United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
WinSystems Center Building
711 Stadium Drive, Suite 252
Arlington, Texas 76011

March 3, 2009

21420-2008-F-0154

Mr. Roderick A. Chisholm
Directorate of Public Works
Department of the Army
U.S. Army Installation Management Command
Headquarters, U.S. Army Garrison, Fort Hood
Fort Hood, Texas 76544-5000

Dear Mr. Chisholm:

This document transmits the U.S. Fish and Wildlife Service's (Service) programmatic biological opinion on the debiting phase of the U.S. Department of Army's (Army) proposed military training activities to be implemented under Fort Hood's Recovery Credit System (RCS) at Fort Hood Military Installation in Bell and Coryell Counties, Texas, and its effects on the federally listed golden-cheeked warbler (*Dendroica chrysoparia*) (GCWA). The Army's letter requesting consultation, dated September 5, 2008, was received at our office on September 10, 2008.

Fort Hood is currently authorized incidental take for military training and other activities under a biological opinion issued on March 16, 2005. This opinion does not supersede the 2005 opinion, but only addresses actions related to training areas that would be modified and mitigated through the RCS.

This biological opinion has been prepared in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C 1531 et seq.). It is based on the Biological Assessment included with your letter initiating consultation, information provided by Fort Hood Natural Resources staff, the Service's Recovery Crediting Guidance (73 FR 44761-44772), and other sources of information. A complete administrative record of this consultation is on file at the Service's Arlington, Texas, Ecological Services Field Office.

Consultation History

March 16, 2005 The Service issued a biological opinion for Fort Hood regarding ongoing activities and revisions to the Endangered Species Management Plan. The

	opinion provided substantial flexibility for training exercises and is the current opinion authorizing incidental take at Fort Hood.
December 2005	The development of a RCS pilot project for Fort Hood was initiated by the Texas Department of Agriculture. Three committees were established, one each for science, policy and economics, and were charged with developing guidance and examples within their respective areas.
February 2006	The first draft of the RCS credit accrual process was completed.
August 2, 2007	Consultation on the credit phase of the RCS was completed, informally, through written concurrence from the Service.
November 6, 2007	Meeting at Texas Department of Agriculture to begin development of Debit Phase of RCS pilot project.
January 31, 2008	The first draft of RCS debit phase was completed.
February 13, 2008	Meeting at Fort Hood with Service staff and Fort Hood Natural Resources staff to discuss site selection criteria and habitat recovery periods for debit process.
February 22, 2008	Fort Hood sends draft of Biological Assessment (BA) to Service for review and comment. Service provides comments on February 28, 2008.
May 30, 2008	Fort Hood submits BA for debit phase of RCS and requests formal consultation.
June 19, 2008	Service provides comments on BA and requests changes to debit process in order to demonstrate a net benefit to recovery of the GCWA.
July 15, 2008	Meeting and site visit at Fort Hood to discuss BA revisions and habitat recovery period based on TA11 observations. Sub-committee established to develop habitat recovery period estimates for treatment standards based on "Shaded Fuel Breaks" and "TA11" examples.
July 28, 2008	Sub-committee completes report on treatment standards using site selection tiers and site development standards 1 and 2.
August 4, 2008	Fort Hood submitted a draft BA, which incorporated the sub-committee report standards, for informal review. The Service provided comments on August 7, 2008.
January 16, 2009	Arlington Field Office requested an extension of the consultation timeframe due to substantial comments received from Fort Hood.

January 28, 2009 Teleconference held between Army and the Service to address comments on draft opinion. The Army agreed to two small changes to their BA and Service would make those and additional minor changes to the draft opinion. The Army agreed to a 30-day extension of the consultation deadline.

BIOLOGICAL OPINION

I. Description of Proposed Action

The proposed action consists of the temporary development of training areas to support dismounted military maneuvers (i.e., Soldiers on foot) and the mitigation of incidental take of the GCWA resulting from training area development, maintenance, and use through the implementation of a RCS. A RCS is an optional process for Federal agencies to use their authorities to further the conservation of listed species (73 FR 44761-44772). Under the RCS, short term habitat preservation and management for the GCWA on private land, in the form of 10 to 25-year agreements, would be banked as credits for use by Fort Hood. The banked recovery credits will be exchanged for "debits" at Fort Hood. The credits acquired under this RCS are held for and can be used by Fort Hood only. The specific process of credit accrual with regard to biological value to the GCWA, are included in the consultation on that process (Service Consultation #: 21420-2007-I-0065, August 2, 2007).

The Goal of the Fort Hood RCS is:

> To enhance the ability of the Army to promote the recovery of the endangered GCWA on non-Federal lands and offset adverse effects to the GCWA from proposed actions at Fort Hood.

Objectives of the RCS are:

1) To produce a net benefit to the recovery of the GCWA,

2) To increase the flexibility of the Army mission at Fort Hood while meeting their requirements under the ESA, and

3) To promote effective Federal/non-Federal partnerships for GCWA recovery.

The proposed RCS is currently structured to provide short term mitigation for proposed short term actions. There are currently no means to mitigate permanent or long term actions. It is within this context that the proposed actions are described. For the purposes of this opinion, short term means the period beginning at the time the GCWA habitat is developed (i.e., modified for military training), through the proposed term of training ***plus*** the estimated period for the developed habitat to return to acceptable pre-disturbance conditions, which in total must be less than or equal to 25 years.

In voluntarily implementing the RCS, Fort Hood will need to show that a net benefit to the recovery of the GCWA is achieved. Under the Service's Recovery Crediting Guidance, a net benefit to recovery is defined as: *"enhancement of a species' current status by addressing the threats identified at the time of listing or in a current status review. Net benefit to recovery represents the cumulative benefits of the recovery actions for a species identified in an RCS that contribute to the goal of downlisting or delisting the species, as specified in a current recovery plan or equivalent Service-approved document, after consideration of the debits applied to any adverse effects of a Federal agency action. A net benefit to recovery will generally be found when an action directly or indirectly provides a material increase in a species' population and/or a material enhancement, restoration, or protection of that species' habitat."*

Fort Hood has proposed to meet the "net benefit to recovery" standard through the following aspects of the RCS:

- maintaining an annual 10% reserve account of credits unavailable for use,
- creating a valuation system that overestimates debits by "rounding up" acreages and underestimates credits by "rounding down" acreages,
- reporting annually on the status of credit properties,
- continuing the maintenance of a self-sustaining viable population and habitat protection at Fort Hood, and
- using a site selection screening criteria that targets high quality habitat for credits and low quality habitat for debits.

If effectively implemented, the RCS should exchange credits for debits on an unequal scale (favoring the GCWA), provide for a viable GCWA population at Fort Hood, and demonstrate an elevation in the status of the GCWA within its range through credit enrollments over time. Thus, a net benefit to recovery of the species can be achieved under the RCS.

The RCS is the first pilot project of its kind and is currently under a 3-year "proof-of-concept" period. The proposed debiting process is for a 5-year period, in which it is estimated that up to 2,024 hectares (ha) (5,000 acres [ac]) of nesting habitat for the GCWA may be affected. Thus, this biological opinion addresses the actions that would be implemented under the RCS up to five years from the date of issuance. The action area for the proposed debiting actions is limited to within the boundaries of Fort Hood, which encompasses approximately 87,890 ha (217,180 ac). The details involved with training area development, use, and RCS implementation are described in the following sections.

A. Military Training

In order for project-specific actions to be included in the RCS, they must fall under the short term limitations for mitigation. In general, the proposed military actions that would be

implemented under the RCS consist of dismounted military maneuvers and associated battle training objectives. Such actions, as described below, may involve armored vehicle and helicopter transport. However, the use of vehicular traffic may only occur on existing trails or non-habitat areas. The modification of habitat to allow vehicle access, as well as the impact wheeled and tracked vehicles would be expected to have on habitat, would exceed the short term limitations of the RCS. Thus, the proposed action is strictly limited to the modification of GCWA habitat for the purpose of training for Soldiers on foot. No vehicular traffic access to previously inaccessible areas is allowed in training areas developed under the RCS. The use of existing trails for vehicular traffic and its potential effects to the GCWA are currently covered under the 2005 biological opinion.

Based on current projections from G3 and Directorate of Plans, Training, Mobilization, and Security (DPTMS), habitat modification for Infantry Brigade Combat Teams (BCTs) will occur in Land Group (LG) 2 and LG 3. These LGs consist of the entire east side of the installation east of the firing ranges boundary, and north and south of Belton Lake. However, future plans and projections may indicate that habitat modification needs to occur in a different LG (e.g., LG 1 or 5). Infantry personnel assignments typically consist of: *platoon* = 4 nine-person squads (36 Soldiers**)**, *company* = 4 platoons (144 Soldiers), *battalion* = 3 to 5 companies (432 to 720 Soldiers), and *brigade* = 2 to 5 battalions (864 to 3,600 Soldiers).

The total Infantry BCT (all Infantry, Cavalry, Artillery, Special Troops, and Support battalions) is approximately 5,000 Soldiers. The preceding numbers are for Infantry BCTs only; Heavy BCTs and Corps level personnel assignments are different. For Heavy BCTs, the personnel strength is approximately the same as Infantry BCTs (i.e., ~5,000 soldiers). However, Heavy BCT mission relies more on armored, mechanized military hardware (Abrams tanks, Bradley vehicles, mobile Artillery) with some Infantry Soldiers assigned to the units. For Corps level, the personnel strength is typically greater than BCT structure, but generally <10,000 Soldiers. Moreover, the Corps mission is that of Command and Control with an emphasis on logistics and support for several BCTs organized under the Corps.

Detailed below are projections of landscape use on a yearly basis by Infantry BCTs. These projections may change due to evolving combat requirements and situations in war theaters, and they may change due to unit requirements once Infantry BCTs arrive on Fort Hood. LG 2 is anticipated to support 65% platoon-level, 30% company-level, and 5% battalion-level training. LG 3 is anticipated to support 20% platoon-level, 45% company-level, 30% battalion-level, and 5% brigade-level. Dismounted Infantry missions will consist of 50% day operations and 50% night operations. Combat convoy/logistics patrols (mounted) missions will consist of 80% day operations and 20% night operations. Units will train quarterly on Essential Mission Tasks with training occurring somewhere in LG 2 or 3 thirty-five percent of the time. Training will be conducted year around during all seasons and during all climate conditions. It is anticipated that these areas will be utilized by Infantry BCTs, however other units from Heavy BCTs, units from Combat Service Support, and National Guard/Reserve units may utilize the developed training landscapes in LG 2 and 3 as well.

During training events there will be intense noise during any hour of any month. The level of intensity will vary according to unit size (e.g., platoon and squad-sized elements may be less

intense than company and brigade-sized elements) and type of unit (e.g., infantry unit may have less weaponry than armor unit). Some training events may be short (i.e., several hours) while other events may be long (i.e., several days). Some sites may be used once and remain unused for several weeks or months while other sites may be continually used every day, every week, every other week, or every month. It is anticipated that noise and harassment will be generated by: machine-gun fire (individual weapons to crew served weapons), smoke grenades, riot control grenades, percussion grenades, artillery blast and flash simulators, IED blast simulators, pyrotechnics such as flares, tracked and wheeled vehicle noise from nearby non-habitat areas, humans yelling, rapid foot traffic of large numbers of Soldiers, bright lights, low-flying rotary wing aircraft, and vehicle/aircraft noise from nearby insertion areas (pre-existing roads and openings). Additionally, in some areas there may be wheeled and tracked vehicles and rotary-wing aircraft utilizing drop off points and clearings in close proximity to the developed habitat.

