

This is the second of two installments of Appendix H, which has been broken into two files for ease of downloading via the Internet.

Determination of Impacts **Federally Listed Species**

Table 4-9. Avoidance and Minimization Measures for Federally Listed T&E Species Affected by JSF and 7SFG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (IA B-75 and TA C-62)	JSF Bombing Areas ⁴
Sea Turtles	<p>avoidance of contact with emergent vegetation along banks and shorelines.</p> <p>Use only designated boat landing sites.</p> <p>If surveys indicate a sea turtle nest is within 200 feet of the insertion point, use another insertion point for that mission.</p> <p>During sea turtle season, do not conduct any beachfront activities until after Eglin's NIRS completes the morning sea turtle nesting surveys.</p>		√	√						

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Determination of Impacts **Federally Listed Species**

Table 4-9. Avoidance and Minimization Measures for Federally Listed T&E Species Affected by JSF and 75FG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	75FG(A) SOF Ranges and DZs/LZs	75FG(A) SRI	75FG(A) Boat Landing Sites ¹	75FG(A) Interstitial Areas	75FG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (IA B-75 and TA C-62)	JSF Bombing Areas ⁴
	Coordinate all 75FG(A) activities on SRI with the NRS prior to beginning the activity.		√							
	Troops and personnel must avoid sea turtle nests by at least 50 feet and must not interfere with nesting sea turtles, impede hatching sea turtles from emerging from the nest and crawling to the Gulf of Mexico, or obscure signs of sea turtle activity.		√							
	Stage vehicles, helicopters, and watercraft at least 200 feet away from any nest that is found past 60 days		√							

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Determination of Impacts **Federally Listed Species**

Table 4-9. Avoidance and Minimization Measures for Federally Listed T&E Species Affected by JSF and 7SFG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (LA B-75 and TA C-62)	JSF Bombing Areas ⁴
	into the incubation period. Restore any beach and dune habitats that are impaired by mission activities.		√							
	Immediately following operation completion, refill all holes and remove all ruts deeper than 2 inches during August through October at nests at incubation day 60 or greater.		√							
	Avoid vehicular and foot traffic in areas with dunes over 5 feet high.		√							
	Prohibit driving on the beach during sea turtle season. Properly shield any		√							

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Determination of Impacts **Federally Listed Species**

Table 4-9. Avoidance and Minimization Measures for Federally Listed T&E Species Affected by JSF and 75FG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	75FG(A) SOF Ranges and DZs/LZs	75FG(A) SRI	75FG(A) Boat Landing Sites ¹	75FG(A) Interstitial Areas	75FG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (IA B-75 and TA C-62)	JSF Bombing Areas ⁴
Eastern Indigo Snake	light from view of the beach during sea turtle nesting and hatching season. Comply with all avoidance and minimizations measures and all applicable Terms and Conditions from the SRI <i>Mission Utilization Plan Biological Opinion</i> (USFWS, 2005). Cease vehicular activity if an indigo snake is sighted, and wait until the animal is out of harm's way before resuming activity. The NRS should be notified immediately.		√							

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Determination of Impacts **Federally Listed Species**

Table 4-9. Avoidance and Minimization Measures for Federally Listed T&E Species Affected by JSF and 7SFG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (LA B-75 and TA C-62)	JSF Bombing Areas ⁴
Piping Plover	Immediately prior to clearing, conduct surveys for indigo snakes. Permitted NRS staff will relocate these animals to another area on Eglin. Direct personnel not to injure, harm, or kill the indigo snake. Follow the <i>Standard Protection Measures for the Eastern Indigo Snake</i> (U.S. Air Force, 2004a). Prohibit 7SFG(A) activities in piping plover critical habitat. The NRS will maintain fencing or signs around critical habitat.	√					√			
		√			√	√	√			
					√	√	√			
			√							

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Determination of Impacts **Federally Listed Species**

Table 4-9. Avoidance and Minimization Measures for Federally Listed T&E Species Affected by JSF and 75FG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	75FG(A) SOF Ranges and DZs/LZs	75FG(A) SRI	75FG(A) Boat Landing Sites ¹	75FG(A) Interstitial Areas	75FG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (IA B-75 and TA C-62)	JSF Bombing Areas ⁴
Perforate Lichen	Continue piping plover surveys as scheduled. Continue perforate lichen population monitoring as scheduled.	√	√							
	In the event that monitoring showed an expansion of lichen cover, expand the fenced area accordingly.		√							
	Prohibit 75FG(A) activities in areas with <i>Cinadonia perforata</i> populations. The NRS will maintain fencing or signs around these areas.		√							
All Species	75FG(A) and JSF must provide conditions and restrictions regarding	√	√	√	√	√	√	√	√	√

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Determination of Impacts **Federally Listed Species**

Table 4-9. Avoidance and Minimization Measures for Federally Listed T&E Species Affected by JSF and 7SFG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (IA B-75 and TA C-62)	JSF Bombing Areas ⁴
	biological resources to all participants in verbal or written form. Provide maps when necessary.									
	Contain bullets within collection berms and periodically cleanup and dispose of munitions on the firing ranges.	√								
	Use native vegetation for all landscaping and other plantings.	√		√		√	√			
	To reduce potential seed sources, treat areas with known invasive non-native species problems.	√	√		√	√	√			
	To avoid spreading invasive non-native plant species, do	√	√		√	√	√			

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Table 4-9. Avoidance and Minimization Measures for Federally Listed T&E Species Affected by JSF and 7SFG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (IA B-75 and TA C-62)	JSF Bombing Areas ⁴
	not drive vehicles or boats in areas with known invasive non-native plant species problems; these areas are designated by signs. If a vehicle is driven in such an infested area, clean the vehicle before it is driven to a non-infested area.									
	Follow Eglin's Wildlife-Specific Action Guide Restrictions (U.S. Air Force, 2006a).	√			√				√	√
	Develop wildfire operational plans with Eglin NIS to identify high wildfire risk conditions and notification procedures that	√			√				√	√

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Determination of Impacts **Federally Listed Species**

Table 4-9. Avoidance and Minimization Measures for Federally Listed T&E Species Affected by JSF and 75FG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	75FG(A) SOF Ranges and DZs/LZs	75FG(A) SRI	75FG(A) Boat Landing Sites ¹	75FG(A) Interstitial Areas	75FG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (LA B-75 and TA C-62)	JSF Bombing Areas ⁴
	units will follow to engage fire response personnel when needed. Immediately notify Eglin Fire Department Dispatch of any wildfire started as a result of pyrotechnics or munitions use.	√			√				√	√
	Hire additional wildland fire positions to respond to the increased number of wildfires and increased manpower needed to conduct prescribed burns around the 75FG(A) cantonment area and the ranges used by the	√			√				√	√

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Determination of Impacts **Federally Listed Species**

Table 4-9. Avoidance and Minimization Measures for Federally Listed T&E Species Affected by JSF and 7SFG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
	7SFG(A) and JSF. Avoid ground disturbing fire suppression activities (bulldozers) in wetland habitats.	√			√				√	√

1. Yellow River, East Bay River, Santa Rosa Sound, Choctawhatchee Bay, and the near-shore waters of the Gulf of Mexico;
 2. Eglin Main Base, Choctaw Field, and Duke Field
 3. TA B-75 and TA C-62
 4. TA B-82 and TA C-59E
 7SFG(A) = 7th Special Forces Group (Airborne); DZ = Drop Zone; IJTS = Initial Joint Training Site; JSF = Joint Strike Fighter; LZ = Landing Zone; NRS = Natural Resources Section; RCW = Red-cockaded Woodpecker; SOF = Special Operations Forces; SRI = Santa Rosa Island; TA = Test Area; U.S. = United States

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Determination of Impacts

Other Species Considered

4.2 OTHER SPECIES CONSIDERED

4.2.1 Gopher Tortoise

Impacts may occur to the state-listed gopher tortoise due to burrow collapse or direct physical impacts from vehicles. Certain operations may take place in close proximity to state-listed gopher tortoise burrows. While it is possible that vehicles could crush an individual tortoise, burrow or egg clutch during these exercises, this risk is minimized by the fact that vehicle activity will be limited for the most part to established roads and trails. In the event that a gopher tortoise or burrow is spotted, personnel will avoid the animal and burrow. Personnel will immediately notify the NRS of the location; and in areas where frequent off-road activity may occur, the NRS will evaluate the need for relocation. Vehicle operators will be instructed to cease activity if a gopher tortoise is sighted, and wait until the tortoise is out of harm's way before resuming activity.

Immediately prior to land-clearing, the NRS will conduct a survey of the construction areas to evaluate the presence of any gopher tortoise burrows (Figure 3-2, and Figure 3-6 to Figure 3-8). If gopher tortoises are found, Eglin will apply for a relocation permit from Florida Fish and Wildlife Conservation Commission (FWC). The Air Force will relocate gopher tortoises found to be in imminent danger from construction activities to another area on Eglin AFB. Transportation and release of tortoises will follow guidelines established by the FWC.

Gopher tortoises, if present, may be affected by the noise of JSF and 75FG(A) munitions, or potentially from direct physical impacts from a projectile. There are no noise criteria or thresholds for hearing impacts to this species, though Bowles et al. (1999) studied sonic boom effects on the desert gopher tortoise. For occasional exposures to impulse noise (sonic booms), Bowles found that gopher tortoise hearing was not affected, but did caution against daily repeated exposures. As with the sonic booms studied by Bowles, bomb events are a low frequency impulse noise but also have the potential for greater effect due to pressure, heat, and other blast effects.

Risk of noise disturbance and direct physical impacts is minimized by protection afforded to the tortoise from its underground burrow. Gopher tortoises are present on many of Eglin's bombing ranges despite the noise and disturbance. The presence of open, sunny habitat in proximity to good quality foraging areas appears to outweigh any negative impacts from bombing. Table 4-10 summarizes avoidance and minimization measures for the gopher tortoise.

Impacts to the gopher tortoise from the Proposed Action will not be significant.

