palo Pinto has historical and current records of GCW occurrences (Table 11).

Table 11 . GCW population estimates for recovery unit 1.		
Area of Habitat	Population	Source of Information
Major Populations		
None known		
Medium-sized Populations		
None known		
Small Populations		
Wagley Ranch (Palo Pinto County)	At least 9 males detected	Environmental Defense 2004
Possum Kingdom S.P.	Up to 8 males detected	TPWD 2004

Recovery Unit 2 – Current Status

This unit consists of six counties, four of which are entirely within the action area: Bosque, Erath, Hood, and Somervell, and two of which are partially within the action area: Hill and Johnson (Table 12).

Table 12 . GCW population estimates for recovery unit 2.		
Area of Habitat	Population	Source of Information
Major Populations		
None known		
Medium-sized Populations		
Dinosaur Valley State Park (Somervell Co.)	16 males	Texas BCD 2004
Lake Whitney (Bosque, Hill and Johnson Co.s)	10 males	Texas BCD 2004
Small Populations		
FM 1234 (Johnson Co.)	9 males	Texas BCD 2004
Cahopo Ranch (Somervell Co.)	At least 7 males detected	Environmental Defense 2004
Fossil Rim Wildlife Center (Somervell Co.)	5 males	Texas BCD 2004
Meridian State Park (Bosque Co.)	No recent data are available	

Recovery Unit 3 – Current Status

This unit consists of five counties, three of which are entirely within the action area: Coryell, Hamilton, and Lampasas and two of which are partially in the action area: Bell and McLennan (Table 13).

Table 13 . GCW population estimates for recovery unit 3.		
Area of Habitat	Population	Source of Information
Major Populations		
Fort Hood Military Reservation (Bell and Coryell counties)	4000-5000	John Cornelius pers. comm. 2004
Medium-sized Populations		
Colorado Bend State Park (Lampasas Co.)	30 territories	TPWD 2004
Small Populations		
None known		

Recovery Unit 4 – Current Status

This unit consists of five counties all of which are entirely within the action area: Blanco, Gillespie, Llano, Mason, and San Saba. GCW population estimates are shown in Table 14 for this recovery unit.

Table 14 . GCW population estimates for recovery unit 4.		
Area of Habitat	Population	Source of Information
Major Populations		
None known		
Medium-sized Populations		
Pedernales Falls State Park (Blanco Co.)	No recent data are available	
Small Populations		
Private Ranch near Johnson City (Blanco Co.)	6 pairs	Texas BCD 2004

Recovery Unit 5 – Current Status

This unit consists of four counties, one of which is entirely within the action area: Burnet and three of which are partially within the action area: Hays, Travis, and Williamson. GCW population estimates are shown in Table 15 for this Recovery Unit.

Table 15 . GCW population estimates for recovery unit 5.		
Area of Habitat	Population	Source of Information
Major Populations		
Balcones Canyonlands National Wildlife Refuge (Burnet, Travis and Williamson counties)	1,000 pairs	Chuck Sexton pers. comm. 2004
Balcones Canyonlands Preserve (Travis Co.)	223	Abbruzzese 2000.
Medium-sized Populations		
Barton Creek Habitat Preserve (Travis Co.)	60 pairs	Dan Snodgrass pers comm.. 2004
Panther Hollow (Travis Co.)	24 pairs	Texas BCD 2004
Steiner Ranch (Travis Co.)	20 pairs	Texas BCD 2004
San Gabriel River (Williamson Co.)	11 pairs	Texas BCD 2994
Small Populations		
Payton (Hays Co.)	5 pairs	Texas BCD 2004
Longhorn Cavern State Park (Burnet Co.)	4 pairs	Texas BCD 2004
LCRA Canyon of the Eagles (Burnet Co.)	4 pairs	Texas BCD 2004
Small Populations		
Wild Basin Preserve (Travis Co.)	2 males	Texas BCD 2004
Russell and McLeod Easements (Williamson Co.)	9 pairs	Environmental Defense 2004
US Highway 183A (Williamson Co.)	1 male	Texas BCD 2004

Recovery Unit 6 – Current Status

This unit consists of three counties, one of which is entirely within the action area: Kendall and two of which are partially within the action area: Bexar and Comal.

Table 16 . GCW population estimates for recovery unit 6.		
Area of Habitat	Population	Source of Information
Major Populations		
None known		
Medium-sized Populations		
Government Canyon State Park (Bexar Co.)	35 territories	TPWD 2004
Honey Creek State Natural Area (Comal Co.)	22 territories	TPWD 2004
Guadalupe River State Park (Comal Co.)	No current data are available	
Small Populations		
Camp Bullis (Bexar Co.)	No recent data are available	
Friederich Wilderness Park (Bexar Co.)	No recent data are available	

Recovery Unit 7 – Current Status

This unit consists of four counties all of which are entirely within the action area: Edwards, Kerr, Kimble, and Menard.

Table 17. GCW population estimates for recovery unit 7.		
Area of Habitat	Population	Source of Information
Major Populations		
None known		
Medium-sized Populations		
RM 674 (Edwards Co.)	47 males	Doug Booher pers. comm.. 2004
Dobbs Run Ranch (Edwards Co.)	38 males	Environmental Defense 2004
Kerr Wildlife Management Area (Kerr Co.)	26 males	Craig Farquhar pers. comm.. 2004
Small Populations		
Small Populations		
Cedar Creek Road (Edwards Co.)	6 males	Texas BCD 2004
Segovia (Kimble Co.)	4 males	Texas BCD 2004
Vance (Edwards Co.)	4 males	Texas BCD 2004

Recovery Unit 8 – Current Status

This unit consists of five counties all of which are entirely within the action area: Bandera, Kinney, Medina, Real, and Uvalde.