B. Training Area Development

Project Planning

The following provides a general overview of the planning and site-specific consultation of training projects proposed under the RCS.

1. Army maneuver and battle training mission needs are approved by III Corps G3 and executed by DPTMS.

2. Once the needs have been identified, DPTMS staff will meet with Fort Hood Natural Resource Management Branch (NRMB) staff to determine feasibility of RCS debits application, and to select a site, by way of mutual consensus, that best suits the requirements of the training mission while minimizing adverse effects to GCWA habitat and avoiding vireo habitat. Early planning will be a crucial step so that the mission, tier selection, treatment standard, maintenance schedule, duration of use, intensity of use, minimization measures, the affected GCWA habitat, recovery time, and credit availability can be accurately identified. Additionally, if upper level tiers are selected, there will be justification statements provided detailing why the lower tiers were inadequate.

3. Based on the examination in step 2, NRMB staff prepares project-level documentation for consultation with the Service under the programmatic biological opinion.

4. The Service issues a concurrence/non-concurrence statement. If concurrence, then project proceeds. If non-concurrence, then project is re-evaluated.

5. Duration of use debits are applied to Fort Hood's credit account and Fort Hood environmental baseline is adjusted (developed habitat is subtracted).

6. If applicable (i.e., depends upon tier selection and treatment standard), habitat recovery debits are applied to Fort Hood's credit account and habitat recovery is monitored according to a monitoring program. Once recovery of developed habitat is complete,

Fort Hood environmental baseline is adjusted (recovered habitat is added back to the inventory).

Site Selection Screening

A tiered decision approach for site selection will be used in order to prioritize training areas based on minimizing impacts to GCWA habitat. Primarily developing training areas that do not contain breeding habitat or that have habitat identified as low quality, is necessary to ensure a net benefit to the recovery of the GCWA. It is understood that habitat quality may vary within a habitat block. For site selection, the area constraints for each tier (i.e., > or < 101 ha) is measured based on the entire block of GCWA habitat as designated by the current GIS at Fort Hood. The quality designation for each tier (i.e., marginal or moderate to high quality) will be determined based on the proposed project footprint occurring within the habitat block. The list below begins with the highest priority for potential training area development (Tier 1) and ends with the lowest priority (Tier 5b).

For these tiers, ***isolated*** is defined as gaps in habitat that are greater than 25 meters (m) (82 feet) (see Horne 1999) between habitat blocks (i.e., blocks with hard or soft edge); the gaps may be canopy gaps (i.e., 0% canopy cover) or ecotone between forest and grassland or one forest type to another forest type (e.g., juniper-oak to post oak savannah); ***forest interior*** is defined as those areas ≥ 60 m from any direction of pre-existing edge (Paton 1994, Peak et al. 2004) and that have very few breaks in the canopy other than pre-existing tank trails.

Habitat Tiers in order of priority for RCS Projects

Tier 1. Non-endangered species habitat

Wooded areas that are not designated as endangered species habitat, according to the most current GIS layer (based on vegetation mapping) available for the installation. Areas where GCWAs are not expected to occur include park-like savannahs with canopy cover of < 35%. For example; open, park-like post oak (*Quercus stellata*) forests and live oak (*Q. fusiformis*) savannahs. Ashe juniper (*Juniperus ashei*) clearing can easily be accomplished in these areas that are already naturally open and have some canopy coverage. GCWAs are not expected in stands of monoculture juniper that have no hardwood component and are invading grasslands (Texas Parks and Wildlife Department [TPWD] 1999). Juniper monocultures are regrowth Ashe juniper trees, less than 1.8 m (6 feet) tall, that grow in a monoculture forest (i.e., with < 5% hardwoods growing amongst the juniper patch) at sites that were previously open (e.g., fallow agriculture fields). Note that "Cedar brakes" – a term referring to patches of monoculture Ashe juniper embedded within old-growth GCWA habitat (Pulich 1976) - are not classified as regrowth Ashe juniper and are excluded from Tier 1 classification. No debits are needed for this tier. All non-endangered species habitat areas that: 1) are ***not*** open grasslands, shrublands, or park-like savannas, and 2) that are adjacent to habitat areas, must have scientifically acceptable surveys conducted to ensure absence of GCWAs.

Tier 2. Isolated < 101-hectare Marginal Habitat

Isolated < 101 ha (250 ac) habitat blocks that are marginally suitable. Marginally suitable is defined as patchy woodlands with trees ≥ 4.6 m (15 feet) in height and canopy cover of 35-50%, on flat or rolling uplands with shallow soils, generally with low hardwood diversity (TPWD 1999). These blocks may be connected to other, non-endangered species habitat forested blocks where most modification can occur without debit use or endangered species restrictions.

Tier 3. > 101-hectare Marginal Habitat

Isolated > 101 ha (250 ac) habitat blocks that are marginally suitable (see definition in Tier 2 above). These blocks generally have juniper monocultures and/or open uplands. These blocks may be connected to other, non-endangered species habitat forested blocks where most modification can occur without debit use or endangered species restrictions. Within habitat blocks, select: upland habitat rather than slope, canyon, and mesa edge habitat; open (less dense forest) rather than cluttered (dense forest) habitat; edge areas rather than interior. If interior is used, minimize modification footprint to the maximum extent practicable. Where juniper comprises 10-90% of total trees in canopy, select juniper monocultures (see definition in Tier 1 above) rather than juniper-oak areas.

Tier 4. Isolated < 101-hectare Moderate to High Quality Habitat

Isolated < 101 ha (250 ac) habitat blocks that are moderately-highly suitable. Moderately-highly suitable is defined as woodlands with trees ≥ 4.6 m (15 feet) in height and canopy cover of 50-100%, on flat or rolling uplands, or slopes and canyons, with mature junipers and a diversity of hardwood species represented in the canopy (TPWD 1999). Within habitat blocks, select: upland habitat rather than slope, canyon, and mesa edge habitat; open (less dense forest) rather than cluttered (dense forest) habitat; edge areas rather than interior. If interior is used, minimize modification footprint to the maximum extent practicable. Where juniper comprises 10-90% of total trees in canopy, select juniper monocultures (see Tier 1 above) rather than juniper-oak areas.

Tier 5. > 101-hectare Moderate to High Quality Habitat

Contiguous > 101 ha (250 ac) habitat blocks that are moderately-highly suitable (see definition in number 4 above) and needed for existence and maintenance of a viable, self-sustaining population on Fort Hood. Within habitat blocks, select: upland habitat rather than slope, canyon, and mesa edge habitat; open (less dense forest) rather than cluttered (dense forest) habitat. Where juniper comprises 10-90% of total trees in canopy, select juniper monocultures (see Tier 1 above) rather than juniper-oak areas. For this tier, use category a. first.

a. Use block edge, preexisting field edges, preexisting opening edges, existing tank trail edges, or a combination thereof.

b. Use forest interiors immediately adjacent to preexisting tank trails and secondary roads. Distance from trail/road must not exceed 18 m (60 feet) on

one side (one side is developed and the other is left intact), or 9 m (30 feet) on both sides (both sides developed).

General Conditions for Training Area Development

The development of training areas to allow Soldiers on foot to move through GCWA habitat will require understory modification within the habitat. The following conditions apply to training area development:

1. Existing tank trails and natural openings shall be used and modified (if necessary), rather than creating new trails and openings.

2. Rooted deciduous trees and saplings will not be removed.

3. All brush/slash piles shall be mulched in place, or moved to another area and mulched in place. Burning of slash material will be considered only as a last resort, and only with prior concurrence from DPW-NRMB, which is responsible for burning.

4. There will be no "borrow areas" in habitat

5. Black-capped vireo habitat will be avoided.

Treatment Standards for Training Area Development and Maintenance

A sub-committee consisting of species and habitat experts was assemble to develop "standards" that will be used to modify GCWA habitat on Fort Hood and estimate appropriate habitat recovery periods for use in the RCS. The development of new training areas for use by Soldiers on foot is limited to the thinning and pruning of Ashe juniper trees. The following two methods of thinning habitat described in the sub-committee report can be used in the RCS.

Standard 1 – Light thinning

This standard involves the partial thinning and pruning of juniper with ***hand tools*** (loppers, chainsaws, etc) up to a height of 1.8 m (6 feet). Immature juniper saplings < 2″ dbh that are wholly contained within the understory and do not contribute to the canopy may be removed if necessary for movement. Pruning according to this standard will be used to create an intertwining network of understory openings through which human traffic on foot could pass. No juniper cover above 1.8 m will be removed (i.e., pre-existing canopy cover will be retained). When creating maneuver corridors, ***non-canopy*** contributing limbs and branches from junipers will be cut rather than the trees. Fort Hood may explore the use of miniaturized mechanical equipment to achieve this standard, and it is incumbent upon Fort Hood to demonstrate to the satisfaction of the Service that the thinning standard, as described (impacts confined to less than six feet in height, removal of stems < 2-inches in diameter only) can be successfully achieved with something other than hand tools without any unintentional direct or indirect effects to the habitat (e.g., elimination of groundcover, increased soil erosion).

Standard 2 – Moderate Thinning

This standard involves the partial thinning and pruning of juniper cover with ***machine driven tools*** (skid steer, power driven cutting blades, etc) up to a height of 4.6 m (15 feet). Thinning and pruning will remove lower limbs and some rooted stems of junipers < 5″ dbh. Pruning according to this standard will be used to create an intertwining network of openings through which human traffic on foot could pass. Thinning and pruning widths will not exceed 1.5 m (5 feet) to prevent wheeled and/or tracked vehicle entry onto the trail networks (most vehicles associated with Fort Hood units are ≥ 2.1 m [7 feet]). No juniper cover above 4.6 m will be removed; no rooted juniper stems > 5″ dbh will be removed. Impact to juniper cover between 0 and 3 m (10 feet) will be limited to a 10% reduction from pre-alteration condition. However if the maximum canopy height is ≤ 3 m (e.g., on mesa "hard pans"), then the 3% reduction standard will be used. Impact to canopy cover above 3 m will be limited to 3% reduction from pre-alteration condition. Cut material will be removed from the treatment area and mulched.

C. Determination of Debit Values

The method for determining a debit amount for a particular project will be equivalent to the method for valuing credits, with the exception that the credit screening criteria will not be used. The site screening criteria above will be used for debits, rather than the credit screening criteria. In general, debit value of a proposed action is calculated based on the 20-acre conservation unit and ranked based on value to the GCWA. The area that will be considered for debit valuation consists of the entire area proposed for development of a training area. The complete method for determining credit/debit value is provided in Appendix A.

D. Trading of Debits

Debit values will be traded for credits based on the duration of use ***plus*** the habitat recovery period. Habitat recovery period is the time necessary for the affected habitat within the training area to return to acceptable pre-disturbance condition as a result of the treatment standard, scheduled maintenance, and training disturbance. Habitat recovery period begins when scheduled training area maintenance and training use have ceased (see duration of use below). Actual habitat recovery period will be relatively unknown; however, the following table, developed by the sub-committee (see Treatment Standards for Training Area Development and Maintenance section above) will be used to estimate habitat recovery period to be added to training duration. Habitat tiers are described in Site Selection Criteria above.