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Determination of Impacts	Other Species Considered	
<p>4.2.2 Florida Black Bear</p>		
<p>The Proposed Action has the potential to impact black bears from vehicle strikes, noise, and habitat alteration. Development of the proposed 7SFG(A) and JSF cantonment areas, and 7SFG(A) ranges will affect less than one percent of the total area of undeveloped lands on Eglin AFB, which provides black bear habitat throughout the Reservation; therefore, habitat loss for the Florida black bear will be minimal. The possible increase in human-bear interactions is of more concern, particularly those associated with increased vehicular traffic. To reduce the potential for vehicle strikes, vehicle and equipment operators will be instructed to stop and allow bears to move away from the area before continuing activities.</p>		
<p>The state-listed Florida black bear potentially occurs within many of the proposed 7SFG(A) ranges and JSF flight training areas, and may be exposed to noise from aircraft and munitions. This species uses a number of different habitats on Eglin as indicated by documented sightings throughout the Eglin reservation. Bears are not limited to any particular geographic area on Eglin and are free to avoid noise and disturbance from munitions. Bears would likely just move away from noisy areas. Additionally, exposure to low-level aircraft noise and munitions noise is likely already occurring given the wide distribution of the black bear on Eglin AFB.</p>		
<p>Black bears could be potentially exposed to dye-colored smoke through inhalation, ingestion, direct contact, or bioconcentration. The most likely opportunity for such exposure will be immediately after the smoke has been dispelled, but since bears will most likely leave the area during training exercises, the likelihood of direct exposure to toxic levels of emissions is low. Ingestion or inhalation of particles in sufficient amounts to cause harm is unlikely because of the wind-driven distribution of smoke particles.</p>		
<p>Impacts to the black bear from the Proposed Action will not be significant.</p>		
<p>4.2.3 Santa Rosa Beach Mouse</p>		
<p>It is unlikely that 7SFG(A) activities on SRI will affect the Santa Rosa beach mouse. The chances of an encounter with troops is very low due to the fact that beach mice tend to spend much of their time in burrows that they excavate in the dunes. To reduce the potential for direct physical impacts and habitat impacts, troops will be instructed to avoid dunes greater than five feet high. Avoiding dunes will also reduce impacts to the dune vegetation, which serves as a food source for this species. Vehicle use will be concentrated on established roads and in previously approved areas, and troop movements would leave minimal traces due to their clandestine nature. Thus, impacts to the Santa Rosa beach mouse from the Proposed Action will not be significant.</p>		
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Other Species Considered

4.2.4 Florida Bog Frog

The primary potential impacts for the Florida bog frog are crushing, trampling, and erosion from vehicles and troops (typically small groups of less than 12) moving from boat landing sites and DZ/LZs to SOF ranges, within SOF ranges, and between SOF ranges. The bog frog is typically found in herbaceous and shrubby bogs of the Wetland/Riparian ecological association. Sporadic 7SFG(A) ground maneuvering will occur in these areas, with little to no disturbance; however, driving and digging in these areas will be restricted to minimize the potential for impacts to the bog frog. Impacts to the Florida bog frog from the Proposed Action will not be significant.

4.2.5 Dusky Gopher Frog

Of main concern regarding the state-listed gopher frog is the potential to impact breeding sites from sedimentation, hydrologic alteration, and chemicals. Vehicles will not traverse wetlands (including gopher frog ponds), thereby reducing the potential for vehicle impacts to the gopher frog. Erosion control measures such as silt fencing will be used to reduce sediment runoff into the ponds.

Pyrotechnics and munitions have the potential to impact dusky gopher frog health if ingested or accumulated in soils and water. To reduce the potential for leaching from munitions to enter groundwater or runoff to water bodies, containment of bullets within collection berms and periodic cleanup and disposal procedures will occur. Munition impact areas will be located away from dusky gopher frog ponds to reduce the potential for chemical and sedimentation impacts. Table 4-10 summarizes avoidance and minimization measures for the dusky gopher frog.

Impacts to the dusky gopher frog will not be significant.

4.2.6 Pine Barrens Tree Frog

The state-listed pine barrens tree frog is typically found in herbaceous and shrubby bogs of the Wetland/Riparian ecological association. To minimize the potential for impacts to the pine barrens tree frog, heavy equipment use will be restricted in wetlands. Sporadic 7SFG(A) ground maneuvering will occur in these areas, with little to no disturbance; however, driving and digging in these areas will be restricted to minimize the potential for impacts to the pine barrens tree frog. Impacts to the pine barrens tree frog will not be significant.

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4.2.7 Florida Pine Snake		
<p>The Florida pine snake may occur in sandhills habitat across Eglin. The primary potential impact is crushing by vehicles, both during construction and daily operations. While potential adverse impacts to individual snakes could occur if encountered during project activities, the impacts to overall populations at Eglin will be minimal considering that Eglin has many thousands of acres that provide suitable habitat for the species. Impacts to the Florida pine snake will not be significant.</p>		
4.2.8 Shorebirds and Wading Birds		
<p>Some state-listed shorebirds and wading birds may be temporarily displaced as a result of noise or movements of 7SFG(A) activities on SRI. Colonies or individual nests of several state-listed shorebird species (least terns, southeastern snowy plovers, and black skimmers) are usually found along the rack line or other suitable habitat along the beach and have the potential to occur within the proposed action areas. State-listed wading birds such as the snowy egret, little blue heron, tricolored heron, and white ibis, forage mainly in wetland areas or along shorelines of saltwater and freshwater water bodies. 7SFG(A) activities will be avoided in marked shorebird nesting habitats.</p>		
<p>Land-based activities near nesting areas may result in a flush/startle response. During nesting season, this may result in a potentially increased vulnerability of eggs and chicks to predation. However, foraging species typically move on to other areas, while nesting species return after the general disturbance was over. These activities will also likely scare other species such as predators (e.g., feral cats, coyotes, etc.) from the area, thus reducing the chances of nest predation should nesting birds be flushed.</p>		
<p>Recent hurricane events have created prime shorebird nesting habitat all along the barrier island within Eglin boundaries. The NRS has documented several shorebird nesting areas on SRI. To reduce the potential for impacts, the 7SFG(A) will avoid activities in these areas, and will coordinate ground movement operations on SRI through the NRS. 7SFG(A) activities on SRI would be of a transient nature, and any disturbances would be of short duration. Thus, impacts to wading bird and shorebird species from 7SFG(A) activities will not be significant.</p>		
4.2.9 Bald Eagle		
<p>Aircraft noise from JSF training has the potential to affect the bald eagle nest near TA A-22 south of the Eglin Main Base cantonment area (Figure 3-3). Most commonly, the reaction of birds and wildlife to aircraft noise, particularly when the aircraft is visible to the animal, is some degree of startle response, one response being flushing (i.e., abruptly leaving a nest) (Gladwin et al., 1988). In this case, an animal could</p>		
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Appendix H

Biological Resources

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Other Species Considered

theoretically leave its nest open to predation, thereby affecting reproductive success (Larkin, 1996).

At the location of the bald eagle nest on Eglin Main Base, aircraft are already a major component of the existing noise environment, thus aircraft noise from JSF air operations will not pose a novel or new threat to the eagle. They have nested at this location for several years, moving from Rocky Bayou to TA A-22 in the mid 1990s. Average noise increases from the addition of new aircraft will not be abruptly noticeable, as flights of this new aircraft are integrated in with other aircraft that currently use this runway on a day to day basis. Changes in flight patterns such as lower altitude or routes closer to the nest would be more likely to have an effect but such changes are not foreseen. In one study, bald eagle response was primarily related to the proximity of a disturbance such as a person or aircraft, rather than to a particular noise (Larkin, 1996); in effect, eagle response was related more to a visual presence.

Noise and human presence associated with ground movements and boats near the eagle nest near TS A-12 on SRI has the potential to disturb the eagle. However, 7SFG(A) operations on SRI would be of a clandestine nature and would involve only a few troops for any particular mission, thus should not result in any loud noise. Additionally, some of the operations would take place at night, removing the visual presence disturbance.

Eglin observes the restrictions detailed in the *National Bald Eagle Management Guidelines* (USFWS, 2007). As pertains to aircraft activities at Eglin Main Base, the guidelines state that aircraft should not operate within 1,000 feet of the nest during the breeding season (01 October to 15 May), except where eagles have demonstrated a tolerance for the activity. For 7SFG(A) activities at SRI, the guidelines state that foot traffic visible from the eagle's nest, should remain at least 330 feet from the nest, and boat traffic should maintain a buffer of 330 feet when possible, but small motorized boats may pass within 330 feet of the nest if the boats minimize trips and avoid stopping in the area.

Impacts to the bald eagle will not be significant.

4.2.10 Southeastern American Kestrel

The Proposed Action may impact the southeastern American kestrel from tree removal, noise, and wildfires. Kestrels typically nest in cavities excavated by woodpeckers in snags (dead trees). They most frequently use decayed longleaf pine trees greater than 9 inches in diameter and 20 feet tall. Kestrels frequently locate their nests in the abandoned longleaf pine nest cavities of the RCW. The inactive and abandoned RCW nests in proximity to the 7SFG(A) ranges and JSF munitions test areas that are tracked by Eglin's RCW monitoring program may represent potential kestrel nesting sites.

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<p>Prior to the removal of any inactive RCW trees, the NRS will conduct surveys to check for occupation by the kestrel. If a nest is found, it must be left alone until the nestlings fledge unless the removal is required for training purposes. Construction activities must wait until the nestlings fledge. Wildfires started by munitions may be beneficial or harmful to the kestrel, depending on the intensity of the fire. Fires help to keep vegetation low for better hunting grounds, but if fires burn too hot, cavity trees may be destroyed.</p>		
<p>As with the RCW, direct physical impacts are unlikely and noise impacts will be minimal. Research on noise and predatory birds indicates they will startle in response to aircraft overflights, but have been observed to acclimate to this type of disturbance (Anderson et al., 1989). Kestrels will be exposed intermittently to noise from small arms fire, but will likely acclimate to the disturbance over time (Larkin, 1996). Birds that continue to live near test areas are likely accustomed to the types of noise disturbance produced by missions or are not deterred by the disturbance as long as the habitat is suitable.</p>		
<p>Most commonly, the reaction of birds and wildlife to aircraft noise, particularly when the aircraft is visible to the animal, is some degree of startle response, one response being flushing (i.e., abruptly leaving a nest; Gladwin et al., 1988). In this case, an animal could theoretically leave its nest open to predation, thereby affecting reproductive success (Larkin, 1996). Research on noise and predatory birds (kestrels are predatory) indicates these types of birds are less likely to startle or flush from noise than other types of birds, such as songbirds. Low response was observed in nesting ospreys (Trimper et al., 1998). Red-tailed hawks exhibited habituation to helicopter noise (Anderson et al., 1989). In general, Mancini et al. (1988) found that most raptors did not exhibit a negative response to low-level overflights.</p>		
<p>For training, the JSF will use existing runways, routes, and airspace blocks. Birds that continue to live near airfields are likely accustomed to the types of noise disturbance produced by missions or are not deterred by the disturbance as long as the habitat is suitable. Since aircraft are already a major component of the existing noise environment at Eglin, aircraft noise from JSF air operations will not pose a novel or new threat to the kestrel that would cause adverse reactions, other than temporary flight. Table 4-10 summarizes avoidance and minimization measures for the kestrel.</p>		
<p>Impacts to the Southeastern American kestrel will not be significant.</p>		
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4.2.11 Avoidance and Minimization Measures
 The JSE, 7SFG(A), Eglin NRS, and Eglin AFB will implement the avoidance and minimization measures below to reduce or remove impacts to biological resources from JSF and 7SFG(A) cantonment and range activities (Table 4-10).