Table 18. GCW population estimates for recovery unit 8.		
Area of Habitat	Population	Source of Information
Major Populations		
None known		
Medium-sized Populations		
Love Creek Preserve (Bandera Co.)	40 territories	Lee Elliot pers. comm. 2004
Lost Maples State Park (Bandera Co.)	No recent data are available	
Small Populations		
Hill Country State Natural Area (Bandera and Medina counties)	6 pairs	Lockwood and Hernandez 2000
Texas Highway 55 (Real Co.)	2 males	Texas BCD 2004

Habitat Assessment

Estimates of GCW breeding habitat have progressed from evaluation of early Soil Conservation Service (SCS) soil survey data (Pulich 1976) to various forms of remote sensing (Shaw 1989, Wahl et al., 1990, Rowell et al., 1995, Diamond and True 2002). Pulich (1976) relied upon SCS estimates of “virgin juniper” habitat, amounting to 24.6% of all cedar brakes. We employ here, unless otherwise noted, the unpublished map of Diamond and True (2002) who examined the National Land Cover Datalayer (NLCD), the Gap Analysis land cover data for Texas, and a land cover they developed for FWS using circa 1986 and 1996/97 satellite data. To define GCW habitat, Diamond and True (2002) grouped all forest land cover types from the NLCD (evergreen, mixed, deciduous) into a single class (forest) and then buffered back from the edge of forest by 82 yards. Buffering away from edge achieved the effect of eliminating very small forest patches, thus eliminating potential errors in the original classification and thereby 'smoothing' the land cover classification results. Resulting habitat patches are no smaller than 100 ha (247 ac).

In the opinion of the experts in the brush consultation Workgroup, annual impacts to 0.8% of potential suitable GCW habitat within each recovery unit would not impair the recovery of the species. The table below indicates the amount of potential suitable habitat which occurs within each county and recovery unit and the resultant 0.8% acreage total per county and recovery unit.

Table 19. Approximate land area by county within each GCW recovery unit, estimated acreage of potential suitable GCW habitat, percent estimated habitat within county, and 0.8% of potential suitable GCW habitat.

RECOVERY UNIT/COUNTY	County Land Area (ac)	Potential Suitable Habitat (ac)	Potential Suitable Habitat (% of County)	0.8% of Potential Suitable Habitat (ac)
Unit 1				
EASTLAND	570,309	8,265	1.4%	66
PALO PINTO	609,596	31,134	5.1%	249
STEPHENS	572,299	9,823	1.7%	79
Unit 1 Total	1,752,204	49,222	2.8%	394
Unit 2				
BOSQUE	632,814	4,147	0.7%	33
ERATH	695,058	995 ¹	0.1%	8
HILL	615,610	566	0.1%	5
HOOD	269,724	516	0.2%	4
JOHNSON	466,583	4,197	0.9%	34
SOMERVELL	119,795	3,167	2.6%	25
Unit 2 Total	2,799,584	13,587	0.5%	109
Unit 3				
BELL	611,325	28,331	4.6%	227
CORYELL	672,828	28,524	4.2%	228
HAMILTON	534,508	247 ¹	0.0%	2
LAMPASAS	455,468	5,044	1.1%	40
MCLENNAN	724,210	2,159	0.3%	17
Unit 3 Total	2,998,339	64,304	2.1%	514
Unit 4				
BLANCO	454,974	25,493	5.6%	204
GILLESPIE	678,756	23,798	3.5%	190
LLANO	597,987	30,270	5.1%	242
MASON	596,258	3,912	0.7%	31
SAN SABA	725,686	8,791	1.2%	70
Unit 4 Total	3,053,661	92,264	3.0%	738
Unit 5				
BURNET	637,260	55,449	8.7%	444
HAYS	433,732	34,876	8.0%	279
TRAVIS	632,814	44,109	7.0%	353
WILLIAMSON	718,276	3,959	0.6%	32
Unit 5 Total	2,422,082	138,394	5.7%	1,107
Unit 6				
BEXAR	797,563	74,868	9.4%	599
COMAL	359,138	70,059	19.5%	560
KENDALL	423,852	19,930	4.7%	159
Unit 6 Total	1,580,553	164,858	10.4%	1,319
Unit 7				
EDWARDS	1,356,030	31,016	2.3%	248
KERR	707,655	77,864	11.0%	623
KIMBLE	800,033	14,734	1.8%	118
MENARD	582,920	467	0.1%	4
Unit 7 Total	3,446,638	124,080	3.6%	993

RECOVERY UNIT/COUNTY	County Land Area (ac)	Potential Suitable Habitat (ac)	Potential Suitable Habitat (% of County)	0.8% of Potential Suitable Habitat (ac)
Unit 8				
BANDERA	506,597	107,482	21.2%	860
KINNEY	872,157	11,547	1.3%	92
MEDINA	849,433	129,013	15.2%	1,032
REAL	447,811	133,600	29.8%	1,069
UVALDE	995,657	149,699	15.0%	1,198
Unit 8 Total	3,671,655	531,341	14.5%	4,251
TOTAL	21,724,716	1,178,051	5.4%	9,424

¹ Environmental Defense, Inc. (Unpubl. Data).

In the implementation of its 2002 Farm Bill conservation programs, NRCS will not fund projects on more than 9,424 acres (0.8%) of potential suitable habitat to ensure the recovery of the species is not impaired. This conservation effort will be further distributed among the 8 recovery units in proportion to the estimated amount of known suitable occupied habitat as explained in Section V.