The habitat recovery table was developed by species and habitat experts and includes estimates of habitat recovery periods. There are no data that support these estimates. Habitat recovery period monitoring using an appropriate study design to evaluate habitat recovery to pre-disturbance conditions (e.g., canopy cover, understory regeneration, juniper/hardwood recruitment) should provide these data. Once sufficient data are available to support a specific habitat recovery period for a particular treatment standard and habitat tier, then the estimated value in the table may be replaced with the data-supported value.

		Habitat Tier			
		2	**3**	**4**	**5**
Treatment Standard	**1**	0 yr	0 yr	10 yr	15 yr
	2	10 yr	10 yr + Minimization Measures or 15 yr	20 yr	20 yr + Minimization Measures or 25 yr

Minimization is used in the table to provide a 5-year incentive for creating habitat modification projects in ways that limit impacts to large blocks of habitat. In order to utilize the 5-year debit incentives in the table, each of the measures detailed in the Minimization Measures Section must be implemented.

The effective implementation of the RCS necessitates the concurrent preservation and management of credits with the modification of habitat, training effects, and habitat recovery period of debits. That is, debits can only be used under the short term limitations of the banked credits. Credits cannot be "stacked" to increase the debit time constraints (e.g., two credits of 25 years cannot cover a one debit project for 50 years).

Following the termination of training activities at a project site, the determination of habitat return to acceptable pre-disturbance condition should be supported by appropriate data designed to measure habitat conditions (e.g, canopy cover, understory regeneration, juniper/hardwood recruitment) in order to support a conclusion that pre-disturbance conditions (or better) have been achieved. Once results are obtained that support such a conclusion for a particular RCS project site, then, if the measured habitat recovery period equals the habitat recovery period specified in the table, the project is considered completed under the RCS. Otherwise:

- if the measured habitat recovery period is less than the period specified in the habitat recovery table, then the balance of credits assigned by Fort Hood for that particular project may be applied to another project, or

- if the measured habitat recovery period is greater than the period specified in the habitat recovery table, then Fort Hood's credit account will be debited for additional credits based on an estimate made using data collected from habitat monitoring.

E. Project-specific Documentation

Candidate projects proposed for inclusion under the RCS will undergo project-level review by the Service's Arlington Field Office. Following the review, the Service will respond to Fort Hood with concurrence or non-concurrence. The purpose of the review will be to evaluate the project-specific action in meeting the goal and objectives of the RCS as detailed in this opinion, as well as other associated RCS documents. Concurrence documentation will be appended to

this biological opinion in Appendix B. The following minimum information will be submitted by Fort Hood for project-level review:

1. **Project description**. The military training mission shall be identified and it shall include, but not be limited to: a) training site task (e.g., infantry assault), b) type of training event (e.g., night infiltration), c) expected unit level (e.g., company and below), d) use intensity/severity (e.g., maneuver only, training enhancers used, force on force contact), e) proposed location, f) tier selection used (along with justification statement if lower levels are not acceptable), and g) treatment standard used to develop training area.

2. **Project footprint**. Acreage of anticipated habitat impacts shall be calculated and the footprint projected as a shapefile onto existing GCWA habitat shapefile. Nearby open areas/tank trails that will be part of the site (e.g., assembly and insertion areas), any construction related use (e.g., equipment storage areas and access trails), and any black-capped vireo habitat shall also be identified on the image.

3. **Minimization**. All minimization measures that would be implemented.

4. **Exposure/effects analyses**. Description of anticipated effects and any additional stressor effects not identified in this biological opinion.

5. **Duration of use and habitat recovery period**. ***Duration of use*** begins after habitat modification and ends after the last use by a military unit. The proposed duration of use will include a specific end date for termination of training activities at the proposed site. ***The habitat recovery period*** begins after the proposed end date for military training at the site. Some tiers do not have a habitat recovery period (0 years), for example tiers 2 and 3 utilizing standard 1. However, if tier selection and type of treatment standard entail a habitat recovery period, then an estimate of the recovery period, using the Habitat Recovery Periods Table, will be added to the project for debit calculation (see Trading of Debits section). Estimated habitat recovery period depends upon use intensity and habitat modification method. Therefore, actual habitat recovery period may be more or less than what is predicted by the table. Fort Hood will actively work to identify and employ less invasive techniques for achieving the mission landscape requirements, in order to minimize recovery time and direct effects to habitat.

6. **Recovery credits available**. The current (at the time of the project) credit availability amount will be quantified and will take into account the duration of contracts (e.g., 10-year, 15-year) that are available through the RCS, current credit contracts that are being used under another debit project (unavailable for use), time remaining on contracts, and the 10% yearly set-aside (Recovery Credit Reserve Account). This will provide some assurance that sufficient credits may be available to offset duration of use and recovery debits.

7. **Debit amount.** An estimated debit amount (duration of use plus estimated habitat recovery period) will be quantified by Fort Hood. This amount shall be compared to the existing credit balance to ensure a deficit does not exist. This debit amount shall take

into consideration that an estimated habitat recovery period will use the Habitat Recovery Periods Table (page 10). Using the estimated habitat recovery period is appropriate because the debit amount (value) is subtracted from the credit account *each year* the developed habitat remains unsuitable (i.e., sum of duration of use and estimated habitat recovery period). However, the estimated debit amount can be considered "spent" until a shorter habitat recovery period is demonstrated. This provides a protection against overly-optimistic estimation of a short habitat recovery period and the subsequent debit "spending" when a longer habitat recovery period and possibly longer contracts/more credits are actually needed.

8. **Incidental take, monitoring and minimization.** A detailed estimate of incidental take (in habitat area) associated with the project. For some projects, multiple methods may be used to create the required mission landscape, resulting in a reporting of the actual acreage that will be registered as debits, as well as acreage not suitable for RCS, and the associated charge to incidental take covered under a different biological opinion (i.e., 2005 biological opinion or subsequent opinion). The Fort will provide details on application of minimization and avoidance measures used to produce the final project design, and if deemed scientifically feasible and cost effective, describe an appropriate level of bird monitoring to document responses to the treatment and use of the project area. In addition, the Fort will provide a description of an appropriate level of site compliance monitoring to ensure that the treatment methods are put in place on the ground in accordance with the project scope of work, that the actual use of the site results in no unanticipated effects to the habitat, and that the habitat recovery period after discontinuation of active use progresses as predicted.

Minimization Measures

During the project planning phase, minimization measures will be included in the project description. Measures listed below will be followed to the maximum extent practicable and will serve as guidelines for habitat modification and best management practices during the project implementation phase. Each measure below is **required** for projects using the 5-year incentive using minimization under the Habitat Recovery Periods Table (Tiers 3 and 5 using standard 2). Adherence to the measures described below should: 1) avoid long-term adverse effects associated with habitat modification and use projects, 2) greatly expedite the habitat recovery process, which is cost effective for the Army and provides a net benefit to recovery of the GCWA, and 3) avoid and minimize some of the potential effects identified in the Effects of the Action section.

- Training area development associated with a project shall occur from 01 July to 15 March.

- Thinning juniper will be concentrated adjacent to existing linear openings (>25 m); thinning projects will focus along habitat edge rather than interior of a patch, focus thinning in flat upland rather than on steep slopes (> 15%) and canyons, and thin areas of < 10% hardwood composition in the canopy rather than mixed woodlands.

- Maintenance of training area (thinning and pruning of juniper subsequent to initial treatment) will be accomplished using treatment standard 1 and be scheduled between 01 July and 15 March.

- All construction trails, equipment storage areas, and equipment staging areas associated with habitat modification will be located *outside* of project area, in non-endangered species habitat areas. Clearing required for equipment storage or staging would not be eligible for RCS offset due to the level of impact.

- To prevent the spread of oak wilt disease (*Ceratocystis fagacearum*), damage to Spanish oak (*Q. buckleyi*) and plateau live-oak trees will be minimized. Immediately sealing oak injuries, and performing modification during the winter months should reduce disease infection and spread.

Monitoring

The success and credibility of the RCS depends upon the monitoring and accountability of credit and debit accounts. Fort Hood is responsible for accounting of credits and compliance with the debit process. The focus of the monitoring program will be to evaluate the goal and objectives of the RCS in both the crediting and debiting aspects. Critical to the monitoring plan will be evaluating any uncertainties in the RCS that would prevent the objective of "net benefit to recovery" of the GCWA from being achieved.

A monitoring program will accompany the use of RCS for offsetting the anticipated impacts of habitat alteration and training. A primary purpose of monitoring will be to provide Fort Hood and the Service with reliable information for assuring that the treatment standards are appropriately applied and the habitat recovery periods are sufficient.

The non-binding nature (i.e., landowner may terminate a contract before contract term expires) and transferability of private landowner contracts creates some uncertainty with regard to future availability of credits. If a landowner decides to exit a contract before the contract officially ends (e.g., terminates a 10-year contract after only six years), then Fort Hood's credit account would be reduced, potentially reducing military operational certainty and flexibility. As a penalty, the landowner must reimburse all money *directly received* for property improvement. However, the landowner does not have to reimburse Army funded costs *indirectly received* such as: contract negotiation, bird surveys, or any other services provided to the landowner from the Cooperator. Although there is a financial penalty for terminating a contract early, there is no certainty that this penalty will prevent such actions. If a landowner prematurely exits a contract that is currently being used under the debit process to offset an impact on Fort Hood, then Fort Hood must use credits from another contract to fulfill the debiting requirement. Alternatively, if sufficient credits are not available (i.e., only 50 credits are left, but debit requires 80 credits) and there are not enough credits in reserve, or if sufficient contract lengths are not available (i.e., project required 25-year time frame, but 25-year contracts are no longer available), then the RCS could not be used, and any anticipated incidental take would need to be authorized under a separate consultation.

Some uncertainty exists with land management actions occurring in adjacent landowner blocks that are not enrolled in RCS, yet this adjacent land is part of the minimum101 ha (250 ac) screening criterion necessary for RCS enrollment. Any land management action or other unanticipated circumstances (e.g., catastrophic fire, natural disaster, etc.) occurring within the non-RCS land of this 101 ha block that brings the amount of GCWA habitat in the screening patch below the minimum 101 ha criterion, may result in a situation where there is no net benefit to recovery of the GCWA. For example, landowner A has two Conservation Units enrolled in RCS. Landowners B and C are not enrolled in RCS yet they share the same habitat patch with landowner A. A wildfire destroys most of the GCWA habitat on landowner B's property and the following year landowner C sells his property for residential development. Landowner A is now below the minimum requirement for enrollment in RCS, and the existence of the GCWA in this patch and possibly surrounding patches are now uncertain. In this case, landowner A's property will be removed from enrollment in the RCS and Fort Hood's credit line adjusted. However, if this property is currently being used for debiting, Fort Hood would need to use the 10% reserve, or seek to use other available credits in an equivalent year class (e.g., 10-year, 15-year, 25-year) if they are available, or seek additional credit properties.