Table 4-10. Avoidance and Minimization Measures for State-listed T&E Species Affected by JSF and 7SFG(A) Activities

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF JTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ¹
Florida Black Bear	Cease vehicular activity if a black bear is sighted, and wait until the animal is out of harm's way before resuming activity. Notify the NRS.	√			√	√	√			
Santa Rosa Beach Mouse	Avoid dunes greater than five feet high.		√							
Gopher Tortoise	Cease vehicular activity if a gopher tortoise is sighted, and wait until the animal is out of harm's way before resuming activity. Notify the NRS.	√			√	√	√			
	Avoid active, inactive, and	√			√	√	√			

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Table 4-10. Avoidance and Minimization Measures for State-listed T&E Species Affected by JSF and 7SFG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
	abandoned gopher tortoise burrows by a minimum of 25 feet.									
	In areas where frequent off-road activity may occur, the NRS will evaluate the need for relocation.	√			√					
	Immediately prior to land clearing, conduct surveys for gopher tortoises. If burrows are found to be in imminent danger from construction, Eglin will apply for a relocation permit from the Florida Fish and Wildlife Conservation Commission (FWC). Follow guidelines established by the	√					√			

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Determination of Impacts **Other Species Considered**

Table 4-10. Avoidance and Minimization Measures for State-listed T&E Species Affected by JSF and 7SFG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
Dusky Gopher Frog	FWC for transportation and release of tortoises.									
	Should a gopher tortoise burrow be identified within the proposed path of construction, cease work near the burrow until NRS personnel have investigated the burrow and relocated any gopher tortoise to a suitable location.	√				√	√			
Dusky Gopher Frog	During construction, employ erosion control measures such as silt fences near gopher frog ponds.	√								
	Restrict digging in gopher frog ponds. Restrict troop and vehicle movements	√			√					

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Determination of Impacts **Other Species Considered**

Table 4-10. Avoidance and Minimization Measures for State-listed T&E Species Affected by JSF and 7SFG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
	in gopher frog ponds. Avoid pyrotechnics and munitions use in water bodies.	✓			✓				✓	
	Avoid ground disturbing fire suppression activities (bulldozers) in dusky gopher frog ponds.	✓			✓				✓	
	Locate munitions impact areas away from dusky gopher frog ponds.	✓							✓	
Pine Barrens Tree Frog	Restrict driving, digging, and heavy equipment use in wetland/riparian areas.	✓			✓					
Florida Bog Frog	Restrict driving, digging, and heavy equipment use in wetland/riparian areas.				✓					

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Determination of Impacts **Other Species Considered**

Table 4-10. Avoidance and Minimization Measures for State-listed T&E Species Affected by JSF and 7SFG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
Bald Eagle	Observe the restrictions detailed in the <i>National Bald Eagle Management Guidelines</i> (USFWS, 2007). Foot traffic visible from the eagle's nest should remain at least 330 feet from the nest, and boat traffic should maintain a buffer of 330 feet when possible, but small motorized boats may pass within 330 feet of the nest if the boats minimize trips and avoid stopping in the area. Restrict low-level aircraft flights within 1,000 feet of the eagle nest on Eglin Main Base during the breeding.		√					√		

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Determination of Impacts **Other Species Considered**

Table 4-10. Avoidance and Minimization Measures for State-listed T&E Species Affected by JSF and 7SFG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
Southwestern American Kestrel	season (01 October to 15 May). Survey inactive RCW cavity trees prior to removal to check for occupation by the kestrel. If a nest is found it must be left alone until the nestlings fledge unless the removal is required for training purposes. Construction activities must wait until the nestlings fledge.	√					√			
Shorebirds	Avoid 7SFG(A) activities in marked shorebird nesting habitats. Coordinate ground maneuvers on SRI with the NRS. 7SFG(A) and JSF must provide conditions and		√							
All Species		√	√	√	√	√	√	√	√	√

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Determination of Impacts **Other Species Considered**

Table 4-10. Avoidance and Minimization Measures for State-listed T&E Species Affected by JSF and 7SFG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
	drive vehicles or boats in areas with known invasive non-native plant species problems. If a vehicle is driven in such an infested area, clean the vehicle before it is driven to a non-infested area. Follow Eglin's Wildfire Specific Action Guide Restrictions (U.S. Air Force, 2006a).									
	Develop wildfire operational plans with Eglin NRS to identify high wildfire risk conditions and notification procedures that units will follow to engage fire response personnel when	√			√				√	√

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Determination of Impacts **Other Species Considered**

Table 4-10. Avoidance and Minimization Measures for State-listed T&E Species Affected by JSF and 7SFG(A) Activities, Cont'd

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
	needed.									
	Immediately notify Eglin Fire Department Dispatch of any wildfire started as a result of pyrotechnics or munitions use.	√			√				√	√
	Provide additional wildland fire resources at Eglin.	√			√				√	√
	Avoid ground disturbing fire suppression activities (bulldozers) in wetland habitats.	√			√				√	√

¹Yellow River, East Bay River, Santa Rosa Sound, Choctawhatchee Bay, and the near-shore waters of the Gulf of Mexico
²Eglin Main Base, Choctaw Field, and Duke Field
³TA B-75 and TA C-62
⁴TA B-82 and TA C-32E
 7SFG(A) = 7th Special Forces Group (Airborne); DZ = Drop Zone; IJTS = Initial Joint Training Site; JSF = Joint Strike Fighter; LZ = Landing Zone; NRS = Natural Resources Section; RCW = Red-cockaded Woodpecker; SOF = Special Operations Forces; SRI = Santa Rosa Island; TA = Test Area; U.S. = United States

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Table 4-11. Cumulative Effects Determinations

Activity	Sea Turtles				Perforate Lichen	Piping Plover		Gulf Sturgeon		RCW	Flatwoods Salamander	Freshwater Mussels	Indigo Snake	Okaloosa Darter
	5/1-10/31		11/1-4/30			Species	Critical Habitat	Species	Critical Habitat					
	Day	Night	Day	Night										
7SFG(A) Cantonment	NE	NE	NE	NE	NE	NE	NE	NE	LAA	NLAA	NE	NLAA	NE	
7SFG(A) Range	NLAA	LAA*	NE	NE	NE	NLAA	NE	NLAA	NLAM	LAA	NLAA	NLAA	NLAA	
JSF JITS Cantonment	NE	NE	NE	NE	NE	NE	NE	NE	NE	NLAA	NE	NE	NLAA	
JSF Flight Training	NE	NE	NE	NE	NE	NE	NE	NE	NE	NLAA	NLAA	NE	NE	

7SFG(A) = 7th Special Forces Group (Airborne); JITS = Initial Joint Training Site; JSF = Joint Strike Fighter; LAA = Likely to Adversely Affect; NE = No Effect; NLAA = Not Likely to Adversely Affect; NLAM = Not Likely to Adversely Modify
 * LAA "take" is incorporated in the Santa Rosa Island Programmatic Biological Opinion (USFWS, 2005)

Determination of Impacts **Other Species Considered**

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Conclusion

5. CONCLUSION

Based on analysis of the potential impacts to federally protected species from direct physical impacts, harassment, and habitat impacts associated with JSF and 7SFG(A) activities, the only species that are likely to be adversely impacted are sea turtles during sea turtle season and the RCW. Sea turtle "take" is incorporated in the SRI Programmatic Biological Opinion (USFWS, 2005), and Terms and Conditions from the SRI BO will be implemented as part of this Proposed Action. Avoidance and minimization measures would serve to mitigate potential impacts to sea turtles and other sensitive species. The RCW would not likely be affected by direct impacts; however, BRAC actions are likely to indirectly affect the RCW through habitat impacts such as land clearing, fire suppression, road improvements, and wildfires. Cumulatively, these stressors have the potential to negatively affect certain RCW clusters, primarily in the 7SFG(A) cantonment and Group 1 range area, where RCWs will be subject to the combination of impacts.

The NRS will notify the USFWS immediately if any of the actions considered in this BA are modified or if additional information on listed species becomes available, as a re-initiation of consultation may be required. If impacts to listed species occur beyond what has been considered in this assessment, all operations will cease and the USFWS will be notified. Any modifications or conditions resulting from consultation with the USFWS will be implemented prior to commencement of activities.

Conclusion

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**2005 BASE REALIGNMENT AND CLOSURE
(BRAC) DECISIONS AND RELATED ACTIONS
AT EGLIN AIR FORCE BASE, FLORIDA**

**Biological Opinion
July 11, 2008**

**Prepared by:
U.S. Fish and Wildlife Service
Panama City, FL**



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Appendix H

This biological opinion refers only to the potential effects to the federally endangered RCW. Table 1 identifies other federally listed species occurring within the Action Area. Eglin's NRS summarized potential impacts to these species from actions associated with the BRAC in a Draft EIS (dated March 2008) and accompanying biological assessment. Provided Eglin's NRS follows all proposed avoidance and minimization measures, the Service concurs with Eglin's determination that BRAC activities are not likely to adversely affect the Gulf sturgeon (*Acipenser oxyrinchus desotoi*), Gulf sturgeon critical habitat, Okaloosa darter (*Etheostoma okaloosae*), flatwoods salamander (*Ambystoma cingulatum*), piping plover (*Charadrius melodus*), piping plover critical habitat, eastern indigo snake (*Drymarchon corais couperi*), and perforate lichen (*Cladonia perforata*). Four freshwater mussels, southern sandshell (*Lampsilis australis*), fuzzy pigtoe (*Pleurobema strodeanum*), southern kidneyshell (*Ptychobranchus jonesi*), and Choctaw bean (*Villosa choctawensis*), which are federal candidates, are also not likely to be adversely affected. As stated in NRS's BA for BRAC, the threatened loggerhead sea turtle (*Caretta caretta*), the endangered green sea turtle (*Chelonia mydas*), the endangered leatherback sea turtle (*Dermochelys coriacea*), and the endangered Kemp's ridley sea turtle (*Lepidochelys kempii*) on Santa Rosa Island may be affected, but these species were covered under the Santa Rosa Island (SRI) Mission Utilization Plan Biological Opinion (SRI Programmatic) (USFWS 2005).