The resource management systems planned by TPWD and NRCS in accordance with the NRCS guidelines (Enclosure 2) are expected to reduce the composition of Ashe juniper and increase deciduous hardwoods in a stand to benefit the GCW; however, more data and time will be required to confirm this expectation. Where mature Ashe juniper is relatively abundant when compared to hardwood species, some mature junipers may be removed with little impact on habitat suitability (Campbell 1995). Likewise, areas of regrowth Ashe juniper may be selectively controlled within and adjacent to some GCW habitats with minimal impact to the species. High-quality GCW habitat commonly occurs on slopes >15% -- plant removal on these areas is difficult, expensive and not cost-effective. Selective juniper control on slopes <15% may result in short term adverse impacts; however, the long-term benefits are likely to result in improved habitat conditions on a landscape level when delivered through the 2002 Farm Bill conservation programs.

Practices such as water facility construction and pond construction will be implemented in accordance to the NRCS developed guidelines for the GCW and the revised TPWD GCW “no take” management guidelines. Therefore, no adverse effects to the GCW as a result of these practices is anticipated.

The following actions deviate from TPWD “no take” guidelines and may result in some take of the species, primarily in the form of harassment which could impair normal behavior patterns such as maintaining nesting territories, feeding, resting, etc.:

- 1) seasons of operation for mechanical brush management (hydraulic shearing, hand-cutting, or chain sawing):
 - Recovery Units 1,2,3,4, and 7 --- August 1st - March 15th
 - Recovery Units 5, 6, and 8 --- August 1st - March 1st;
- 2) the thinning of mature Ashe juniper to a 15% juniper canopy cover while maintaining a total tree canopy of at least 75%; and

3) increasing fence and pipeline right-of-ways from the recommended management width of 16 feet to 20 feet.

GCWs arrive in central Texas around March 1st and by early August leave for their southern wintering grounds. Nesting usually begins in April, and the nestlings fledge in May to early June (FWS 2002). The GCW management guidelines recommend that selective removal of brush, if it is to occur adjacent to GCW habitat, be conducted during the non-breeding season to avoid adverse impacts such as disturbance of nesting and feeding birds (Campbell 1995). The season of operation proposed within the NRCS guidelines (hydraulic shearing, chain sawing, and hand-cutting), beginning the last 31 days (August 1st - August 31st) of the breeding season and continuing through the first 15 days (March 1st - March 15th) of the onset of the breeding season, may have an effect on the GCW. The season of operation has the potential to temporally disrupt territory defense, breeding, and foraging (Campbell 1995). Since mechanical brush management should be a single event during the life of a contract, and hydraulic shearing, chain sawing, and hand-cutting removes vegetation at ground level without seriously disturbing the topsoil (Ball and Taylor 2003), it is anticipated that only temporal effects related to disruption, displacement, and/or harassment of the GCW will occur.

The thinning of mature Ashe juniper to a 15% juniper canopy cover while maintaining a total tree canopy of at least 75% may have an effect upon the GCW. The GCW management guidelines recommend that areas typically occupied by GCWs consist of mature Ashe junipers (trees with shedding bark) that are at least 15 feet in height with a trunk diameter of about 5 inches at 4 feet above the ground (dbh) with scattered oaks. These areas generally will have a nearly continuous canopy cover of trees with 50% to 100% canopy closure and an overall woodland canopy height of 20 feet or more (Campbell 1995). However, when mature Ashe junipers are abundant in the habitat, selective removal of the trees for agricultural purposes will have little impact on the overall warbler habitat (Campbell 1995). Horne and Anders (2001) found that canopy height and number of trees per acre (hectare) did not influence the presence of GCW on Fort Hood; however, GCW occurrence was positively related to the number of mature Ashe juniper suggesting that GCWs may prefer mature forests over less mature forests. Additionally, Horne and Anders (2001) found the highest GCW occurrence in areas with a mixture of both mature Ashe junipers (10% to 25%) and hardwoods (75% to 90%).

Increasing fence and pipeline right-of-ways from the recommended management width of 16 feet to 20 feet may also have an effect upon the GCW. The GCW management guidelines recommend that new fence lines and livestock watering facilities (pipelines) be planned to avoid areas of habitat whenever possible. However, narrow linear openings, such as those needed for traditional agricultural management (fence lines and livestock water pipelines) will not harm GCW if openings (spaces between trunks or stems at 4 feet above the ground) are no greater than 16 feet in width. This width is large enough to allow for maintenance, while permitting the hardwood tree canopy to grow over the gap (Campbell 1995). Horne (2000), in a study at Ft. Hood, found that clearings less than 32 feet wide did not appear to greatly affect GCW territory placement, as about 80% of the territories would be expected to span an opening this wide. This is probably because, in general, canopies are not completely broken by openings less than 32 feet wide and thus may not be perceived as openings by the birds (Horne 2000). However, if a lower confidence interval is used, only 50% of the territories would be expected to span a corridor 32

feet wide (Horne 2000). Nonetheless, Horne (2000) cautioned about drawing conclusions about the effects of corridors less than 32 feet wide on GCW breeding habitat.

IV. Cumulative Effects

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

Environmental Defense, Inc. (ED) developed a Safe Harbor Agreement (SHA) and received a Section 10(a)(1)(A) Safe Harbor Enhancement of Survival Permit in 2000 (USFWS 2000a). This permit covers habitat restoration activities on private lands for the BCV and GCW in 25 Central Texas counties.

The primary objective of the SHA is to encourage voluntary habitat restoration or enhancement activities to benefit BCVs and/or GCWs. Under the program, landowners may voluntarily enroll their lands under the SHA with ED. As described in the SHA, enrolled landowners sign a cooperative agreement that specifies the management activities to be carried out on their lands that are expected to restore and enhance habitat for BCV's and/or GCW's, and will receive a certificate of inclusion under ED's permit. These actions, where appropriate, may include (but are not limited to) prescribed fire, protection of juniper-oak woodlands, improved grazing practices, selective brush management, cowbird control, and other activities. The SHA encourages such actions by ensuring that landowners will not be subjected to increased endangered species restrictions if their land stewardship results in increased populations of these two endangered species (USFWS 2000b).