The preceding scenario may exist for neighboring ≥ 101 ha blocks targeted for conservation by RCS, thus highly fragmenting an area and disrupting connections between habitat patches that may be needed for population maintenance. Further, the same scenario may exist for a series of patches in the same county or in a series of counties undergoing rapid urban development. If there are several events in one area in which Fort Hood has invested in numerous credits, then the 10% reserve may be depleted and additional credits unavailable. In this case, Fort Hood would need to acquire additional credits or enter into section 7 consultation. For example, assume 70% of credits occur in counties A & B. An increase in land prices favor developing the land, and several landowners not part of the RCS develop parcels in which Fort Hood has RCS credits, thus degrading the integrity of the habitat functions and connectivity. Additionally, land development may create a situation where many RCS landowners are no longer eligible for RCS, adjacent land blocks are now no longer eligible, or RCS landowners opt out of the contract for more favorable ventures. Under this scenario, the GCWA would no longer receive a net benefit to recovery and the Fort Hood's credit account and debiting actions would be curtailed.

Effectiveness monitoring. This monitoring will assess the credit process with regard to achieving recovery actions in the GCWA Recovery Plan and achieving a net benefit to the recovery of the GCWA. Credits acquired under RCS contribute to GCWA recovery outlined in the Recovery Plan; specifically: 1.36- determine current distribution of existing habitat on private land in breeding range; 2.12-2.122- protect populations on private land- locate landowners interested in voluntarily protecting habitat- encourage voluntary protection and improve incentives for voluntary protection; 3.1- enhance and maintain habitat quality on private lands; 3.2- maintain hardwood regeneration; and 3.5- reduce impact of cowbird parasitism (USFWS 1992).

Ultimately, the Army is responsible for accounting for credits accrued in the Fort Hood RCS. Fort Hood has opted to contract the monitoring and accounting of credits to a third party cooperator (hereafter, Cooperator). The monitoring by the Cooperator allows the confidentiality of enrolled parcels within the RCS. Landowner information, including habitat location, RCS

agreement, and associated management plans would be held confidential and not available to the Service for evaluation or audit. The information made available to the Service would be through the reporting process as required under the terms and conditions of this biological opinion.

Under this process, the basic Conservation Unit is a parcel of land 8 ha (20 ac) in size. During RCS crediting, the GCWA benefits because credit acreages are rounded down during evaluation. For example, assume a private landowner has 15 ha (38 ac) that he/she wishes to offer for consideration under the RCS, one Conservation Unit (8 ha) is assessed even though there are 15 ha that may be managed (according to Science committee guidelines there are no partial Conservation Units [one unit = 8-16 ha (20-39 ac)]). During debiting, the GCWA benefits because credits acreages are rounded up. For example, assume Fort Hood developed 4 ha (10 ac) of habitat, one Conservation Unit (8 ha) is used as credit even though only 4 ha were developed. In both cases, the GCWA benefits because there is excess acreage conserved that is not yet part of a Conservation Unit, and the Army benefits by using its 7(a)1 authority to further the purposes of the ESA while meeting GCWA population goals and mission requirements on Fort Hood.

Before private land is considered for acceptance as credits, the bid is assessed through screening and ranking criteria (refer to consultation on credit accrual, Consultation #: 21420-2007-I-0065, August 2, 2007). Under these criteria, bid assessment is based upon landscape context, proximity to other GCWA populations, the size of the nearest GCWA populations, and recovery region designation in which the private land is located. The criteria allow flexibility when selecting bid contracts so that suitable habitat in a favorable landscape context with the greatest potential for GCWA recovery can be selected. The process provides some assurance that Fort Hood credits represent some of the best GCWA habitat available on private land. Included in the bids are State-approved Wildlife Management Plans that promote GCWA habitat conservation through brown-headed cowbird (*Molothrus ater*) management, white-tailed deer (*Odocoileus virginianus*) management, prescribed burning, and grazing management/deferment.

Each patch of land (includes potential credit properties and non-RCS properties) that is used for ***screening*** eligibility for the RCS (i.e., patches ≥ 101 ha [250 ac]) will be evaluated annually to ensure eligibility to remain in the RCS and to identify any failures in the ***screening patch***. On an annual basis, Fort Hood will evaluate and report on Management Plan compliance for <u>each</u> property. The report will include, but not be limited to: property bid contract number system used by the Cooperator [see Compliance Monitoring below]), county location of property, contract length (10-year, 20-year, etc), credit vintage, results of bird monitoring surveys, results of vegetation monitoring surveys, results of scientific studies other than bird and vegetation monitoring, any change in status of the credit property (e.g., habitat damage from fire or land management), any change in status of credit property owner, any change in status of the *surrounding* properties (i.e., habitat destruction within the 101 ha (+) block), and copy of aerial imagery and any other imagery/maps used to determine credit land status.

Compliance monitoring. This monitoring audits and accounts for debits and credits to ensure proper implementation and documentation of the actions under this opinion. Fort Hood will monitor the account balance by receiving a bi-annual report for <u>each</u> property and <u>each</u> debit charge from the Cooperator, and by monitoring the habitat developed on Fort Hood (i.e., debit projects) and reporting the results of monitoring to the Service on an annual basis. The bi-annual

report will include, but not be limited to: **credits-** property bid contract number, county location of the property, contract length (10-year, 20-year, etc), credit vintage, number of credits for the property, status of credits (available or non-available [if non-available, project name of debit charge or 10% reserve]), balance of 10% reserve, balance of credits with debits applied, final balance of credit (minus debit charges and 10% reserve); and **debits**- military project name (determined during activity-specific consultation), number of debits used, length of debit period (duration of use and/or recovery period [if applicable]), date of debit use (start of training area development), property bid contract number to which the debits will be applied, final balance of debits. The total from the credit columns will be grouped according to length of contract. For example, nine contracts worth 95 credits for 10-years, and three contracts worth 100 credits for 25-years. The total from the debit columns will be grouped according to debit process length. For example, IED defeat lane costing 60 debits for 10-years, and assault lanes costing 85 debits for 25-years. By using this process, Fort Hood can independently monitor the account and verify account status with the Cooperator.

II. Status of the Species

The following threatened (T), endangered (E), and candidate (C) species have been documented, or are known to occur in Bell and Coryell Counties:

black-capped vireo (*Vireo atricapilla*) – E
golden-cheeked warbler (*Dendroica chrysoparia*) – E
whooping crane (*Grus americana*) – E
Salado salamander (*Eurycea chisholmensis*) – C (Bell County only)
smalleye shiner (*Notropis buccula*) – C (Bell County only)

Currently, there are no known populations of the Salado salamander or smalleye shiner on Fort Hood. Additionally, habitat for these species does not occur within the action area. Whooping cranes are transient at Fort Hood; conditions for encounters of whooping cranes are covered in the 2005 biological opinion.

A large population of black-capped vireos occurs at Fort Hood. The RCS does not include the vireo as a covered species, and therefore, any potential effects to the vireo for RCS projects will be avoided. Incidental take of the vireo for non-RCS projects are covered under the 2005 biological opinion. The proposed action only covers potential effects to the GCWA, and therefore, no other species will be considered in this opinion.

Golden-cheeked warbler Description and Life History

The GCWA is a small, insectivorous songbird, 11.4 to 12.6 cm (4.5 to 5 inches) long with a wingspan of approximately 20.3 cm (eight inches). Average breeding weight is 10.2 grams (0.36 ounces) for adult males and 9.4 grams (0.33 ounces) for adult females. Wings are black with two distinct white wing-bars. Males have a black back, throat, and cap, and yellow cheeks with a black eye strip. Females are similar, but duller overall in color (USFWS 1992).

GCWAs breed exclusively in the mixed Ashe juniper/deciduous woodlands of the central Texas Hill Country west and north of the Balcones Fault. GCWAs require the shredding bark produced

by mature Ashe junipers for nest material. Typical deciduous woody species include Texas oak (*Quercus buckleyi*), Lacey oak (*Quercus glaucoides*), live oak, Texas ash (*Fraxinus texensis*), cedar elm (*Ulmus crassifolia*), hackberry (*Celtis occidentalis*), bigtooth maple (*Acer grandidentatum*), sycamore (*Platanus occidentalis*), walnut (*Juglans* spp.), and pecan (*Carya illinoinensis*). Breeding and nesting GCWAs feed primarily on prey items including insects, spiders, and other arthropods found in Ashe junipers and associated deciduous tree species (Pulich 1976).

Male GCWAs 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. Females arrive a few days later, but are more difficult to detect in the dense woodland habitat. Three to five eggs are generally incubated in April, and unless there is a second nesting attempt, nestlings fledge in May to early June. By early August, the GCWAs begin their migration south. GCWAs winter in the highland pine-oak woodlands of southern Mexico and northern Central America.

Historic and Current Distribution

The GCWA's entire breeding range occurs on the Edwards Plateau and Lampasas Cut Plain of central Texas. GCWAs are confirmed in 27 counties and may occur in another 11 counties. However, many of the counties where it is known to occur, now or in the past, have only small amounts of suitable habitat (Pulich 1976).

Several state and federally owned lands occur within the breeding range of the GCWA, but the overriding majority of the species' breeding range occurs on private lands that have been either occasionally or never surveyed (USFWS 1992). As a result, the population status and suitability of habitat for GCWAs on private lands remains undocumented throughout major portions of the breeding range. DeBoer and Diamond (2006) estimated that the amount of suitable GCWA habitat across the species' range was 1,869,511 acres (757,000 ha), with much of this habitat occurring on private lands. However, DeBoer and Diamond (2006) note that some of this habitat occurs in patches that may be too small to serve as useful breeding habitat.

Currently there are only four large GCWA populations known that receive some degree of protection: those at the Balcones Canyonlands Preserve in Travis County, the nearby Balcones Canyonlands National Wildlife Refuge in Travis, Burnet, and Williamson Counties, Fort Hood Military Reservation in Coryell and Bell Counties, and Camp Bullis in Bexar County.

Reasons for Decline and Threats to Survival

Before 1990, the primary reason for GCWA habitat loss was juniper clearing to improve conditions for livestock grazing. Since then, habitat loss has occurred as suburban developments spread into prime GCWA habitat along the Balcones Escarpment. GCWA populations are limited primarily by the amount and configuration of available habitat. Pulich (1976) estimates that approximately 52,608 ha (130,000 ac) of potential habitat, or 35%, were lost from 1962-1990 and nesting territories have declined approximately 25% during that same period.

Activities that continue to threaten GCWAs include the clearing of deciduous oaks upon which the GCWAs forage, oak wilt, nest parasitism by brown headed cowbirds (Engels and Sexton 1994), drought, fire, stress associated with migration, and competition with other avian species (Ladd and Gass 1999), and particularly loss of habitat from urbanization. Human activities have eliminated habitat within the central and northern parts of its range, especially areas associated with the Austin and San Antonio metropolitan areas.

Populations of GCWA and other neotropical migrants are less stable in small habitat patches surrounded by urbanization (Coldren 1998, Engels 1995, Arnold et al. 1996, Bolger et al. 1997, Moses 1996). Some studies indicate that the abundance of several bird species, including GCWAs, is reduced within 200-500 m (656-1640 feet) of an urban edge (Engels 1995, Arnold et al. 1996, Bolger et al. 1997, Coldren 1998). Coldren (1998) reported that GCWA occupancy declined with increasing residential development and roadway width.

Range-wide Survival and Recovery Needs

The recovery strategy outlined in the GCWA recovery plan divides its breeding range into eight regions and calls for the protection of sufficient habitat to support at least one self-sustaining population in each region. These Recovery Regions were delineated based primarily on watershed, vegetational, and geologic boundaries (USFWS 1992).