Table 1. Species and Critical Habitat Evaluated for Effects and those where the Service has concurred with a "Not Likely Adversely Affected" Determination.

Species or Critical Habitat	Present in Action Area	Not Likely Adversely Affected
Gulf sturgeon	yes	NLAA
Gulf sturgeon critical habitat	yes	NLAA
Okaloosa darter	yes	NLAA
Flatwoods salamander	yes	NLAA
piping plover	yes	NLAA
piping plover critical habitat	yes	NLAA
Eastern indigo snake	yes	NLAA
perforate lichen	yes	NLAA
southern sandshell	yes	NLAA
fuzzy pigtoe	yes	NLAA
southern kidneyshell	yes	NLAA
Choctaw bean	yes	NLAA

Appendix H

Biological Resources

Consultation History

- September 8, 2005 The 2005 Defense Base Closure and Realignment Commission (DBCRC) completed its review of initial base realignment and closure (BRAC) recommendations made by the Secretary of Defense and forwarded a Final Report with a list of recommended base closures and realignments to the President.
- February – July, 2006 During this period, Eglin AFB reviewed possible scenarios to implement BRAC recommendations and determined that there would be potential impacts to federally listed species.
- July 2006 - December 2007 The Service participated in monthly telephone conferences with the Eglin Natural Resources Section and updates were given on the status of the preferred alternative for the BRAC actions.
- January 17, 2008 The Service received a Biological Assessment and cover letter dated January 15, 2008 initiating formal section 7 consultation.
- February 12, 2008 Eglin Natural Resources Section briefed the Service’s Panama City Field Office on the BRAC actions.
- February 29, 2008 The Service requested additional information a in letter dated February 29, 2008.
- March 14, 2008 Eglin Natural Resources Section provided a response to the Service’s request for additional information.
- May 08, 2008 The first draft of the Biological Opinion is prepared.
- June 24, 2008 The Service and Eglin NRS discuss several concerns via conference call.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

The proposed action would result in a group of new missions at Eglin Air Force Base (AFB) (Figure 1) mandated by implementation of the Base Realignment and Closure (BRAC) Commission decisions. The BRAC implementation at Eglin AFB would require: constructing the 7th Special Forces Group (Airborne) (7SFG(A)) cantonment area; constructing the Joint

Strike Fighter (JSF) Initial Joint Training Site (IJTS) cantonment area; and providing adequate access and capability to fulfill training missions of the two new users—the 7SFG(A) and the JSF Program (Figure 2).

Known RCW clusters are present in the areas under the Military Training Routes (MTRs) VR-1082 and VR-1085, with a concentration of RCWs in Conecuh National Forest in south Alabama, and in the northeast portion of Eglin Range. It is unknown if and where RCWs may be located on private lands in the area. F-35 aircraft would fly as low as 500 feet Above Ground Level (AGL) along certain segments of VR-1082 and VR-1085, generating Sound Exposure Level (SEL) of 129 decibel (dB). Currently, these routes are flown at the same altitudes. However, the loudest aircraft that uses the routes frequently is the F-15, which generates an SEL of 112 dB at 500 AGL.

As with MTRs VR-1082 and VR-1085 under the Tyndall Military Operating Area (MOA), flights may occur over Lathrope Bayou Tract, land under private ownership and Bureau of Land Management ownership and management. These lands are located just north of Tyndall property. Flight patterns will increase over RCW clusters located on Apalachicola National Forest lands. Any RCWs present under the Tyndall MOA flight paths may be exposed to SEL up to 133 dB from F-35 flights at 300 feet AGL. The loudest overflight event currently occurring regularly under Tyndall MOAs is 116 dB SEL at 300 feet AGL, as generated by F-15 aircraft.

7SFG(A) Proposed Action

The 7SFG(A) would construct a Special Operations Forces (SOF) Compound, which would contain the cantonment area for the 7SFG(A). Most weapons systems training for the 7SFG(A) would require the use of 13 ranges specifically designed for certain weapons training certifications. All 7SFG(A) munitions would fit inside the existing Munitions Storage Area (MSA) at Duke Field. The majority of the land required for training would be utilized for mounted (in vehicles) and dismounted (on foot) maneuvers.

Cantonment Area

Cantonment requirements for the 7SFG(A) realignment would include establishing a SOF Compound (approximately 500 acres) composed of several functional building types, including administrative, industrial, warehouse, and residential. A number of road improvements, such as asphaltting or widening, are planned to provide proper access to the 7SFG(A) cantonment area and ranges. Widening would include providing areas (right of ways) on each side of the road for water, sewer, and electrical lines. The area impacted would not be more than 400 feet in width overall and approximately 45 acres. Details on cantonment area construction and road improvements are available in the BRAC EIS (U.S. Air Force 2008).

Range Training

The 7SFG(A) Range Training involves utilization of the Eglin Range in three areas: (1) Firing Ranges, (2) Aircraft Operations, and (3) Water Operations and Ground Maneuvers. The 7SFG(A) requires developed range land with facilities, utilities, roads, trails, and other assets for weapons training and certification (6,736 acres). Ammunitions expenditures at the SOF ranges would include small caliber, large caliber, mines, demolitions, grenades, and rockets.

The 7SFG(A) range training would require the use of airspace for fixed-wing and rotary-wing operations. The 7SFG(A) would use existing Landing Zones (LZs) and Drop Zones (DZs), plus two new proposed DZs. The 7SFG(A) air operations would occur over the SOF Ranges mentioned previously as well as over the water operations and ground maneuver areas.

The water operations and ground maneuver requirements for the 7SFG(A) provide training for a wide variety of activities such as reconnaissance, surveillance, visibility training, convoy training, and so on. Water operations involving troops and small rubber combat boats may occur in adjacent rivers, Choctawhatchee Bay, and nearshore coastal areas. Ground training includes a number of activities, but is generally the movement of dismounted soldiers (12-man teams) through wooded areas of the interstitial area. Some blank small-arms ammunition, hand flares, smoke grenades, or other training ammunition are expended during certain operations. Ground vehicle movement is normally restricted to the existing road and trail network, but some training integrates the use of all-terrain vehicles (ATVs) or small trucks.

Details on 7SFG(A) air operations, firing ranges, water operations, and ground maneuvers are available in the BRAC EIS (U.S. Air Force 2008).

JSF Program Proposed Action

The purpose of the proposed action for the JSF Program is to provide the facilities, classrooms, instruction, equipment, ranges, and airspace needed to teach aviators and maintenance technicians how to properly operate and maintain the new JSF weapon system. The aircraft accompanying the JSF IJTS and beddown is the F-35, which is a supersonic, single-seat, single-engine aircraft capable of performing and surviving lethal strike warfare missions.

Cantonment Area

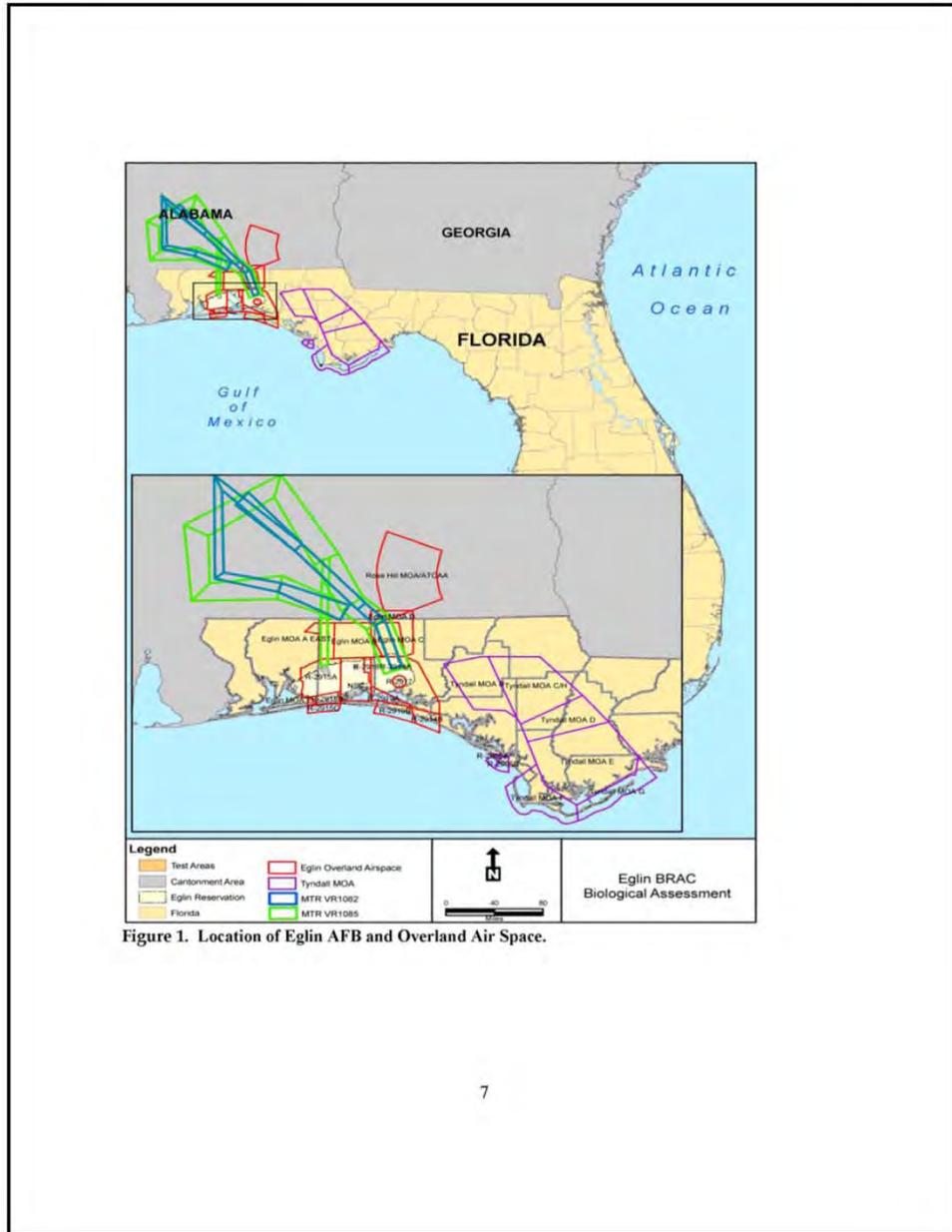
The JSF IJTS would require between 100 and 200 acres, and would provide the facilities to house academic classrooms, virtual trainers, flying training squadrons, and hardware trainers. Initial requirements involve constructing approximately 23 new facilities or buildings, taxiways, and runways. The JSF IJTS would use the existing MSA on Eglin Main Base.