To further encourage voluntary landowner assistance in conservation activities to benefit BCV's and GCW's, ED has also initiated the "Hill Country Stewardship Program," which will help to underwrite the costs of such activities on private lands. With the assurances provided by the SHA and the financial incentives provided by the Hill Country Stewardship Program, many central Texas landowners may be willing to voluntarily undertake activities to conserve, protect, and/or enhance habitat for BCV's and GCW's (USFWS 2000b).

The **Nature Conservancy of Texas** has recently completed a planning process for the Edwards Plateau (*A Biodiversity and Conservation Assessment of the Edwards Plateau Ecoregion (2004)*) that considered BCVs, GCWs, and Tobusch fishhook cactus as conservation targets. Working in collaboration with partners (agencies, private landowners, etc.), the Conservancy will attempt to use this assessment as a basis for implementing conservation action at 102 terrestrial conservation areas and 62 aquatic areas. The assessment captured 70 viable occurrences of BCV and 33 occurrences of GCW within the 102 terrestrial areas.

Ongoing BCV habitat restoration efforts are occurring at several managed areas throughout the Edwards Plateau. At the Barton Creek Habitat Preserve (BCHP) in Travis County, The Nature Conservancy has implemented an aggressive fire management program in concert with selective and local scale juniper removal efforts. Two pairs of BCVs were documented on the preserve in

2003 following at least 8 years of absence. Future work will focus upon reestablishing 550 acres of BCV habitat. In 2004, one territory was confirmed and a second was suspected. The Conservancy is also working on expanding BCV habitat at its Love Creek Preserve in Medina County, Dolan Falls Preserve in Val Verde County and Independence Creek Preserve in Terrell County.

The **Lower Colorado River Authority (LCRA), City of Austin, and Travis County** all have very active land management programs with a special emphasis upon endangered species habitat restoration and management. The BCV and GCW are primary species of focus these entities. The Balcones Canyonlands Preserve (BCP) will eventually amount to 30,428 acres. Presently, LCRA has the McGregor, Westcave, and Wheless Preserves which total about 2,500 acres. On the Wheless Preserve, since 2002, the LCRA has been implementing a focused BCV habitat restoration and enhancement program. The City of Austin owns a number of preserves such as Bull Creek and Barton Creek Wilderness Park. Travis County manages preserves such as Wild Basin and Hamilton Pool. Presently, the BCP consists of about 27,000 acres and with a need to acquire at least 3,500 more acres. This effort is a product of an extensive Habitat Conservation Planning initiative in the Austin area.

The **Texas State Soil and Water Conservation Board's (TSSWCB) Brush Control Program** is designated to enhance water availability by removing water depleting brush and trees, such as cedar and mesquite, which have invaded much of the state's cattle grazing land. In 1985, the Legislature directed the TSSWCB to administer the program entailing the development of management strategies and the designation of areas where brush control is most needed.

In 1999, the Legislature appropriated \$9 million to the TSSWCB for financial incentives to landowners who adopted Water Quality Management Plans and would participate in a Brush Control Pilot Project in the North Concho River Basin. State appropriated grants made to entities other than a local district was made to the Upper Colorado River Authority in the amount of \$60,000.00 to conduct North Concho River Pilot Brush Control Program monitoring and paired watershed evapotranspiration studies. The current status of all projects is as follows:

The **North Concho Watershed project** was initiated September 1, 1999. It is approximately 953,000 acres in size with approximately 432,000 acres of brush. Cost share funding in the amount of \$13,253,950 has been made available in the North Concho River watershed.

Status of Project:

- 370,715 acres were under contract to be treated at a cost of \$13,173,242
- \$80,708 remained to be obligated (<1%)
- 238,700 acres had been treated at a cost to the State of \$9,837,267
- There are 143 active contracts, 57 completed contracts, 200 total contracts.

The **Pedernales Watershed project** was initiated September 1, 2002. It is approximately 815,000 acres in size with approximately 200,000 acres of brush. It is divided into 35 sub-basins with 13 sub-basins currently eligible for cost-share. Cost share funding in the amount of \$4,001,199 has been made available in the Pedernales River Watershed.

Status of Project:

- 59,708 acres were under contract to be treated at a cost of \$3,987,521.

- \$13,678 remained to be obligated (<1%)
- 45,750 acres had been treated at a cost to the State of \$2,987,224
- There are 116 active contracts, 170 completed contracts, 286 total contracts

The **Twin Buttes Watershed project** was initiated September 1, 2002. It is approximately 2,423,854 acres in size with approximately 1,015,407 acres of brush. It is divided into 69 sub-basins with 28 sub-basins currently eligible for cost-share. Cost share funding in the amount of \$8,295,950 has been made available in the Twin Buttes Watershed.

Status of Project:

- 182,091 acres were under contract to be treated at a cost of \$8,287,506
- \$8,444 remained to be obligated (<1%)
- 124,854 acres had been treated at a cost to the State of \$5,961,440
- There are 136 active contracts, 51 completed contracts, 187 total contracts.

The **Lake Ballinger Watershed project** was initiated September 1, 2002. It is approximately 148,849 acres in size with approximately 54,485 acres of brush.

Cost share funding in the amount of \$484,886 has been made available in the Lake Ballinger Watershed.

Status of project:

- 8,570 acres were under contract to be treated at a cost of \$406,901
- \$77,985 remained to be obligated (16%)
- 5,676 acres had been treated at a cost to the State of \$263,332
- There are 45 active contracts, 20 completed contracts, and 65 total contracts.

The **Oak Creek Lake Watershed project** was initiated September 1, 2002. It is approximately 151,532 acres in size with approximately 96,616 acres of brush.