In general, the recovery plan calls for the creation of protected populations scattered over the known breeding range. Habitat protection must include elements of both breeding and non-breeding habitat (i.e., associated uplands and migration corridors). Efforts to create new and protect existing habitat will enhance the GCWA's ability to expand in distribution and numbers. Efforts to increase numbers of existing viable populations is critical to the survival and recovery of this species, particularly when rapidly expanding urbanization continues to result in the loss of prime breeding habitat.

Catastrophic fires within occupied habitats could result in the loss of significant portions of habitat and/or entire existing populations within each Recovery Region. Efforts to control accidental fires should continue to be a priority to minimize the chance of significant loss of breeding habitat necessary to allow for the expansion of distribution and numbers of GCWAs.

In order to better assess the status of the GCWA, formal surveys need to be conducted across its range in central Texas. However, access to private lands to conduct formal surveys continues to be difficult to obtain. The *Golden-cheeked warbler Population Viability and Habitat Assessment Report* (USFWS 1996) indicates that only a few counties (e.g., Bexar, Travis, Bell, and Coryell) have been intensively studied in a manner that produces confident assessments.

Population viability assessments on GCWAs have indicated the most sensitive factors affecting their continued existence are population size per patch, fecundity (productivity or number of young per adult), and fledgling survival. It is estimated that a minimum of 13,152 ha (32,500 ac) of prime unfragmented habitat must be preserved to reduce the possibility of extinction of a GCWA population to less than five percent over 100 years (USFWS 1996). This acreage is estimated to provide the carrying capacity for a population of 3,000 breeding pairs. Further, this

minimum carrying capacity threshold estimate increases with poorer quality habitat (e.g., patchy habitat resulting from urbanization).

III. Environmental Baseline

A. Description of the Action Area

Fort Hood dates to 1942 when the Army established Camp Hood to prepare soldiers for tank destroyer combat during World War II. Renamed Fort Hood, it became a permanent installation in 1950. Various armored divisions have been assigned to Fort Hood since 1946.

Landscape Description

Fort Hood is located in the Lampasas Cut Plains physiographic region of the Edwards Plateau in Bell and Coryell counties in north-central Texas. Geologically, the installation is in a karst landscape (Klemt et al. 1975, Reddell 2001) characterized by Cretaceous-age limestone mesas and canyons with rock outcrops, cliffs, sinkholes, caves, springs, and rock shelters; wide-to-narrow valleys separate the mesas. Elevation ranges from 180 m to 375 m (590 – 1,230 feet) above sea level. High elevations occur on mesa ridges that span the north-central portion of the installation in a west-east direction and on a remnant mesa on West Fort Hood. Lower elevations occur on rolling uplands and canyons associated with creek watersheds and drainages. Annually, 79 – 81 cm (31-32 inches) of rainfall occurs (Bomar 1983, Diggs et al. 1999) mostly during spring and autumn; short, wet, mild winters and long, hot, dry summers typify the climate of the region.

Fort Hood occurs in the Cross Timbers and Prairies vegetation region (Diggs et al. 1999). Local-scale vegetation systems are heterogeneous and patchy, often intergrading abruptly amongst different types. Woody vegetation is characterized by contiguous, closed-canopy, Ashe juniper-oak (*Juniperus ashei-Quercus* spp.) forests on mesa slopes, tops, and canyons. Some mesatops are dominated by open, park-like post oak/blackjack oak (*Q. stellata/Q. marilandica*) forests. Shin oak (*Q. sinuata* var. *breviloba*) shrubland/grassland matrices are found where wildfire has occurred. Expansive, open grasslands occur on some valleys and rolling uplands, and in small patches near and amongst mesa forest/shrubland stands. Grassland/live oak savannahs occur on some rolling uplands. Riparian corridors are characterized by juniper-oak forests and forest belts of pecan, walnut, sycamore, eastern cottonwood (*Populus deltoides*), bur oak (*Q. macrocarpa*), black willow (*Salix nigra*), and slippery elm (*Ulmus rubra*) trees.

Military activities in the Action Area

The installation provides the infrastructure and training lands for Combat/Support Aviation Units and BCTs from the 1st Cavalry Division, the 4th Infantry Division (Mech), and the 3rd Armored Cavalry Regiment, as well as combat service support units for III Armored Corps. National Guard units from different states and units from the 1st Infantry Division are assigned to Fort Hood as temporary tenants. With increased emphasis on force structure changes and BRAC

initiatives, Fort Hood will likely remain the largest active U.S. installation in terms of assigned personnel. Total assigned personnel authorization is approximately 50,000 Soldiers.

Fort Hood provides state-of-the-art training ranges and environments so that BCTs can train for decisive victory on the battlefield. The War on Terror and the modular structure of BCTs require constant changes in battle tactics. Evolving tactics include: convoy/patrol security and reaction to improvised explosive devices and ambushes; conducting operations from Forward Operating Bases and embedded combat outposts; and conducting cordon-and-search and urban combat operations in villages. These new tactics often involve small-to-moderate-sized BCTs, or Battalion-level and below units undergoing realistic training in or near GCWA habitat during the day and night at any time of the year. Multi-BCT and Division-level combined-arms/command-and-control operations occasionally occur. These operations often encompass a large area with BCTs, command-and-control units, aviation support, and enemy forces spread out amongst the landscape.

Maneuver training is a critically important skill for BCTs so that they can remain combat ready. Training programs focus on units attaining and maintaining proficiency in collective tasks that support Mission Essential Task Lists. Commanders synchronize activities of their units within a framework so that operations can occur over the full spectrum of the battlefield. Such exercises involve greater depth and rapidity of unit movement within battlefields; therefore, greater demands are placed on land-use. Heavy BCTs (i.e., teams composed of mainly tanks, artillery, and combat engineers) and Air Defense Artillery units (i.e., Patriot and Avenger missile crews) require large areas in which to train. The focal areas for these units are Land Groups 4-6 on the west side of the installation. The area features a wide variety of terrain and vegetation that greatly enhance cross-country, combined-arms maneuver for large operations and air defense. Infantry BCTs (i.e., small teams composed mainly of Bradley fighting vehicles, dismounted infantry, and armor support) can train in large or small areas. The focal areas for these units are Land Groups 1-3 on the east side of the installation, occasionally Land Groups 4-6 are used. Land Groups 1 and 2 are heavily vegetated and cross-compartmentalized by steep canyons, providing limited value for large, heavy BCT maneuver operations. Land Group 3 is not as heavily vegetated and cross-compartmentalized, providing more favorable terrain for Infantry BCTs and medium-sized heavy BCTs. Rotary-wing combat/support aviation units utilize the air space in all maneuver areas (east and west). Rotary wing maneuvers often include day and night operations of low-level flight, enemy identification/surveillance, close combat support, rearming and refueling operations, air insertion, medical evacuation, and transport. Supporting units such as command-and-control, intelligence, field hospitals, and logistics utilize all maneuvers areas (east and west) and provide combat support for infantry and heavy BCTs.

Fort Hood units train with the most modern and sophisticated weapons systems available. Fort Hood uses a 5-year Range Upgrade and Modernization Program to manage upgrades and expansion of existing range facilities. Live-fire ranges occur in the central portion of the installation, essentially separating the west and east sides of Fort Hood. Direct fire from a multitude of weapons platforms for individual, crew-served, and sophisticated weapons systems is directed toward the target arrays in live-fire, thus no maneuvering occurs. Line-of-site pathways, firing positions, and target arrays are kept clear of woody vegetation by cutting and/or

prescribed burning. Indirect fire from artillery units is directed toward the live-fire ranges from firing points in the maneuver areas on the west and east sides of the installation.

Land Management in the Action Area

Fire plays an important role in management of endangered species habitat on Fort Hood. During extremely hot and dry conditions in late February 1996, approximately 2,728 ha (6,741 ac) of endangered species habitat were burned by wild fires on Fort Hood. This included about 2,108 ha (5,209 ac) of GCWA habitat. New fire protection policies have been implemented on Fort Hood as a result of the 1996 fires and consultation with the Service (USFWS 2005). Between October 2006 - September 2007, 10,096 ha (24,946 ac) of non-GCWA habitat were burned under prescribed burn plans. An additional 206 ha (509 ac) were burned by wildfire. Most prescribed burning activities focus on GCWA habitat protection (reduction of fuels and ignition paths around habitat). Reduction of fuel loads mitigates the threat of crown-fire damage in GCWA habitat. Prescribed burning activities provide direct support for the military training mission because units are able to fire weapon systems without interruption (i.e., reduction of "cease fire" orders due to wildfire ignition). Prescribed burns are managed through the Fort Hood NRMB. Fire break maintenance is performed on 135.4 km (84.1 mi) of line. Fire breaks are designed to protect GCWA habitat and facilitate fire suppression in the event of wildfire. Other objectives of the installation prescribed fire program are to reduce encroachment of Ashe juniper in all range sites and grasslands, improve vegetation composition, and improve wildlife habitats.

Brush piles have been left on Fort Hood from previous land management activities conducted by Range Control, Integrated Training Area Management program (ITAM), and other entities. These piles are flammable and constitute a fire hazard near GCWA habitat because they provide ladder fuels for fire to move into habitat crowns, and they are a firebrand source during wildfires. Piles are removed either by mulching or by mechanical removal followed by burning.

Brown-headed cowbird removal is conducted to reduce the incidence of nest parasitism on endangered songbirds (Cornelius et al. 2007). Over a 5-year period, Fort Hood is required to keep nest parasitism below 10% (USFWS 2005). Currently, removal activities are conducted on the east side of the installation (Summers 2007). As part of a 3-year cessation experiment, cowbird removal has been temporarily suspended on the west side of the installation (Kostecke et al. 2007). During the 2007 season, 5,178 cowbirds were captured via trapping, and 25 cowbirds were removed via shooting; five year rolling mean nest parasitism frequency for the vireo was 8.4%.

On Fort Hood, Ashe juniper management outside of GCWA habitat is carried out in several ways. Juniper encroachment into open pasture used for military maneuver is primarily controlled with prescribed burning. In some training areas juniper has been hand-cut under a contract with the Natural Resources Conservation Service. Juniper clearing to enhance maneuver capabilities is conducted under the ITAM Land Sustainment Management Plan (LSMP). In some locations, juniper encroachment into vireo habitat has been treated with tree shears. Unlike past efforts where non-GCWA habitat areas were cleared using heavy equipment (i.e., bulldozers), current efforts are focused on the use of less invasive techniques. Control efforts are

allowed up to, but not including, GCWA habitat boundaries. All control efforts and contracts are coordinated through the Fort Hood NRMB to avoid impact on GCWA habitat.

As part of LSMP, ITAM and Directorate of Public Works conduct several erosion control and land improvement activities in the maneuver and live fire areas of Fort Hood. These projects include: brush pile mulching, soil contour ripping, gully plugs, tank trail maintenance, erosion sediment control dams, hilltop access trail creation, river crossing abutment, staging/assembling area creation, training damage repair, vegetation reseeding, and stream crossing improvement. With the exception of tank trail maintenance, these activities are typically not conducted in GCWA habitat.