Flight Training

JSF flights are designed to teach the students various skills, such as flying in formation, advanced aircraft handling, and tactics and weapons used when approached by enemy aircraft. Training exercises would occur five days per week with most flights occurring during the day. On average, approximately 122 sorties would be conducted per day.

All departures and terminations would occur from Eglin Main Base. The other training events would occur at the three airfields—Duke Field, Choctaw Field, and Eglin Main. The JSF would utilize a variety of Special Use Airspace (SUA) on a routine basis, including Warning Area W-151, Tyndall Military Operating Areas (MOAs), VR-1082, and VR-1085. The JSF flight training would use restricted areas (R-2914/15/18/19) for air-to-surface munitions drops (live and inert guided bomb units) and strafing runs (25-mm), to simulate attacks on threat emitters, and to practice evasive maneuvers. For strafing, the JSF flight training would use existing targets on Training Area (TA) C-62 and TA B-75. For both inert and live bombs, existing targets on TAs C-52E and B-82 would be used. Details on JSF air operations are available in the BRAC EIS (U.S. Air Force 2008).

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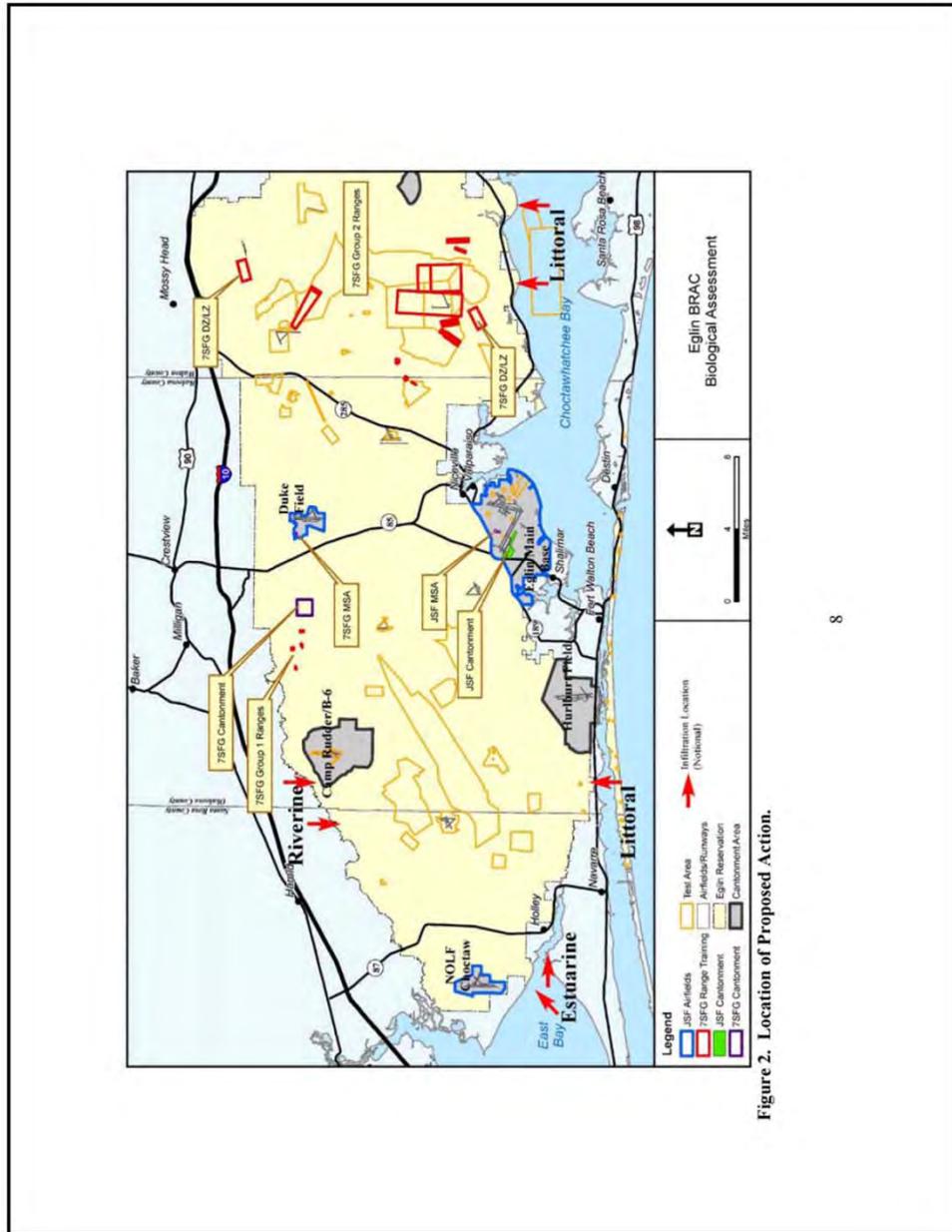


Figure 2. Location of Proposed Action.

Avoidance and Minimization Measures

The JSF, 7SFG(A), Eglin Natural Resources Section (NRS), and Eglin AFB will implement the Avoidance and Minimization Measures below to reduce or remove impacts to biological resources from JSF and 7SFG(A) cantonment and range activities (Table 2).

Table 2. Avoidance and Minimization Measures for Federally Listed T&E Species Affected by JSF and 7SFG(A) Activities.

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ and TA C-62)	JSF Bombing Areas ⁴
Red-cockaded Woodpecker	Continue monitoring of RCWs in the area by the Eglin NRS. Follow the <i>Management Guidelines for the Red-Cockaded Woodpecker on Army Installations</i> , which details activities that are allowed and those that are restricted near active RCW trees (U.S. Army, 2006) (Table 4-1). Within 200 feet of marked cavity trees allow only military activities of a	√			√	√	√	√	√	√

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Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JFS IJTS	JFS Airfields ²	JFS Strafing Areas ³ (TA B-75 and TA C-62)	JFS Bombing Areas ⁴
	transient nature (less than two hours occupation). Within the 200 foot buffer, prohibit bivouacking, excavating, digging, and establishing command posts. Prohibit military vehicles from occupying a position or traversing within 50 feet of a marked cavity tree, unless on an existing road or maintained trail or firebreak. For protected clusters in areas of the Eglin reservation where ground training will occur, mark buffers for all suitable cavity and cavity start trees prior to mission initiation. Warning	√			√	√				

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
	<p>signs will be posted at reasonable intervals along the 200-foot perimeter of cavity trees facing to the outside of the buffer zone and along roads, maintained trails and firebreaks, and other likely entry points into the buffer zone.</p> <p>Do not allow longleaf pine trees larger than 5 feet in height to be cut or destroyed, unless written permission has been granted by the NRS.</p> <p>Immediately report to range control known damage to any marked cavity or cavity start tree and/or any known extensive soil disturbance in and around RCW</p>	√			√					

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Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JFSF IJTS	JFSF Airfields ²	JFSF Strafing Areas ³ (TA B-75 and TA C-62)	JFSF Bombing Areas ⁴
	clusters; range control will notify NRS biologists immediately. Within 3 working days of notification, the Eglin NRS will re-provision a cavity tree; if one is destroyed due to training activity. If a unit causes damage to training land within a cluster, the responsible unit will coordinate with the NRS to repair damage as soon as practicable (normally within 3 working days of notification). All digging for military training activities in RCW habitat management units will be filled and inspected upon	√			√					
					√					

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS Airfields ²	JSF Airfields ²	JSF Straffing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
	completion of training.									
	Continue prescribed burning as much as possible in RCW foraging habitat.	√			√	√			√	√
	In areas where the use of prescribed fire may be limited, use herbicides or mechanical means to maintain RCW foraging habitat.	√				√				
	In RCW foraging habitat in direct fire areas that are not directly impacted by weapons firing, continue to conduct RCW management the same as for foraging habitat outside of impact areas.	√							√	√
	If tree clearing is to occur during nesting season, screen each	√				√				

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Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JFS IJTS	JFS Airfields ²	JFS Strafing Areas ³ (TA B-75 and TA C-62)	JFS Bombing Areas ⁴
Flatwoods Salamander	<p>inactive cavity tree during the breeding season to verify no trees have been recolonized.</p> <p>Modify range and target layout to protect RCW foraging and nesting habitat.</p> <p>During land clearing, construction and road improvements, employ erosion control measures such as silt fences near potential flatwoods salamander habitat.</p> <p>Observe the following restrictions from the Final Rule for federal listing of the flatwoods salamander: Timber harvesting in pine flatwoods habitat is</p>	√				√			√	√

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Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF LJTS	JSF Airfields ³	JSF Strafing Areas ⁵ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
	allowed within a 164-meter (538-foot) radius buffer zone surrounding known flatwoods salamander breeding ponds by using selective harvest only during dry periods; within an outer secondary zone extending from 164 meters (538 feet) to 450 meters (1,476 feet) out from the edge of the breeding pond; a mixture of clean-cutting and selective harvesting is allowed. The rule allows clear-cutting of up to 25 percent of this secondary zone at any given time, as long as 75 percent of the secondary zone remains in pine flatwoods habitat at a basal area of									

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Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JFS IJTS	JFS Airfields ²	JFS Strafing Areas ³ (TA B-75 and TA C-62)	JFS Bombing Areas ⁴
	4.2 to 4.7 square meters per hectare. Instruct vehicle and equipment operators to remain on existing roads when moving within or near potential flatwoods salamander habitat.	√			√	√				
	South of the East Bay River, prohibit ground disturbing activities (i.e., digging) within the 1,500-foot flatwoods salamander buffer, and restrict vehicle traffic to established roads.				√					
	Prohibit pyrotechnics and munitions use in water bodies.	√			√				√	
	Prohibit ground disturbing fire suppression activities (bulldozers) in flatwoods salamander.	√			√				√	