Cost share funding in the amount of \$1,095,765 has been made available in the Oak Creek Lake Watershed.

Status of Project (May 14, 2004):

- 18,261 acres were under contract to be treated at a cost of \$832,468
- \$263,297 remained to be obligated (24%)
- 12,624 acres had been treated at a cost to the State of \$603,687
- There are 18 active contracts, 14 completed contracts, 32 total contracts.

The **Pecan Creek Watershed project** was initiated September 1, 2002. It is approximately 60,400 acres in size with approximately 43,000 acres of brush. It is divided into 13 sub-basins with all sub-basins eligible for cost-share. Cost share funding in the amount of \$323,764 has been made available in the Pecan Creek Watershed.

Status of Project:

- 12,195 acres were under contract to be treated at a cost of \$323,589
- \$175.00 remained to be obligated (<1%)
- 10,095 acres had been treated at a cost to the State of \$232,774
- There are 3 active contracts, 2 completed contracts, 5 total contracts.

The **Mountain Creek Lake Watershed project** was initiated September 1, 2002. It is approximately 18,500 acres in size with approximately 10,458 acres of brush.

Cost share funding in the amount of \$95,542 has been made available in the Mountain Creek Watershed.

Status of Project:

- 2,034 acres were under contract to be treated at a cost of \$88,728
- \$6,814 remained to be obligated (7%)
- 1,440 acres had been treated at a cost to the State of \$70,033
- There are have 4 active contracts, 6 completed contracts, 10 total contracts.

The **Champion Creek Lake Watershed project** was initiated September 1, 2002. It is approximately 115,737 acres in size with 40,347 acres of brush. Cost share funding in the amount of \$906,932 has been made available in the Champion Creek Watershed.

Status of Project:

- 17,481 acres were under contract to be treated at a cost of \$865,202
- \$41,730 remained to be obligated (<5%)
- 10,786 acres had been treated at a cost to the State of \$504,606
- There are 55 active contracts, 21 completed contracts, 76 total contracts.

The **Pecos/Upper Colorado Salt Cedar Project** has involved cost share funding in the amount of \$410,710 being made available in the Pecos/Upper Colorado Watersheds.

Status of Project:

- 6,354 acres are under contract to be treated at a cost of \$298,477
- \$112,233 remained to be obligated (<27%)
- There are 22 active contracts, 40 completed contracts, 62 total contracts
- 3,468 acres have been treated at a cost to the State of \$180,678.

The **Spring and Dove Creek Watershed project** was initiated September 1, 2002. It is approximately 163,000 acres in size with 77,468 acres of brush. It is divided into 23 sub-basins with 3 sub-basins eligible through the Spring and Dove Creek Special Project.

Cost share funding in the amount of \$1,146,275 has been made available in the Spring/Dove Watershed.

Status of Project:

- 40,479 acres were under contract to be treated at a cost of \$1,146,275
- \$0.00 remained to be obligated (0%)
- 18,958 acres had been treated at a cost to the State of \$649,329
- There are 16 active contracts, 5 completed contracts, 21 total contracts.

Other Activities:

TSSWCB Staff completed 9 brush control plans/contract amendments for landowners

TSSWCB Staff completed 62 brush control certifications for landowners

TSSWCB Staff prepared brush control reports/updates for Runnels, Middle Clear Fork, Coke County, Nolan, Tom Green, and Eldorado-Divide SWCDs

TSSWCB Staff provided information on State Brush Control Program to the following groups: Canadian River Authority, Texas Farm Bureau, Texas Wildlife Association, West Central Texas Water Municipal Water District, and the U.S. Fish and Wildlife Service.

TSSWCB funding in 1999 was about \$9 million and for years 2000 through 2004, funding was about \$12 million (T. Wood, TSSWCB, pers. comm., October 2004). For fiscal years 2000

through 2003, about 30% of the funding was spent on brush control projects (TSSWCB Semi-annual Report, July 1, 2004). Special emphasis has been placed upon correcting incompatible habitat management practices that may have impacted BCV and GCW habitat and to adhere to strict “no take” guidelines. It is unknown at this time what level of impact may have occurred in BCV and GCW habitat as a result of these efforts. No monitoring of endangered species habitat is taking place relative to these projects.

The extent that TSSWCB will be engaged in activities that could benefit or harm BCVs and GCWs in the future is unknown. Funding for the program for fiscal year 2005 was decreased to about \$600,000 which will sharply curtail brush control activities (T. Wood, pers. comm., October 2004).

Private actions involving brush management both within and outside of the consultation area as a result of privately funded activities on private lands occur and are reasonably certain to occur in the future. It is unknown what effects, if any, these actions may have on BCVs, GCWs, or other listed species.

V. Conclusion

After reviewing the current status of the BCV and GCW, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the 2002 Farm Bill funding that will be used for brush control in Texas west of IH- 35 in fiscal years 2005, 2006, and 2007 is not likely to jeopardize the continued existence of the BCV or the GCW. Possible harm and/or harassment to both species will only occur on a small portion of nesting habitat in Texas. BCV nesting habitat in Mexico and Oklahoma will not be affected. No critical habitat has been designated for either species; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to Section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act and its implementing regulations prohibit the removal and reduction to possession of Federally listed threatened and endangered plants or the malicious damage of endangered 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.

The measures described below are non-discretionary, and must be undertaken by the NRCS so that they become binding conditions of any grant or permit issued for the exemption in Section 7(o)(2) to apply. The NRCS has a continuing duty to regulate the activity covered by this incidental take statement. If the NRCS (1) fails to assume and implement the terms and conditions or (2) fails to require the EQIP participants to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of Section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the NRCS must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. (50 CFR §402.14[i][3]).