B. Status of the species within the action area

Habitat

Fort Hood occurs in Recovery Region 3 (USFWS 1992). There are approximately 24,267 ha (59,964 ac) of suitable GCWA habitat on Fort Hood (Figure 1). This total represents approximately 27.9% of the Fort Hood landmass. Overall, forests and woodlands account for 48% of the Fort Hood landmass (Reemts and Teague 2007). Most GCWA habitat parcels occur as very large, interconnected, contiguous blocks. Blocks that are not connected usually have forested travel corridors (e.g., shrublands, riparian, or upland forests), or are separated by roads and valleys. Approximately 16% of GCWA habitat is classified as "core" (subject to training restrictions); the remaining 84% is classified as "non-core" (Cornelius et al. 2007). GCWA habitat can be classified into four regions: 1) a very large, interconnected system that follows a mesa ridge from the east side (north of Belton Lake), across northern live fire ranges, and to the west side, 2) a large, interconnected system follows a mesa ridge from the east side (south of Belton Lake), across remnant mesas in the southern live fire ranges, and to the rolling uplands/canyons bordering House creek, 3) disjunct parcels in the rolling uplands/canyons bordering Table Rock and Cowhouse creeks, and 4) isolated parcels on West Fort Hood (Figure 1). Within habitat, there are many water sources such as creeks, tributaries, springs, and upland depressions/tank trail mudholes.

Population Status

Fort Hood has a long history of GCWA monitoring and research dating to 1992 (Pekins 2006), much of which relates to Priorities 1 and 2 of the Recovery Plan (USFWS 1992). GCWAs have been observed in all training areas with suitable habitat (i.e., 100% occupancy). However, only three sites are intensively studied to quantify demographic variables (pairing success, return rate, age structure, territory size/density, nest survival, etc). Of the three sites, one is in core habitat (TA 32) and two are in non-core habitat (TAs 51 and 70). Population trend on Fort Hood has been studied for many years using point count survey methodology (Ralph et al. 1995). These surveys were conducted at 428 points along 31 routes during 1998-2007; during 1992-1997, the number of point count locations surveyed ranged from 206-365 points along 19-27 routes (Peak 2007b).

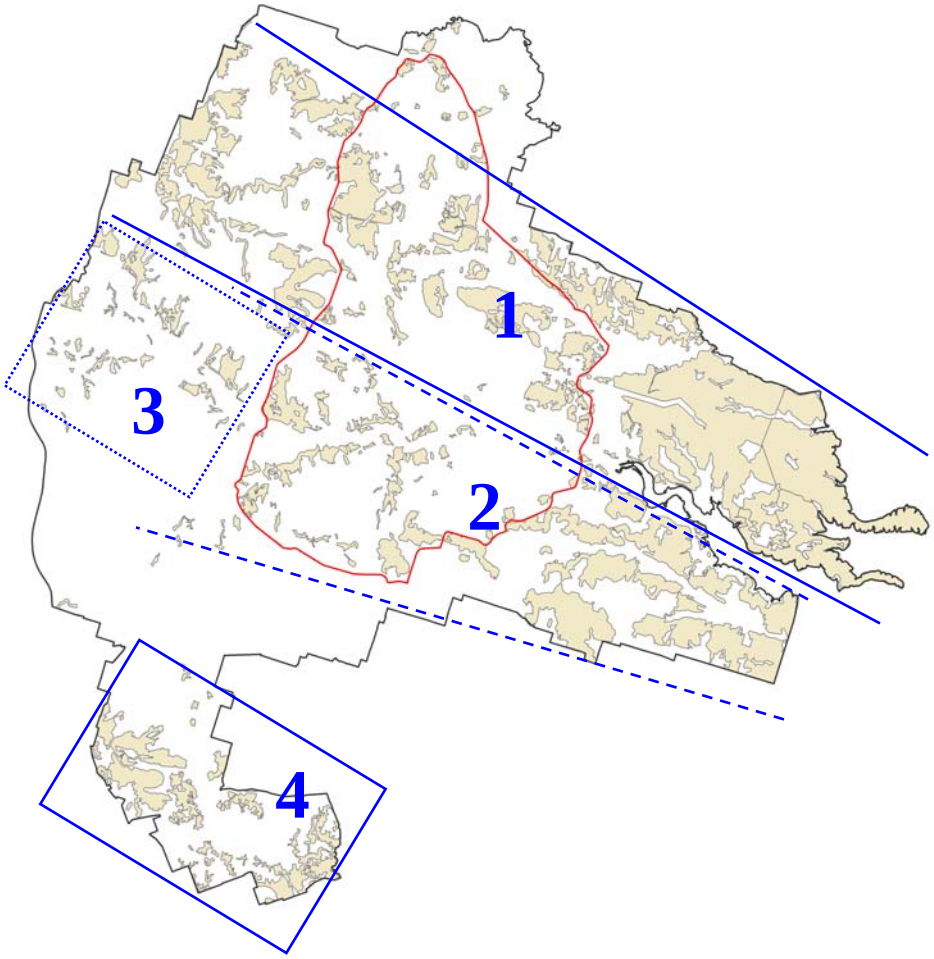

Figure 1. GCWA habitat (brown polygons) on Fort Hood, Texas. Red line indicates weapon system ranges and firing area. Distance from northernmost to southernmost, and from westernmost to easternmost installation boundary is approximately 42 km. See text for region descriptions. Regions 1 & 2 are divided by a wide valley and major creek. Regions are identified for habitat description purposes only; they are not meant to imply sub-populations or genetically isolated populations.

Analyses of point count data (index of abundance) suggest that GCWA abundance on Fort Hood increased from 1992 to 2007 (Anders and Dearborn 2004, Peak 2007b). Mean number of detections observed per point significantly increased during this period. However, data from 2000-2007 suggest the mean number of detections may be stabilizing at one bird detected per point. In 2007, observed density on intensive study plots was 0.26 territories/ha (Peak 2007c), which when extrapolated to all available habitat on Fort Hood (24,267 ha), would produce an estimate of 6,309 territories. However, this estimate unrealistically assumes habitat quality is equal amongst all habitat patches. Therefore, the actual estimate may be lower than 6,309 territories. During 2007, pairing success was 90%; daily survival rate of nests was 0.96; nest survival (daily survival rate expanded for the entire nesting cycle of 25 days was 0.37, 93% of males successfully produced at least one fledgling, 16% of all territorial males were aged second-year, 75% were aged after second-year, and 9% were aged after hatch-year; return rate was 44% (Peak 2007c). A one-year demographic study, conducted in an historically

unexamined area on the east side of Fort Hood, found that GCWA density was slightly lower than intensively studied areas; pairing success and age structure were similar to intensively studied areas, but number of males producing at least one fledgling was slightly higher (MacAllister et al. 2007).

C. Factors affecting the species in the Action Area

Fort Hood is currently operating under a 2005 biological opinion that authorizes incidental take for both the GCWA and black-capped vireo. A summary of the incidental take authorized in the 2005 opinion is given below:

Summary of potential incidental take of the black-capped vireo (BCVI) and golden-cheeked warbler (GCWA) authorized in the 2005 biological opinion. Take is estimated in terms of habitat impacts (hectares) and nests and/or nesting attempts lost (nests).

Activity	BCVI	GCWA
Incidental take anticipated from training activities over the next 5-year period and successive 5-year periods.	360 hectares, 150 nests	660 hectares, 125 nests
Incidental take anticipated from construction and range improvements over the next 5-year period.	108 hectares	217 hectares

The incidental take associated with training activities is authorized to continue, in the absence of reinitiation of that consultation, in successive 5-year periods.

When the 2005 consultation was completed, it was estimated that approximately 21,422 ha (52,935 ac) of suitable GCWA habitat occurred on Fort Hood. The current amount of available breeding habitat for the GCWA on Fort Hood is estimated to be 24,267 ha (59,964 ac). The majority of the incidental take authorized in the table above is considered temporary, as it would result from wildfires and the habitat would be expected to regenerate in 25 – 50 years. The 2005 opinion authorizes wildfire take to continue in successive five year periods, under the terms and conditions of the incidental take statement, because the maximum habitat loss allowed due to fire would not cumulatively impact the Fort's population and management goals for the species.

IV. Effects of the Action

The direct and indirect effects of the proposed action involve all activities related to the development of training areas, continued maintenance of newly developed training areas, and Soldiers on foot utilizing newly developed training areas. The proposed actions associated with the establishment of the debit process for the RCS are anticipated to result in short-term (10 – 25 years) adverse effects to the GCWA at Fort Hood. There will be concurrent, short-term

preservation and management of existing GCWA habitat on private land until the affected Fort Hood habitat recovers.

Direct Effects

Habitat modification occurring during the breeding season, especially during active nesting which is typically early March to early June, will likely result in direct take of a nest or direct take by harassment (prevention of territory establishment/defense and pair bond formation). Persistent harassment may cause pairs to abandon the area in favor of areas with fewer stressors. Alternatively, pairs may stay in the area and experience reduced nest success and fledgling survival. Direct exposure to development/maintenance activities will be avoided if the activities take place outside of the breeding season.

Direct exposure to training activities at the project site is highly likely to occur. However, exposure severity will be variable depending upon the timing, duration, and type of military training activities. For example, during the breeding season: silent, nighttime, dismounted infantry movement through developed habitat will likely have low effects, especially if they are non-persistent (e.g., occur [bi-] monthly) and short-duration (e.g., used < 4 hrs); however, noisy, nighttime dismounted infantry movement through developed habitat will likely have higher effects, especially if they are persistent (e.g., occur over the course of many continuous nights) and long-duration (e.g., used all night). Under either of the preceding scenarios, pairs nesting in the area may exhibit increased nest vigilance, chronic stress, and lower nesting success. Alternatively, in addition to lowered nest success, persistent daytime use may interfere with the ability of male GCWAs to broadcast courtship and territorial defense songs, an important component of GCWA life history (Pulich 1976, USFWS 1992, Ladd and Gass 1999). On Fort Hood, experimental exposure of adult GCWAs to human foot-traffic during the day did not stimulate a strong, stress hormone response (Hayden et al. 2007). However, the experiment did not examine the combined effect of degraded habitat concurrent with simulated military training. Further, different forms of military activity (i.e., blasts and machine-gun fire), and human activity at night, could be perceived much differently by GCWAs, and could cause acute and chronic stress. The anticipated activities in the treatment areas are military-unique and not well-studied.

Training enhancers (i.e., artillery/IED blast simulators, machine gun firefights, grenade blasts, blast flash simulators, smoke grenades) may be used in developed habitat. This may increase harassment severity, especially if a nest or territorial male GCWA is nearby. Should these activities persist, that is, units train on a daily basis for many weeks, pairs may abandon the area, especially if the exposure is during a critical point in the breeding season. Alternatively, pairs may stay in the area and may experience reduced nest success, reduced fledgling survival, and decreased site fidelity. GCWA nest success decreased by 50% and male territory sizes were larger in areas with mountain biking than in areas without biking (Davis and Leslie 2007). However, density of trail users at the Fort Hood site was much lower (4.47 ± 1.47 bikers/day) when compared to the urban site (16.57 ± 2.24 bikers/day). On Fort Hood, there were no detectable differences in number of males producing at least one fledgling and abundance between a mountain biking area and a nearby non-biking area which may genuinely reflect a lack of difference among years or a difference may not have been detected due to low statistical

power (Peak 2003). Although mountain bike use and dismounted infantry use are very different with respect to time of use (daytime vs. nighttime, respectively) and acoustic background (bike traffic vs. simulated war), they are similar in terms of varying densities of humans using trails.