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Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JFS IJTS	JFS Airfields ²	JFS Strafing Areas ³ (TA B-75 and TA C-62)	JFS Bombing Areas ⁴
Okaloosa Darter	habitat. Locate munitions impact areas away from hardwood salamander ponds.	✓							✓	
	During land clearing and construction, utilize erosion control measures such as silt fencing near Okaloosa darter streams.	✓					✓			
	Maintain at least a 100-foot vegetated buffer along Okaloosa darter streams. For trees that must be removed within the Okaloosa darter vegetative buffer, hand-cut them and remove them without heavy machinery.	✓						✓		
	Near Okaloosa darter streams, conduct land	✓					✓			

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Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
	clearing and construction activities during dry periods to limit the potential for rutting and erosion into darter streams. Prohibit equipment and vehicle use, bivouac, and fighting positions on stream slopes near Okaloosa darter streams and in newly restored areas adjacent to Okaloosa darter streams. Use established roads, trails, and bridges when troops and vehicles are crossing Okaloosa darter streams. Mark darter streams on field maps. Prohibit pyrotechnics and munitions use in Okaloosa darter	✓			✓		✓			

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JFSF IJTS	JFSF Airfields ²	JFSF Strafing Areas ³ (TA B-75 and TA C-62)	JFSF Bombing Areas ⁴
Freshwater Mussels	streams. Locate munitions impact areas away from Okaloosa darter streams.	√								
	In locations where the 7SFG(A) ranges appear to impact Okaloosa darter streams, the final surveys and design layouts will be implemented so that riparian areas will not be impacted.	√								
	At boat landing sites, minimize erosion through restoration/stabilization, rotational use, and avoidance of contact with emergent vegetation along banks and shorelines. Use only designated boat landing sites.			√						
				√						

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Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
Gulf Sturgeon	At boat landing sites, minimize erosion through restoration, stabilization, rotational use, and avoidance of contact with emergent vegetation along banks and shorelines. Use only designated boat landing sites.			√						
Sea Turtles	If surveys indicate a sea turtle nest is within 200 feet of the insertion point, use another insertion point for that mission. During sea turtle season, do not conduct any beachfront activities until after Eglin's NRS completes the morning sea turtle nesting surveys. Coordinate all		√							

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and LZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
	7SFG(A) activities on SRI with the NRS prior to beginning the activity. Troops and personnel must avoid sea turtle nests by at least 50 feet, and must not interfere with nesting sea turtles, impede hatching sea turtles from emerging from the nest and crawling to the Gulf of Mexico, or obscure signs of sea turtle activity. Stage vehicles, helicopters, and watercraft at least 200 feet away from any nest that is found past 60 days into the incubation period. Restore any beach and dune habitats that are impaired by mission activities.		✓							

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Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JFSF IJTS	JFSF Airfields ²	JFSF Strafing Areas ³ (TA B-75 and TA C-62)	JFSF Bombing Areas ⁴
	Immediately following operation completion, refill all holes and remove all ruts deeper than 2 inches during August and September at nests at incubation day 60 or greater.		√							
	Avoid vehicular and foot traffic in areas with dunes over 5 feet high.		√							
	Prohibit driving on the beach during sea turtle season.		√							
	Property shield using wildlife lighting any light from view of the beach during sea turtle nesting and hatching season.		√							
	Comply with all avoidance and minimizations measures and all		√							

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Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and LZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JFS IJTS	JFS Airfields ²	JFS Strafing Areas ³ (TA B-75 and TA C-62)	JFS Bombing Areas ⁴
Eastern Indigo Snake	<p>applicable Terms and Conditions from the <i>SRI Mission Utilization Plan Biological Opinion</i> (USFWS, 2005).</p> <p>Cease vehicular activity if an indigo snake is sighted, and wait until the animal is out of harm's way before resuming activity. The NRS should be notified immediately.</p> <p>Immediately prior to clearing, conduct surveys for indigo snakes. Permitted NRS staff will relocate these animals to another area on Eglin.</p> <p>Direct personnel not to injure, harm, or kill the indigo snake(s).</p>	✓			✓	✓	✓			

Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
Piping Plover	Follow the <i>Standard Protection Measures for the Eastern Indigo Snake</i> (U.S. Air Force, 2004). Prohibit 7SFG(A) activities in piping plover critical habitat. The NRS will maintain fencing or signs around critical habitat. Continue piping plover surveys as scheduled. New locations consistently used by piping plovers will be given the same protection afforded the critical habitat units (i.e. posting and signing, prohibit troop access).	√	√		√	√	√			
Perforate Lichen	Continue perforate lichen population monitoring as		√							

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Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and LZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JFS IJTS	JFS Airfields ²	JFS Strafing Areas ³ (TA B-75 and TA C-62)	JFS Bombing Areas ⁴
	periodically cleanup and dispose of munitions on the firing ranges. Use native vegetation for all landscaping and other plantings. To reduce potential seed sources, treat areas with known invasive non-native species problems. To avoid spreading invasive non-native plant species, do not drive vehicles or boats in areas with known invasive non-native plant species problems; these areas are designated by signs. If a vehicle is driven in such an infested area, clean the vehicle before it is driven to a non-infested area.	√	√	√	√	√	√	√		

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Species	Avoidance and Minimization Measures	7SFG(A) SOF Ranges and DZs/LZs	7SFG(A) SRI	7SFG(A) Boat Landing Sites ¹	7SFG(A) Interstitial Areas	7SFG(A) Cantonment	JSF IJTS	JSF Airfields ²	JSF Strafing Areas ³ (TA B-75 and TA C-62)	JSF Bombing Areas ⁴
	number of wildfires and increased manpower needed to conduct prescribed burns around the 7SFG(A) cantonment area and the ranges used by the 7SFG(A) and JSF. Avoid ground disturbing fire suppression activities (bulldozers) in wetland habitats.									√

Description of the Action Area

The Service has described the Action Area to include the habitats within and adjacent to Eglin AFB and the land areas under the SUA used for JSF flight training. The land area of the Eglin Military Complex is comprised of 464,000 acres of test areas and interstitial areas (the areas between the test areas). Proposed BRAC activities would occur within both the test areas and interstitial areas. Eglin is found within the Northeast Gulf Plains Ecoregion in Santa Rosa, Okaloosa, and Walton counties. The Action Area is defined as the Sandhills, upland pine and flatwoods community types found within the 450 RCW Management Emphasis Area as the area outlined in red in **Figure 3**.

Research documents that noise effects from existing military flight activities over RCW clusters are negligible effects. We have therefore not included areas off of Eglin's Reservation as part of the Action Area.

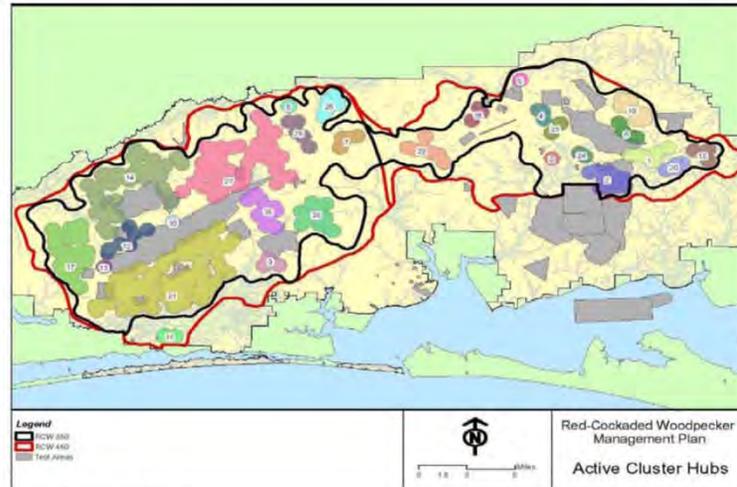


Figure 3. Action Area.

The total acreage of the Sandhills, upland pine, and flatwoods community types in the Action Area is 236, 936 acres. Five broad ecological associations exist on Eglin: the Sandhills, Wetland/Riparian, Flatwoods, Barrier Island, and Grassland/Shrub. Because most of the land area under the SUA outside of Eglin is privately owned, exact habitat types are unknown; however, they are assumed to be historically similar to those on Eglin, but with greater habitat alterations.

The test areas are mainly dominated by the Grassland/Shrub ecological association. Fire or machinery maintains this habitat type on test areas. The Grassland/Shrub association is not common within the interstitial areas, although some portions of the interstitial areas have consequently become grassland/shrublands (i.e., Duke Field and auxiliary fields) due to prior clearing efforts.

The Sandhills ecological association is the largest ecological association within the interstitial areas. The fire-dependent Sandhills association covers 78 percent of the Eglin reservation. Mechanically established longleaf pine, slash pine and sand pine plantations populate this association. The longleaf pine forest component of this association is globally very rare. Eglin's Integrated Natural Resources Management Plan (INRMP) states that "as little as 0.5 percent of old growth longleaf pine forest remain globally and Eglin's Sandhills contain more than 90 percent of these remnant stands."

Those remaining portions of the interstitial areas not in the Sandhills or Grassland /Shrub associations are in different vegetative communities within the Wetland/Riparian, Flatwoods, and Barrier Island associations. Most of Eglin's flatwoods are located in the southern portion of the reservation or are associated with stream/river systems. This fire-dependent community typically has an overstory of longleaf or slash pine with an open, herbaceous understory. The Yellow River borders much of Eglin's northern boundary. It is an Outstanding Florida Water and an Aquatic Preserve.

STATUS OF THE SPECIES/CRITICAL HABITAT

Species/critical habitat description

The red-cockaded woodpecker (RCW) is a territorial, non-migratory, cooperative breeding species (Lennartz et al. 1987; Walters et al. 1988) and is the only North American woodpecker that exclusively excavates its roost and nest cavities in living pine trees. In 1970, the Service listed the RCW as endangered (Federal Register 35:16047), and in 1973, the RCW was provided protection as an endangered species with the passage of the Endangered Species Act. No critical habitat is designated for the RCW.

Historically, the RCW occupied a wide range throughout old-growth, fire-maintained pine ecosystems of the southern United States. Although still widely distributed, the range of the RCW is now reduced and fragmented as a result of past and present human activities (e.g., timber harvesting and urban development) and natural factors (e.g., hurricanes and pine beetle outbreaks). The remaining RCW populations exist primarily on Federal lands located in the Coastal Plain from North Carolina to Texas, the Piedmont of Georgia and Alabama, the Sandhills of North Carolina and South Carolina, and the interior highlands of Arkansas, Oklahoma, and Kentucky (Costa and Walker 1995).