Amount or Extent of Take Anticipated

Take, mostly in the form of harm and/or harassment, is anticipated for the BCV and the GCW. For both species, take is anticipated to be primarily harassment that could impair normal behavior patterns and could result in short-term reduced recruitment to the population. Take in the form of loss of active nests, eggs, juvenile or adult birds is not anticipated for the GCW and would only be a rare occurrence for the BCV, occurring only as a result of non-mechanized handcutting to be conducted in BCV suitable habitat during the nesting season, as discussed in Section III.

Take, in the form of harm and/or harassment, is difficult to quantify and usually can not be estimated in terms of numbers of individuals. The statewide abundance of both the black-capped vireo and golden-cheeked warbler was estimated in terms of total estimated area of potential suitable habitat divided by the estimated average area of breeding territories. Because the abundance of both species was based on estimates of acres of potential suitable habitat and because harm to both species will be from actions taken to reduce four species of brushy vegetation, again measured in terms of area, the maximum amount of incidental take allowed under this BO is prescribed in terms of area (acres of potential suitable habitat that may be subjected to certain brush control measures).

Black-capped Vireo

Harm or harassment of BCVs could occur as a result of the extended season of mechanical brush management (August 1st through March 15th). It is possible that in some parts of its range, BCVs could be attempting to establish breeding territories before March 15th and use of engine-driven implements could disrupt these breeding behaviors. Similarly, it is possible that some BCVs could still be in Texas on or after August 1st and resumption of mechanical brush management could disrupt feeding and pre-migration behavior, although it is likely the birds will move to locations outside the effects from engine-driven implements.

Although the intensity of the labor required makes it unlikely that the practice will be widely used, it is possible that year-round hand-cutting Ashe juniper and mesquite could harm or harass BCVs by temporally disrupting establishment of breeding territories, breeding activities, and foraging of BCVs. At any given site, hand-cutting of brush will most likely only be done in small areas for short time periods, so harm or harassment effects to BCVs should be minimal. There is also the remote possibility that direct impacts to BCV nests and/or eggs could occur as a result of handcutting in BCV suitable habitat during the nesting season.

There is an estimated 1,450,438 acres of potential suitable BCV habitat in Texas. In the implementation of its 2002 Farm Bill conservation programs, projects may be funded through fiscal year 2007. Therefore, this consultation covers projects funded in fiscal years 2005, 2006, and 2007. As described in Section III, annually, as a program conservation measure, NRCS will limit funded projects to no more than 50,765 acres (3.5%) of potential suitable BCV habitat. Therefore, for the remaining three years of the 2002 Farm Bill, BCVs in a maximum of 10.5% (152,295 acres) of potential suitable habitat could experience some form of harm and/or harassment. Annually, the 3.5% of potential suitable BCV habitat that could be subjected to brush control measures will be further distributed among the four recovery units in proportion to the estimated amount of known suitable occupied habitat.

Recovery Unit	Maximum Annual Incidental Take Authorized (acres)
1	6,096
2	23,752
3	4,296
4	16,620

The Service believes that other than mostly short-term harm and/or harassment, the combination of practices normally incorporated into NRCS cost-share agreements (brush management, prescribed burning, prescribed grazing, range planting) and approved wildlife management plan will be beneficial to BCVs by generating BCV habitat through succession. Removal of junipers followed by application of management practices that discourage regrowth of these species should result in an overall increase to the 1.5 million acres of potential suitable BCV habitat currently estimated to occur in Texas.

As discussed previously, the potential exists for the year round hand clearing of juniper to result in the destruction of BCV nests and/or eggs. However, since NRCS very rarely has cost-share contracts which involve the practice of hand clearing brush, the hand clearing will be conducted through non-mechanical means (during the breeding season), and junipers are not a preferred nesting shrub for BCVs, the likelihood of direct impacts to BCV nests and/or eggs is very unlikely. Nevertheless, based upon an analysis of vireo territory and clutch size, the Service believes that no more than five black-capped vireo nests could be destroyed annually, equating to no more than 18 eggs and/or juveniles.

Golden-cheeked Warbler

Harm and/or harassment of GCWs in Recovery Units 1, 2, 3, 4, and 7 could result from the extended season of mechanical brush management (August 1st through March 15th). It is possible that in this area some GCWs could attempt to establish breeding territories before March 15th and use of engine-driven implements could disrupt breeding behavior. Similarly, it is possible that some GCWs could still be in Texas on or after August 1st and resumption of mechanical brush management could disrupt feeding and pre-migration behavior.

Thinning the canopy cover could have a level of harm to golden-cheeked warblers by decreasing the quality of nesting habitat. It is possible that this could result in a reduced density of nesting GCWs. However, the best GCW nesting habitat most often occurs on slopes greater than 15 percent gradient. Brush control on steep slopes is difficult and not cost-effective and will likely only rarely be done. Therefore, the best GCW nesting habitat will seldom be directly affected by brush control measures funded by the 2002 Farm Bill. Likewise, increasing right-of-ways from 16 feet to 20 feet could remove some nesting habitat and reduce the density of nesting GCWs.

Based on the estimates by species experts detailed in the Biological Assessment, there is an estimated 1,178,051 acres of potential suitable golden-cheeked warbler habitat in Texas. In the implementation of its 2002 Farm Bill conservation programs, as a program conservation measure, annually NRCS will limit funded projects to a maximum of only 9,424 acres [0.8%] of potential suitable GCW habitat. Therefore, for the remaining three years of the 2002 Farm Bill, reproductive efforts of GCWs on a maximum of 2.4% (28,272 acres) of potential suitable GCW habitat could experience some form of harm. None of the known major golden-cheeked warbler populations (Fort Hood Military Reservation, Balcones Canyonlands National Wildlife Refuge, and Balcones Canyonlands Preserve) occupy habitat that will be subject to brush control methods funded by the 2002 Farm Bill.