Identifying military training intensity, severity, and duration; and directing harmful, stress-inducing activities to less suitable areas within the project footprint (e.g., juniper monocultures, uplands, existing canopy gap areas) will help minimize and possibly avoid direct exposure effects. Training activities occurring outside of the breeding season will have no direct effect on nesting pairs.

Although Fort Hood is committed to identifying least-invasive techniques (selection of low level tiers such as 1 & 2 and using Standard 1) for providing the mission landscape required for effective training, at the local-scale, developed habitat may have a direct effect on GCWAs. Habitat variables that have been identified as important for GCWAs may be altered or degraded. Canopy cover of at least 70 -100%, especially in the middle and upper canopy (3 m-15 m+), and high tree density are important components of GCWA habitat (Wahl et al. 1990, USFWS 1992, Ladd and Gass 1999, DeBoer and Diamond 2006). Disturbances which reduce canopy cover integrity below the apparent 70% threshold, and which lower tree density (e.g., selective tree removal and radial trail networks) may negatively affect GCWAs. DPTMS staff has identified that 15 m visibility between infantry Soldiers is needed when maneuvering through lanes. Altering habitat to accommodate infantry maneuver training will primarily entail opening the forest understory to facilitate human movement on foot. Creating such an environment and maintaining the standards for training may affect GCWA habitat quality. Tree density (number/ha) will be reduced as a result of habitat modification, especially projects designed for selective removal of Ashe juniper (standard 2), typically the dominant and most important tree in GCWA habitat. Tree density reduction may negatively affect song broadcast/observation perch selection, female nest area requirements, territory selection, nest tree selection, nest material source (Ashe juniper trees), critical foraging area in the upper 2/3s of the canopy (i.e., woodland overstory), and canopy closure (i.e., increased canopy gaps in middle and upper layers). Litter depth and soil moisture on the forest floor may be affected by canopy modification and continual maneuvering use. These changes could affect seedling and sapling recruitment, survival, and understory composition.

Adherence to Minimization Measures, Training Area Development conditions, and closely following the metrics for treatment standards during training site planning, preparation, and maintenance may virtually eliminate some short term and many long term negative effects to GCWA habitat. Further, selection of treatment standard 1 more often than treatment standard 2, and selecting low level tiers (e.g., 1 & 2) more often than high level tiers (e.g., 4 & 5) will eliminate the need for longer habitat recovery periods, which will benefit the Army by allowing longer duration of site use.

There will be an increased danger of wildfire, especially damaging crown fires, if pyrotechnic/battle simulation devices are used in developed habitat during dry spells, droughts, and red flag conditions, however, under other procedures Fort Hood is already prohibited from using pyrotechnics during these high-risk conditions. GCWA habitat is structurally complex with vegetation extending from the forest floor to the canopy apex. The habitat also has high

fuel loads, many of which are ladder fuels and many of which are dried and cured. The forest floor consists of deep juniper and oak leaf litter, fallen limbs and branches, and herbaceous forbs. From just above the forest floor to the canopy, there are many dead branches which often form a phalanx-like arrangement. As a consequence, surface fires in GCWA habitat often rapidly extend vertically and become a fast-moving crown-fire. Incendiary devices (i.e., smoke grenades, riot control grenades, artillery blast and flash simulators) can ignite a wildfire in GCWA habitat. To reduce the risk of wildfire, Fort Hood has implemented a fire danger rating system to alert trainers when the use of pyrotechnics should be limited or halted. Currently, RCS is not designed to offset long term and/or permanent take such as canopy destroying wildfires. Habitat take due to canopy destroying wildfires will be addressed under the take allowance in the 2005 biological opinion.

At the landscape scale, developed habitat configuration and connectivity, and increased fragmentation may directly affect GCWAs. Based on maneuver training needs, it is possible that large, contiguous blocks of habitat on Fort Hood may be fragmented and "soft" edge created. "Soft" edge is identified as areas with cleared understory, degraded canopy, and areas with trail networks. The configuration of maneuver lanes may be sinuous, linear, bisected, or looped. Additionally, there may be supplemental training structures (e.g., mock villages, IED defeat, obstacle course) in or near these lanes. Because it is unrealistic that maneuvering units will stay on established trails within a maneuver lane or attack pathway, there will likely be interrelated actions associated with maneuver lanes, especially if there is freedom of movement in off-trail areas (e.g., cleared understory or vehicle-width distances between trees). These actions may occur in the form of radial, linear-split, expanding loop, cross-hatch, and wheel-and-spoke trail networks (Greene and Nichols 1995), and lateral movements between maneuvering elements. With time, the incipient networks may have long term impacts and further alter habitat composition and recovery time. Currently, RCS is not designed to off-set such long term and/or permanent take.

Any development or training site use that creates and/or extends hard and soft edges, or fragments habitat is expected to negatively affect GCWAs. When selecting breeding habitat, GCWAs appear to be influenced by composition at the landscape as well as the local scale (Dearborn and Sanchez 2001). As a result, GCWAs are most likely to use habitats where the landscape composition of mature oak-juniper forests in the surrounding landscape is relatively high. When considering the landscape within 400 m of a site, Magness et al. (2006) found GCWAs only when the landscape contained greater than 40% composition of mature oak-juniper habitat. Habitat fragmentation (i.e., large, contiguous habitat parcels divided into smaller, non-contiguous parcels) is an important determinant of GCWA nest success. For example, GCWA reproductive success was greater in unfragmented than in fragmented habitat (Maas-Burleigh 1998), and GCWAs do best in large blocks of unfragmented habitat (USFWS 1992). Additionally, forest edges (consequence of fragmentation) negatively affect GCWA nest survival by increasing depredation by edge-adapted predators and reducing overall habitat quality (Peak 2007a, Reidy 2007). Texas rat snakes, a major GCWA predator, prefer locations with increased structure and closer to edges (J. Sperry, unpublished data).

Indirect Effects

There may be landscape-level, indirect effects associated with long term military use of a site or series of sites (i.e., a convoy route that connects many sites). The effect will largely depend upon how many habitat sites are developed, site locations in habitat blocks, connectivity of developed habitat, training severity/intensity, and duration of use. If there are several, frequently/intensely used sites that are spread across the landscape, or if there is a large site spanning several kilometers, then GCWA pairs may slowly abandon these areas, or may experience a slow decline in nest success. GCWAs exhibit strong site fidelity (Pulich 1976, Ladd and Gass 1999). For example, they were observed defending "phantom" territories in destroyed habitat after the 1996 crown-fire on Fort Hood (Tolle 1998). Thus, GCWAs may persist in marginally suitable habitat for several years before they abandon an area.

Because GCWAs are highly territorial, movement of pairs out of affected areas and into non-affected areas may cause GCWA territory re-shuffling and increased agonistic interactions. This reordering may cause GCWAs to nest in areas beyond resource carrying capacity, thus lowering nesting success and fledgling survival. These responses may be spread across the landscape, or focused into one specific region of Fort Hood. If the effect is focused at a key region GCWAs need for long-term survival on Fort Hood, for example LG 2 or 3, then the effect will likely affect environmental baseline and future population condition on Fort Hood, although the effect may not be immediately noticeable due to time-lagged effects on demography. Further, landscape-level population trends on Fort Hood are monitored using point count analysis which provides an index of relative abundance. This type of analysis does not describe population density and changes in density across a large area. Any time dependent change in population density may not be detected by point counts. Distance sampling techniques (Buckland et al. 2004) would offer a reliable estimate of density across a large area and the time dependent changes thereof. Currently, this technique is used for monitoring black-capped vireo density on Fort Hood (Cimprich 2007). During 2006, the technique was tested with GCWAs on Fort Hood and was deemed a viable method for estimating GCWA abundance (R. Peak, in press). Demographic parameters, such as nest success or recruitment, could be appropriate metrics to examine; however, large-scale demographic studies are not currently being conducted on Fort Hood, only limited (three study areas), small-scale studies are conducted.

Actions which destroy or degrade habitat may take decades from which to recover. Ladd and Gass (1999) suggest that at least 25-50 years are needed to regenerate habitat under favorable conditions, longer if oaks and hardwoods are destroyed. Preliminary results of a recent study conducted at Balcones Canyonlands National Wildlife Refuge in plots where overgrazing and post-cutting occurred in the past, indicate that an average of 80 years may be needed for Ashe juniper to grow to a size considered suitable by the Service; habitat recovery would be longer (80+ years) if oaks and other hardwoods need regeneration (J. Hatfield, unpublished data). Eleven years after crown fires destroyed 2,108 ha of GCWA habitat on Fort Hood, virtually no Ashe junipers (6 saplings, 0 trees) have been observed in the burned areas along 65 study transects totaling 7,150 m length (Reemts and Hansen 2008). Although dominant oak species re-sprouted quickly, large tree density remains low. Lack of large trees and Ashe junipers indicate that it may take decades before the burned Fort Hood habitat becomes suitable for GCWA. These findings suggest that even minor alterations may require lengthy recovery periods.

Further, recovery may take longer if the site has been severely disturbed or used by vehicles. RCS contract lengths (10- to 25-year) are not sufficient to mitigate losses of GCWA habitat that take decades from which to recover.

V. Cumulative Effects

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

At this time, no future state, tribal, local or private actions are known to be planned within the action area. Because the action area encompasses the entire Fort Hood property, any future actions concerning the area would occur at Fort Hood and thus require a separate consultation.

VI. Conclusion

After reviewing the current status of the GCWA, 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 project, as proposed, is not likely to jeopardize the continued existence of the GCWA. No critical habitat has been designated for this species; therefore, none would be affected.

The regulations implementing the ESA define "*jeopardize the continued existence of*" as: "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." An extensive amount of habitat protection and management for the GCWA has occurred at Fort Hood since the species was listed in 1990. Since listing, Fort Hood has managed and monitoring the population, which has shown evidence of increasing in population and distribution. Since the issuance of the 2005 biological opinion, Fort Hood has added approximately 2,834 ha (7,000 ac) of GCWA habitat, presumed to be occupied, to its habitat inventory.

The Service finds that the proposed action is not likely to jeopardize the GCWA for the following reasons:

1) Under their current Endangered Species Management Plan, Fort Hood has committed to managing and monitoring a self-sustaining, viable population of GCWA.

2) The amount of anticipated incidental take, in habitat area, is approximately 10% of the estimated available habitat, considering the maximum amount of incidental take that is authorized under the 2005 BO in the five year duration of this opinion. If the entire amount of take is realized, the Army would still be able to manage the viable population at Fort Hood.

3) The programmatic nature of this consultation allows for subsequent analysis at the project-specific level to ensure no unforeseen effects are encountered and the components of the RCS that would benefit the GCWA are adequately implemented.

4) The RCS is structured to produce a net benefit to the recovery of the GCWA, which will be accounted for through Fort Hood's monitoring plan. Should the RCS fail to produce a net benefit to recovery, the consultation will be reinitiated.

5) The entire amount of incidental take, as well as the majority of take in the 2005 opinion, is temporary, and conditional upon the anticipated full restoration of breeding habitat subsequent to training use.