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Life history

The RCW has an advanced social system that revolves around family groups. A typical RCW group includes one pair of breeding birds, the current year's offspring (if any), and zero to four "helpers". Helpers are usually male offspring from previous breeding seasons that assist the breeding pair by incubating eggs, feeding the young, excavating cavities, and defending the territory (Ligon 1970; Lennartz and Harlow 1979; Lennartz et al. 1987; Walters et al. 1988). The RCW nesting season occurs from April to July. Incubation lasts approximately 9-10 days, and the young fledge 24 to 26 days after hatching. Some juvenile males disperse from their natal territory prior to the next breeding season in an attempt to find vacant territories, or to establish their own (Hooper et al. 1980; USFWS 2003a). Others may remain and become helpers during subsequent nesting seasons. Most juvenile females disperse after fledging, although some may remain with the group as helpers (Walters et al. 1988). The average dispersal distance of fledgling males and females is about three miles (Walters 1991; Letcher et al. 1998).

Each group of RCWs occupies a discrete territory consisting of its cavity trees, called a cluster, and adjacent foraging habitat (Walters 1990). The RCW requires mature (usually 60 or more years old), live pine trees to excavate its nesting and roosting cavities. The cavity trees are essential to the RCW because they provide shelter and a place to nest and raise young (Ligon 1970). A typical cluster contains between one and 20 cavity trees, and the breeding male usually chooses the most recently excavated natural cavity as the nest tree, or selects cavity trees with higher resin yields (Conner and Rudolph 1989). Such cavity trees may enhance the survival of the nestlings by decreasing the parasite load of nestlings and incubating adults, and providing a resin barrier to snake predation.

RCW cluster stands are typically less dense than surrounding stands and may be the least dense stands available (USFWS 2003a). For clusters, basal areas as low as 40 feet²/acre in longleaf stands and from 40 to 60 feet²/acre in shortleaf/loblolly stands are suitable (Conner et al. 1991). Seedtree and shelterwood cuts with excessive pine or hardwood midstory, however, are not acceptable as nesting habitat. Once established, clusters are often utilized for many consecutive years or even decades (Walters 1990). Hardwood midstory lessens the habitat quality, eventually leading to cavity abandonment when the hardwood midstory reaches cavity height (Conner and O'Halloran 1987; Costa and Escano 1989). Cluster abandonment may also occur as a result of displacement by competing cavity dwellers, or stochastic events such as hurricanes (Conner and O'Halloran 1987).

RCWs scale and probe bark on the trunks and limbs of living pine trees while foraging for insects. The amount of foraging area used by a group is dependant upon the quality of the habitat and population density. Research indicates that birds generally forage within one-half mile of the cluster (USFWS 2003a). RCW home ranges may vary seasonally, and encompass 60 to 300 acres. Habitat typically consists of open pine and/or pine/hardwood forests. Although in some habitats RCWs will use smaller pine trees as foraging substrate (DeLotelle et al. 1987), they prefer pines greater than 10 inches in dbh (USFWS 2003a). Groups may forage on pines scattered through hardwood stands, but pure hardwood stands are of little value to the RCW (Conner and O'Halloran 1987). The highest populations of the birds occur on areas with active

prescribed burning programs that control hardwoods. Many complex and interrelated factors, such as condition of the understory plant community, annual weather fluctuations, forest type, soils, physiographic province, season of the year, fire frequency and intensity, are important in determining foraging habitat quality.

The RCW is territorial and defends its home range from adjacent groups (Hooper et al. 1982; Ligon 1970). Territories tend to be smaller in areas with few hardwoods, presumably because of higher quality habitat. Home range size is related to both habitat and demographic (e.g., group size and population density) variables (Hooper et al. 1982; Lennartz et al. 1987) and is inversely related to habitat quality (DeLotelle et al. 1987, 1995). Studies by Hardesty et al. (1997a) and James et al. (2001) suggest that habitat structure, and not just the quantity of total resources, is an important determinant of home range size, territory quality, and reproductive success. The availability, quantity, and quality of foraging habitat affects RCW cluster status, group size, home range size, and reproductive success (Conner and Rudolph 1991; DeLotelle et al. 1987, 1995; Hardesty et al. 1997). Low-quality foraging habitat and large reductions in available foraging habitat can cause RCWs to abandon clusters, reduce fledging rates, and disrupt social interactions (Conner and Rudolph 1991; DeLotelle et al. 1995; Jackson and Parris 1995).

RCW Population dynamics

The recovery of the RCW is directly linked to the viability of discrete populations within selected southeastern states (USFWS 2003a). Populations required for recovery are distributed among 11 recovery units based on physiographic region to ensure the representation of broad geographic and genetic variation in the species. Viable populations within each recovery unit, to the extent allowed by habitat limitations, are essential to recovery of the species as a whole. Until recently, most RCW populations were considered stable at best or declining. RCW population trends since the early 1990s are improving, with an estimated 5,627 active RCW clusters range-wide (USFWS 2003a). The species can be delisted when five criteria are met that establish a tier of populations within the 11 recovery units that contain sufficient suitable nesting and foraging habitat and are not dependent on the installation of artificial cavities to remain stable.

Long-term viability of an RCW population, in genetic terms, depends on the presence of an adequate number of breeding individuals for the natural processes that increase genetic variability (e.g., mutation and recombination) to offset the natural processes that decrease genetic variability (e.g., genetic drift and inbreeding). Additionally, any prediction of a population's viability should also consider the population's ability to survive population fluctuations due to demographic and environmental fluctuations (Koenig 1988) or natural catastrophes. Reproductive rates, population density, and recolonization rates may influence RCW population variability more than mortality rates, sex ratios, and genetic viability. Therefore, dispersal of adult birds into breeding vacancies is essential for population persistence (Daniels et al. 2000; Schiegg et al. 2002). RCWs exhibit relatively low adult mortality rates; annual survivorship of breeding males and females is high, ranging from 72 to 84 percent and 51 to 81 percent, respectively (Lennartz and Heckel 1987; Walters et al. 1988; DeLotelle and Epting 1992).

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Life history

The RCW has an advanced social system that revolves around family groups. A typical RCW group includes one pair of breeding birds, the current year's offspring (if any), and zero to four "helpers". Helpers are usually male offspring from previous breeding seasons that assist the breeding pair by incubating eggs, feeding the young, excavating cavities, and defending the territory (Ligon 1970; Lennartz and Harlow 1979; Lennartz et al. 1987; Walters et al. 1988). The RCW nesting season occurs from April to July. Incubation lasts approximately 9-10 days, and the young fledge 24 to 26 days after hatching. Some juvenile males disperse from their natal territory prior to the next breeding season in an attempt to find vacant territories, or to establish their own (Hooper et al. 1980; USFWS 2003a). Others may remain and become helpers during subsequent nesting seasons. Most juvenile females disperse after fledging, although some may remain with the group as helpers (Walters et al. 1988). The average dispersal distance of fledgling males and females is about three miles (Walters 1991; Letcher et al. 1998).

Each group of RCWs occupies a discrete territory consisting of its cavity trees, called a cluster, and adjacent foraging habitat (Walters 1990). The RCW requires mature (usually 60 or more years old), live pine trees to excavate its nesting and roosting cavities. The cavity trees are essential to the RCW because they provide shelter and a place to nest and raise young (Ligon 1970). A typical cluster contains between one and 20 cavity trees, and the breeding male usually chooses the most recently excavated natural cavity as the nest tree, or selects cavity trees with higher resin yields (Conner and Rudolph 1989). Such cavity trees may enhance the survival of the nestlings by decreasing the parasite load of nestlings and incubating adults, and providing a resin barrier to snake predation.

RCW cluster stands are typically less dense than surrounding stands and may be the least dense stands available (USFWS 2003a). For clusters, basal areas as low as 40 feet²/acre in longleaf stands and from 40 to 60 feet²/acre in shortleaf/loblolly stands are suitable (Conner et al. 1991). Seedtree and shelterwood cuts with excessive pine or hardwood midstory, however, are not acceptable as nesting habitat. Once established, clusters are often utilized for many consecutive years or even decades (Walters 1990). Hardwood midstory lessens the habitat quality, eventually leading to cavity abandonment when the hardwood midstory reaches cavity height (Conner and O'Halloran 1987; Costa and Escano 1989). Cluster abandonment may also occur as a result of displacement by competing cavity dwellers, or stochastic events such as hurricanes (Conner and O'Halloran 1987).

RCWs scale and probe bark on the trunks and limbs of living pine trees while foraging for insects. The amount of foraging area used by a group is dependant upon the quality of the habitat and population density. Research indicates that birds generally forage within one-half mile of the cluster (USFWS 2003a). RCW home ranges may vary seasonally, and encompass 60 to 300 acres. Habitat typically consists of open pine and/or pine/hardwood forests. Although in some habitats RCWs will use smaller pine trees as foraging substrate (DeLotelle et al. 1987), they prefer pines greater than 10 inches in dbh (USFWS 2003a). Groups may forage on pines scattered through hardwood stands, but pure hardwood stands are of little value to the RCW (Conner and O'Halloran 1987). The highest populations of the birds occur on areas with active

prescribed burning programs that control hardwoods. Many complex and interrelated factors, such as condition of the understory plant community, annual weather fluctuations, forest type, soils, physiographic province, season of the year, fire frequency and intensity, are important in determining foraging habitat quality.

The RCW is territorial and defends its home range from adjacent groups (Hooper et al. 1982; Ligon 1970). Territories tend to be smaller in areas with few hardwoods, presumably because of higher quality habitat. Home range size is related to both habitat and demographic (e.g., group size and population density) variables (Hooper et al. 1982; Lennartz et al. 1987) and is inversely related to habitat quality (DeLotelle et al. 1987, 1995). Studies by Hardesty et al. (1997a) and James et al. (2001) suggest that habitat structure, and not just the quantity of total resources, is an important determinant of home range size, territory quality, and reproductive success. The availability, quantity, and quality of foraging habitat affects RCW cluster status, group size, home range size, and reproductive success (Conner and Rudolph 1991; DeLotelle et al. 1987, 1995; Hardesty et al. 1997). Low-quality foraging habitat and large reductions in available foraging habitat can cause RCWs to abandon clusters, reduce fledging rates, and disrupt social interactions (Conner and Rudolph 1991; DeLotelle et al. 1995; Jackson and Parris 1995).