In addition, the maximum of 9,424 acres of potential habitat that may be subject to brush control measures will be further distributed among the eight recovery units in proportion to the estimated amount of known suitable occupied habitat.

Recovery Unit	Maximum Annual Incidental Take Authorized (acres)
1	39
2	109
3	514
4	738
5	1,107
6	1,319
7	993
8	4,251

Effect of the Take

In the accompanying biological opinion, the Service determined that the level of anticipated take is not likely to jeopardize the continued existence of either the BCV or the GCW. No critical habitat has been designated for either species, therefore, no critical habitat will be affected.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures (RPM) are necessary and appropriate to minimize impacts of the anticipated incidental take.

1. Prior to implementation of any cost-share agreement to remove any of the four problem brush species in the range of the BCV and GCW west of IH- 35, landowners, land managers, and/or contractors will attend a Texas Cooperative Extension course on brush management and be certified by the Texas Department of Agriculture. Course content will include BCV and GCW species identification and life history, habitat identification, Endangered Species Act regulations, and installation of NRCS conservation practices to minimize adverse impacts on listed species.
2. Farm Bill program participants, for the lands where brush control methods will be used, will have either a wildlife management plan prepared by TPWD technical guidance biologists or an NRCS zone biologist-approved conservation plan prepared in accordance guidelines in Enclosures 1 and 2. The plan will contain specific guidelines and other information on proper management and/or enhancement of GCW, BCV and Tobusch fishhook cactus habitat.
3. Where 2002 Farm Bill funds are spent to control the four species of brush in potential suitable BCV and GCW habitat, NRCS will record the amount of acres treated.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the NRCS must comply with the following terms and conditions which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. NRCS will be responsible for organizing the course on brush management (described in RPM No. 1) for landowners, land managers, and/or contractors.
2. NRCS must provide sufficient guidance to its employees to ensure compliance with the reasonable and prudent measures of this biological opinion before cost-share agreements funded by 2002 Farm Bill programs can be covered by the incidental take allowed by this opinion.
3. NRCS shall provide annual reports for the duration of cost-share agreements funded with 2002 Farm Bill appropriations to the Service that document the implementation of the proposed action including the status of cost-share agreements, the amount of acres treated

in potential BCV and GCW habitat by Recovery Unit, and any conservation recommendations that are initiated. These annual reports shall be provided to the Arlington Ecological Services Field Office (Texas) by December 1st for the preceding fiscal year (*e.g.*, the report for fiscal year 2005 will be due by December 1, 2005).

Reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. The NRCS must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

The Service will not refer the incidental take of any migratory bird for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize 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 following recommendations are provided for consideration by the NRCS:

1. NRCS should help support research to investigate the influence of Ashe and redberry juniper and related land treatment practices on the hydrology, ecology, rangeland recovery, and habitat suitability for the BCV, GCW, and Tobusch fishhook cactus. Applicable adaptive management modifications derived from this research will be incorporated into future land treatment practices.
2. The conservation practices and brush management guidelines discussed in Section I are expected to have long-term benefit to the BCV and GCW. The few negative impacts are expected to be short-term in nature. In order to determine the validity of these expectations, NRCS should encourage 2002 Farm Bill program participants to cooperate in a monitoring program that is designed to measure the effects of the various practices across a representative sample of sites. Data from this monitoring program would be used to refine future brush control guidelines. Agencies, NGOs, and private parties should be invited to participate in this initiative.
3. While the BCV and GCW habitat estimates for each county are the best available science-based data, the estimates need to be further refined. NRCS and other federal and state agencies (*e.g.*, the Service and TPWD) should support funding for a study designed to more accurately determine the extent of habitat, and abundance of BCVs and GCWs, in Texas, especially in areas where less is known.

4. To further the recovery of both the BCV and the GCW, NRCS should help support TPWD's brown-headed cowbird control efforts.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

Reinitiation Notice

This concludes formal consultation on the actions outlined in the request. 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) the amount or extent of incidental take is exceeded; (2) 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 opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The Service appreciates the cooperation extended by the NRCS staff and the Brush Consultation Workgroup during this consultation. If further assistance or information is required, please contact Mr. Don Wilhelm or myself at the above address or telephone (817) 277-1100.

Sincerely,



Thomas J. Cloud, Jr.
Field Supervisor

Enclosures

cc: State Administrator, Ecological Service, Austin, TX
Regional Director, FWS, Albuquerque, NM (Attn: ARD-ES)

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Enclosure 1

Black-capped Vireo Habitat Identification/Treatment Criteria For NRCS Brush Management Consultation

Habitat Identification

Recognition of suitable habitat is the first step in insuring protection of endangered or threatened species. Habitat for the BCV's in Texas consists of a patchy distribution of shrub species with abundant foliage and branches near ground level. To aid in the identification of habitat, land within the range of the bird should be examined for the following two criteria.

CRITERIA 1. SPECIES COMPOSITION OF WOODY COVER (A or B)*

A. Where woody vegetation is dominated by any one of the following oaks, this criteria is met:

White shin oak, *Quercus durandii breviloba*

Liveoak, *Quercus virginiana*

OR

B. Where woody vegetation is composed of mixtures of species, the presence of at least four of the following species in significant amounts as co-dominants (each species contributes >15% to total canopy coverage) meets this criteria:

Liveoak, *Quercus virginiana*

Texas oak, *Quercus buckleyi*

White shin oaks, *Quercus durandii breviloba*

Agarita, *Mahonia trifoliolata*

Ashe juniper, *Juniperus ashei*

Ceanothus spp

Cedar elm, *Ulmus crassifolia*

Columbrina spp

Deciduous holly, *Ilex deciduas*

Forestiera spp

Greenbriar spp

Hackberry, *Celtis reticulata*

Mexican-buckeye, *Ungnadia speciosa*

Pricklyash, *Zanthoxylum hirsutum*

Redbud, *Cercis Canadensis*

Sophora spp

Rhus spp

Texas ash, *Fraxinus texensis*

Texas persimmon, *Diospyros texana*

* Scientific names taken from Checklist of the Vascular Plants of Texas, 1990, by Stephan L. Hatch and others

CRITERIA 2. DENSITY OF LOW GROWING BRUSH

If the canopy at the three-foot height is >25% of the proposed treatment area as evidenced by a lack of an obvious browse line or severe hedging on the species listed above, this criteria is met.