In development of this biological opinion, the Service has evaluated the ongoing effects and incidental take associated with the 2005 opinion, as well as the commitment by the Army to maintain a viable population of GCWA at Fort Hood. The maximum allowed incidental take from the 2005 opinion combined with this opinion would not exceed the necessary resource requirements for the continued management of the viable population at Fort Hood. Further, the extent of incidental take anticipated is short term, and contingent upon the anticipated full restoration of impacted habitat and the concurrent preservation and management of GCWA habitat (credits) within the species' range. Therefore, it is reasonable that the proposed actions would not compromise the current contribution to GCWA Recovery Unit 3 under management by Fort Hood.

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.

The measures described below are non-discretionary, and must be undertaken by the Army for the exemption in section 7(o)(2) to apply. The Army has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the Army fails to assume and implement the terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to

monitor the impact of incidental take, the Army 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

The Service anticipates that the proposed action would result in the incidental take of GCWAs. Take would be in the form of harm and/or harassment. Take, in the form of harm and/or harassment, is difficult to quantify and usually cannot be estimated in terms of numbers of individuals. However, because the area of habitat for the species is known for the action area, the maximum amount of incidental take allowed under this biological opinion is given in terms of habitat area with regard to harm and harassment.

GCWAs will be exposed to stress producing activities not normally encountered under natural habitat conditions. Additionally, they will be exposed to these stressors during crucial periods of the breeding and post-breeding seasons and during any hour of the night or day ranging from one day to several weeks. The timing of these stressors may prevent territory establishment, territory defense, pair bond formation, successful nesting, and fledgling survival. GCWA habitat understory (i.e., from ground level to three m height) will be negatively modified and potentially degraded by the creation and use of interconnected trail networks for dismounted infantry training. Habitat overstory (i.e., three m+) will be altered; however, alteration is limited by rooted stem dbh and canopy cover thresholds. The overstory may also be negatively affected by understory alteration and military training use, however the effects may not be observed until several years pass. Habitat modification may affect important edaphic and vegetation variables that influence habitat suitability which may result in degradation of habitat to the point of marginal suitability. Monitoring of debit sites on Fort Hood should detect and document any detrimental impacts before unmanageable levels are reached.

Based on the Biological Assessment conducted by Fort Hood, which identifies expected training area needs for the next five years, it is anticipated that up to 2,024 ha (5,000 ac) of GCWA habitat would be developed for training areas. If the proposed actions are fully implemented, the effects described above would harm and/or harass GCWAs occurring on up to 2,024 ha at Fort Hood.

Effect of the take

In the accompanying biological opinion, the Service determined that the level of anticipated incidental take is not likely to result in jeopardy to the GCWA.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of the GCWA:

1) Proposed training area development will be coordinated with the appropriate Fort Hood personnel early in process to ensure proper implementation of RCS.

2) Update the endangered species/sensitive resource Geographic Information System (GIS) for Fort Hood specific to RCS.

3) Fort Hood will develop a dynamic landscape metapopulation model to predict GCWA population viability on Fort Hood.

4) Fort Hood will conduct an appropriate monitoring and accountability program with results reported annually.

Terms and conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Army 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.

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.

1) Proposed training area development will be coordinated with the appropriate Fort Hood personnel early in process to ensure proper implementation of RCS.

    a) In order to ensure a net benefit to recovery of the GCWA, the RCS must be implemented in accordance with the debit process described in this opinion. This process includes coordination with appropriate Fort Hood staff to evaluate project and assist in site selection (see B. Training Area Development: Project Planning above).

    b) Fort Hood staff will coordinate the appropriate justification for use of the RCS for specific projects, including site selection, minimization measures, debit calculation, application of net benefit to recovery of the GCWA and other items listed in section I.E. Project-specific Documentation of this opinion.

2) Update the endangered species/sensitive resource Geographic Information System (GIS) for Fort Hood specific to RCS.

    a) Endangered species habitat and other sensitive resources will be included in GIS, including a best estimate of habitat quality for GCWA based on the tiers in this opinion.

    b) Develop a map based on GIS, which depict areas on Fort Hood that are best suited to avoid and minimize impacts to species/sensitive resources, reduce incidental take, and provide for the management of a self-sustaining viable population of GCWA and black-capped vireo.

3) Fort Hood staff will develop a dynamic landscape metapopulation model to predict GCWA population viability on Fort Hood.

   a) Locations of the 2008 distance sampling survey points will be intersected with GIS data layers to provide information on habitat, patch, and topographic characteristics for each point.

   b) The habitat, patch, and topographic characteristics for each point along with the detections recorded at each point during the distance sampling study will be used to model factors affecting GCWA abundance and to develop a habitat suitability model.

   c) The habitat suitability model along with survival and fecundity estimates will be used to develop a population viability model to determine how changes in habitat over time could affect population trajectories for the GCWA at Fort Hood.

4) Fort Hood will conduct an appropriate monitoring and accountability program with results reported annually.

   a) Monitoring results will document the impacts and recovery from any disturbances created by training activities. To accomplish this, the monitoring program will include field studies with replicated untreated reference sites designed to achieve the following: 1) assess initial impacts from thinning on habitat composition and structure; 2) assess impacts and post-treatment trends in GCW occupancy, population density, and productivity; 3) determine the impacts of various training disturbances on GCW behavior, occupancy, population density, and productivity.

   b) A monitoring component will be included for each action resulting in a RCS debit. A general principle of monitoring will be to align the intensity of field monitoring required with the level of risk anticipated – in general, the level of risk increases as thinning intensity is increased from Standard 1 to Standard 2, as Habitat Tier moves from 2 to 5, and as the level and frequency of training intensity increases during the GCW breeding season.

   c) As statistically reliable conclusions are drawn from the monitoring program, the recovery intervals for individual areas may be modified when warranted. Likewise, when prevailing data support a particular management approach, the intensity of monitoring may be reduced to a subset of actions that simply confirm that the management approach was properly implemented (note: this would normally occur following an analysis and review of several years of trend data that support a particular approach.

Reporting Requirements

The results of the monitoring plan specified in this biological opinion, reports on incidental take associated with this opinion, and implementation of the terms and conditions, will be reported to the Arlington Field Office annually by December 31.

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 recommendation is provided for consideration by the Army:

> The Service recommends the Army investigate Conservation Banking and, if appropriate, develop a Conservation Bank for the GCWA. The establishment of a Conservation Bank would perpetually preserve GCWA habitat as per the Recovery Plan, and provide an additional source of credits for Fort Hood beyond the limitations of the RCS.

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 Army staff and participating parties during this consultation. If further assistance or information is required, please contact Mr. Omar Bocanegra or myself at the above address or telephone (817) 277-1100.

Sincerely,

Tom Cloud

Thomas J. Cloud, Jr.
Field Supervisor

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

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APPENDIX A

Credit/Debit Determination Under the Fort Hood Recovery Credit System (1/30/2008 Version)

Screening Criterion

Proposed conservation units must be within a priority landscape for Golden-cheeked Warbler recovery. Priority landscapes will be defined using the best available information. Pending review of this information, a conservation unit or units must be an integral part of a block of continuous Golden-cheeked Warbler habitat that is at least 250 acres (100 ha) in extent[1]. This criterion does not apply to the calculation of debits on Fort Hood.

Conservation Unit

A conservation unit is defined as a 20-acre area that is verified as meeting the TPWD criteria for areas that are likely to be inhabited by Golden-cheeked Warblers and is an integral component of a priority landscape as described above. Furthermore, a minimum of 50 contiguous acres must be enrolled within a priority landscape during any one sign up/bidding period. Therefore, a landowner with a single conservation unit of 20 acres can only enroll if one or more of his neighbors also enroll, thereby bringing the total enrollment to at least 50 contiguous acres.

Ranking Criteria

The following criteria are designed to place increased value on those projects that have the greatest potential to support viable populations and that are likely to provide the greatest recovery benefits. Greater value is placed on aggregations of conservation units, units that are within Recovery Regions with relatively low known populations, units that are close to existing populations and units that are within relatively large blocks of existing habitat.

1. Assess potential number of contiguous conservation units.

One unit = 20 acres, two units = 40 acres, etc. (No partial units; for credits acreages area rounded down so that one unit = 20 – 39 acres, two units = 40 – 59 acres, etc. For debits acreages are rounded up so that one unit = 1 – 20 acres, two units = 21 to 40 acres, etc.).

2. Apply number of units weighting

The following table provides for an increased credit value as the number of conservation units increases. This weighting reflects the concept that "more is better".

Units	Weighting	Total Credit
1	0.0	1.0
2	0.1	2.1
3	0.2	3.3

[1] A review of the best available information may indicate that, for screening purposes, and to facilitate recovery, the minimum size block of Golden-cheeked Warbler habitat within which a conservation unit will be considered for valuation should be larger or smaller than 250 acres (100 ha).

4	0.3	4.6
5	0.4	6.0
6	0.5	7.5
7	0.6	9.1
8	0.7	10.8
9	0.8	12.6
10	0.9	14.5
Etc.		

3. Apply recovery region priority multiplier

The current recovery plan for the GCW has eight recovery regions. Based on current information, the known populations of GCW males in recovery regions 1, 2, 4, 6, 7 and 8 are well below 1,000 males (the largest population is 125 males), greater than 1,000 in recovery region 5 and greater than 4,000 in recovery region 3 (see map at end of document). To facilitate the recovery process the following table provides a multiplier that creates an incentive for conservation action in recovery regions with relatively low protected/managed populations.

Recovery Region	Multiplier
1, 2, 4, 6, 7, 8	2.00
5	1.50
3	1.00

4. Apply habitat characteristic/landscape context multiplier

Conservation units should be situated in a landscape of sufficient integrity, size and habitat quality to restore and/or enhance species viability. The following criteria are designed to place increased value on conservation units that are proximate to known populations and that are part of a landscape of surrounding habitat that is substantially larger than the minimum screening criteria.

Proximity to existing GCW population	Multiplier
Within 15km of a known population of GCWs of at least 10 pairs	1.10
Within 15km of a known population of GCWs of at least 100 pairs	1.20
Extent of surrounding GCW habitat[2]	
Unit(s) are part of 250 – 620 acres (100 - 250 ha) of contiguous habitat	1.00
Unit(s) are part of >620 acres (250 ha) of contiguous habitat	1.50

[2] If a review of the best available information leads to an adjustment in the screening criteria (minimum size block of Golden-cheeked Warbler habitat within which a conservation unit will be considered for valuation) then the listed ranges for extent of surrounding GCW habitat and their associated multipliers will be adjusted accordingly.

Example: Assume 5 conservation units within 15km of Fort Hood (Recovery Region 3) that are situated within a block of 740 acres (300 ha) of contiguous habitat:

Number of units weighting	5 units = 6.0 credits
Recovery region multiplier	6 credits x 1.00 = 6.00 credits
Proximity multiplier	6.00 credits x 1.2 = 7.20 credits
Landscape multiplier	7.20 credits x 1.5 = 10.80 credits

Example: Assume 3 conservation units in Recovery Region 1 that are greater than15km from a known population of GCWs and that are situated within a block of 300 acres (120 ha) of contiguous habitat:

Number of units weighting	3 units = 3.3 credits
Recovery region multiplier	3.3 credits x 2.00 = 6.6 credits
Proximity multiplier	Not applicable
Landscape multiplier	6.6 credits x 1.0 = 6.6 credits

APPENDIX B

Project-specific documentation for actions implemented under the Fort Hood Recovery Credit System (to be added as needed through the 5-year duration of the programmatic biological opinion).