Areas satisfying the above criteria but which occur in a bottomland setting dominated by large trees shall not be considered BCV habitat.

If suitable habitat exists based on above criteria, refer to the following acceptable Conservation Treatment Guidelines:

Conservation Treatment Guidelines

ACCEPTABLE CONSTRUCTION PRACTICES:

Cross fencing	Ponds
Livestock water pipelines	Diversions
Water storage facilities	

GRAZING AND BROWSING MANAGEMENT GUIDELINES:

Domestic animal numbers will be managed to achieve proper degree of use (50%) on all of the species shown under Criteria 1 of Habitat Identification Criteria.

BRUSH MANAGEMENT GUIDELINES

Prior to using these brush management guidelines, landowners, land managers, or contractors will first attend a Texas Cooperative Extension brush management training course and be certified by the Texas Department of Agriculture.

1. Prescribed burning is acceptable as long as the interval between burns is at least five years. Prescribed burning can be an excellent tool used to maintain or create the desired vegetation structure for vireo nesting; i.e. a mosaic of shrubs and open grassland with abundant woody foliage below 6 feet. Only cool season burns, conducted prior to March 15, are allowed.
2. Selective non-chemical methods of individual plant control on Ashe juniper, honey mesquite, and prickly pear (such as hydraulic shearing, hand cutting, grubbing, or tree-dozing) are acceptable as long as motts of species listed in Criteria 1 are left intact, and Criteria 2 remains satisfied. Treated material will be situated within the habitat area to enhance the use of fire where additional basal stimulation is required. In habitat where species composition does not require the use of fire, treated materials will be pulled away from the habitat.

3. Plant removal by grubbing and tree-dozing will not occur from March 1 to September 1. Removal by hydraulic shears and chain saws will not occur from March 15 to August 1. Use of hand tools, other than chain saws, is not restricted at this time.

4. Herbicidal control of mesquite and prickly pear according to label instructions is acceptable as long as the application of herbicide mixtures does not control any of the species listed under Criteria 1.

Enclosure 2

Golden-cheeked Warbler Habitat Identification/Treatment Criteria For NRCS Brush Management Consultation

Habitat Identification

Recognition of suitable habitat is the first step in insuring protection of endangered or threatened species. Habitat for the GCW in Texas consists of a closed canopy of mixed stands of mature Ashe juniper and deciduous hardwoods. Mature Ashe junipers are at least 15 feet in height with a trunk diameter of 5 inches at 4 feet above the ground (dbh). Sites are usually, but not always, associated with steep topography and mesic conditions. Canopy coverage of Ashe juniper can vary from 5% to greater than 90%.

To aid in the identification of habitat, land within the range of the bird should be examined for all of the following three criteria.

CRITERIA 1. CANOPY CLOSURE >50%

CRITERIA 2. MATURE ASHE JUNIPER STEMS >15 STEMS PER ACRE

CRITERIA 3. AT LEAST 10% OF THE TOTAL CANOPY MUST INCLUDE 2 OR MORE OF THE FOLLOWING SPECIES

Live oak, *Quercus virginiana*
Blackjack oak, *Quercus marilandica*
Chinquapin oak, *Quercus muhlenbergii*
Post oak, *Quercus stellata*
Texas oak, *Quercus buckleyi*
White shin oak, *Quercus durandii breviloba*
Big-tooth maple, *Acer grandidentatum sinosum*
Blackcherry, *Prunus serotina*
Bumelia, *Bumelia lanuginosa*
Cedar elm, *Ulmus crassifolia*
Hackberry, *Celtis reticulata*
Mulberry, *Morus rubra*
Pecan, *Carya illinoensis*
Sycamore, *Plantanus occide*
Texas ash, *Fraxinus texensis*
Black Walnut, *Juglans nigra*
Little Walnut, *Juglans microcarpa*
Western soapberry, *Sapindus saponaria*
Lacy oak, *Quercus glaucoides*

Conservation Treatment Guidelines

ACCEPTABLE CONSTRUCTION PRACTICES:

Fence (ROW's limited to 20 feet)

Pipeline (ROW's limited to 20 feet)

[When both practices use the same ROW, width still limited to 20 feet]

Watering Facility

Pond

GRAZING AND BROWSING MANAGEMENT GUIDELINES

Domestic animals numbers will be managed to achieve proper degree of use (50%) on all of the species shown under Criteria 3 of Habitat Identification Criteria.

BRUSH MANAGEMENT GUIDELINES:

1. Removal of Ashe juniper less than 15 feet in height with a dbh of less than 5 inches can be done using hydraulic shears or hand cutting from August 1 to March 15.
2. Thinning mature juniper down to a 15% juniper canopy while maintaining a total tree canopy of at least 75% is allowable from August 1 to March 15. Do not thin in strips or other patterns.
3. Removal of Ashe juniper within 300 feet of suitable habitat can be done using hydraulic shears or hand cutting from August 1 to March 15. A minimum of 15% woody residual canopy cover will be maintained within a 300-foot perimeter of the GCW habitat to provide fledglings a degree of protection during short flights from the nest.
4. Prescribed fires under cool season burning prescriptions may only be conducted from November 1st to March 15th.

Enclosure 3

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