RCW Population dynamics

The recovery of the RCW is directly linked to the viability of discrete populations within selected southeastern states (USFWS 2003a). Populations required for recovery are distributed among 11 recovery units based on physiographic region to ensure the representation of broad geographic and genetic variation in the species. Viable populations within each recovery unit, to the extent allowed by habitat limitations, are essential to recovery of the species as a whole. Until recently, most RCW populations were considered stable at best or declining. RCW population trends since the early 1990s are improving, with an estimated 5,627 active RCW clusters range-wide (USFWS 2003a). The species can be delisted when five criteria are met that establish a tier of populations within the 11 recovery units that contain sufficient suitable nesting and foraging habitat and are not dependent on the installation of artificial cavities to remain stable.

Long-term viability of an RCW population, in genetic terms, depends on the presence of an adequate number of breeding individuals for the natural processes that increase genetic variability (e.g., mutation and recombination) to offset the natural processes that decrease genetic variability (e.g., genetic drift and inbreeding). Additionally, any prediction of a population's viability should also consider the population's ability to survive population fluctuations due to demographic and environmental fluctuations (Koenig 1988) or natural catastrophes. Reproductive rates, population density, and recolonization rates may influence RCW population variability more than mortality rates, sex ratios, and genetic viability. Therefore, dispersal of adult birds into breeding vacancies is essential for population persistence (Daniels et al. 2000; Schiegg et al. 2002). RCWs exhibit relatively low adult mortality rates; annual survivorship of breeding males and females is high, ranging from 72 to 84 percent and 51 to 81 percent, respectively (Lennartz and Heckel 1987; Walters et al. 1988; DeLotelle and Epting 1992).

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Although the relationship between RCW population variability and density is not well understood, recent studies indicate spatial distribution of territories is important in long-term population stability. Conner and Rudolph (1991) found that, in sparse populations, RCW group size and the number of active clusters decreased as fragmentation increased. Hooper and Lennartz (1995) suggested that populations with less than 4.7 active clusters within 1.25 miles on average had critically low densities that inhibited population expansion. Results from a spatially explicit simulation model of RCW population dynamics suggest that population growth rate may depend more on the number and spatial distribution of territories, than on the initial composition of the population (Letcher et al. 1998). Achieving a self-sustaining population required fivefold more territories when territories were randomly spaced than when they were maximally clumped, and populations with as few as 49 territories were stable when those territories were highly aggregated. Populations of more maximally aggregated groups are likely to persist over the short term (i.e., 20 years) (Crowder et al. 1998).

Natural population growth (i.e., without recruitment clusters) occurs at extremely low rates (one to two percent per year) in this species (Walters 1991) and the availability of cavity trees is limiting (Copeyon 1990; Allen 1991). New groups or new territories arise by two processes, pioneering and budding (Hooper 1983). Pioneering is the occupation of vacant habitat by construction of a new cavity tree cluster and is relatively rare. Budding is the splitting of a territory, and the cavity tree cluster within it, into two. Budding is more common than pioneering in RCWs, since the new territory contains cavities from the outset (USFWS 2003a). Inactive clusters are important to maintaining extant populations of RCWs and may provide a short-term opportunity to enhance habitat available to RCWs, and thus increase the number of groups in populations (Doerr et al. 1989). After a territory is abandoned for two or more years, however, it is almost never reoccupied, typically because cavities are unsuitable due to deterioration or hardwood encroachment (Beckett 1971; Conner and Locke 1982; Copeyon et al. 1991).

However, the technology to create new territories at desired locations exists and management for optimum territory clumping is, therefore, possible (Letcher et al. 1998). Artificial cavities can be installed in unoccupied habitat that is otherwise suitable (Copeyon 1990; Allen 1991), with subsequent occupancy by dispersing birds, typically subadults (Carrie et al. 1999; Conner et al. 1999). Adding artificial cavities to sites already occupied increases group size (Carrie et al. 1999). Artificial cavities provide additional roosting opportunities for subadult males, encouraging them to remain in their natal clusters and potentially inherit the territory (Carrie et al. 1999). Females may also benefit when additional cavities are provided because they are the most subordinate members of the RCW social group, and therefore, may not always be able to secure adequate roost cavities.

Inducing the formation of RCW groups in restored habitat with artificial cavities is an established and successful technique (Copeyon et al. 1991; Walters et al. 1992; Gaines et al. 1995; Watson et al. 1995). Within one year of restoring habitat and providing artificial cavities at 20 unoccupied territories in the Sandhills of North Carolina, 90 percent of the sites were occupied by RCWs (Copeyon et al. 1991). Translocating RCWs is another method successfully used to establish new groups (Rudolph et al. 1992; Allen et al. 1993; Hess and Costa 1995; Costa

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and Kennedy 1994; Franzreb 1999). Translocation can include augmenting a solitary-bird group or translocating a pair of subadult RCWs [i.e., unrelated male and female (Costa and Kennedy 1994)]. Franzreb (1999) found that 63.2 percent of translocated birds (including adults and juveniles) remained at the release site for at least 30 days and 51.0 percent reproduced.

Status and distribution

The RCW was listed as endangered due to documented declines in local populations and massive reduction in foraging and nesting habitat. The life history of RCWs is closely tied to the occurrence of fire-maintained old growth pine forests that once dominated the southeastern United States. Only three million acres of longleaf pine forest remain of the estimated 60 to 92 million acres once in existence (Frost 1993). Timber clearing for agriculture, short timber rotations, and the suppression of fire reduced the amount and quality of RCW foraging and nesting habitat.

At the time of listing, the total number of individuals had declined to less than 10,000 in widely scattered and isolated populations (USFWS 2003a). Most RCW populations, regardless of location or land ownership, were considered stable at best, but more likely declining (Costa 1995). Costa and Escano (1989) documented RCW population declines in at least 10, and perhaps as many as 17 populations on National Forests. James (1995) estimated that the number of active clusters range-wide declined 23 percent between the early 1980s and 1990. Recently, numerous RCW populations have increased, particularly on Federal lands, as a result of management activities.

In 2003, it was estimated that 14,068 RCWs inhabited 5,627 active clusters across 11 States in the southeast United States (USFWS 2003a). National Forests (NF), military installations, and National Wildlife Refuges (NWR) contain the majority of extant populations and most of the habitat that is potentially suitable for RCWs. Conservation of RCWs as a species will depend on prudent management of habitats on those Federal lands. National Forests support the majority of the core populations required for delisting of the species, and therefore, have a uniquely important role in the species' recovery. Prior to the 1980s, most populations on National Forests were declining, but management efforts during the past decade, especially prescribed burning and cavity management, stabilized most of those populations and led to increases in some (USFWS 2003a).

Military installations have experienced similar increases in RCW populations: Eglin Air Force Base (Moranz and Hardesty 1998), Camp Lejeune Marine Corps Base, Fort Benning and Fort Stewart, Georgia (unpubl. Army data). The OCP states that Eglin has the second largest RCW population on military lands, behind only Fort Bragg in total number of active clusters. Eglin AFB is the only Air Force installation with more than 50 clusters of RCWs; Avon Park is the only other Air Force installation with more than 10 active clusters. The Service expects that most populations on Federal properties will eventually increase as proven management techniques and ecosystem management programs are implemented.

The Service, in response to the apparent range-wide decline of the species on private lands, developed a private lands conservation strategy that has been aggressively implemented,

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modified as necessary based on new scientific findings, and regularly evaluated to ensure objectives are being achieved. The RCW recovery objectives of the private lands strategy are to increase the acreage of private land habitat being managed for RCWs, maintain or increase the larger existing RCW population on private lands, rescue RCW groups from private lands that would be lost as a result of demographic and/or genetic uncertainty, foster and develop cooperative partnerships between and among Federal, State, and private parties responsible for and/or interested in RCW recovery, and increase the size of designated recovery and support populations while pursuing those objectives (Costa 1995). To achieve those strategic objectives, the Service implements three types of agreements involving private landowners: Safe Harbor Agreements, Habitat Conservation Plans (HCPs), and “no-take” management plans implemented via Memoranda of Agreement (Costa 1995).

The Service has issued four Biological Opinions within the Service’s Panama City, Florida Field Office area of responsibility for adverse impacts to the RCW. These are described in **Table 3**. No critical habitat is designated for the RCW.

Table 3. Biological Opinions within the USFWS Panama City Office Boundaries that have been issued for adverse impact to the RCW.

OPINIONS ¹ (yr/number)	SPECIES	NUMBERS (amount of Take issued)	HABITAT	
			Critical Habitat	Habitat
2005/1	RCW-EAFB Operational Component Plan- allows removal of surplus groups once recovery goal is achieved.	Up to 125 groups	N/A	N/A
2006/3	RCW-NF in Florida; NWR in SE for prescribed fire; Safe Harbor Enhancement of survival permit to state of Florida;	28 cavity trees; 2 cavity trees; undetermined amount.	N/A	N/A
TOTAL		155+	N/A	N/A

¹ Year/Number of Opinions.

Analysis of the species likely to be affected

This biological opinion is focused on the potential for activities identified in the Environmental Impact Statement for 2005 BRAC Decisions and Related Actions at Eglin AFB to impact multiple RCW groups. Potential effects include the loss of foraging and potential nesting habitat related to construction activities, habitat fragmentation, decreased habitat quality from increased prescribed fire restrictions, and harassment in the form of disturbing or interfering with RCWs attempting to nest, forage, roost and immigrate/emigrate within the project Action Area.

ENVIRONMENTAL BASELINE

Status of the species within the action area

The Service considers Eglin AFB as 1 of 13 designated primary core populations (and 1 of 3 primary core populations in the East Gulf Coastal plain) needed for recovery of the species (USFWS 2003a). The Recovery Plan defines a primary core population as one that will harbor at least 350 potential breeding groups (PPGs) at the time of and after delisting (USFWS 2003a).

Prior to 1990, Eglin’s Natural Resource staff conducted limited RCW surveys, mostly in response to mission activities. As a result, little was known about Eglin’s RCW population. From 1990 to 1994, managers allocated resources to surveying only unsurveyed habitat and did not resurvey known clusters. The number of distinct separate and abandoned clusters observed on Eglin indicated that the population was in a state of decline (Hardesty et al. 1997b). During this time, newly discovered clusters were added to the installation’s records as they were discovered. Therefore, records added prior to 1994 do not represent an increase in the RCW population, but rather an increase in knowledge about the population. By 1994, 95 percent of Eglin’s estimated suitable RCW habitat was surveyed, and 217 active clusters containing 169 breeding pairs were documented. The Eglin Natural Resources Section uses records from 1994 as the population baseline for future monitoring and management actions.

In addition to a declining population, inventory data also revealed two subpopulations, sufficiently isolated from one another such that their population dynamics are largely independent (Walters et al. 2000). To properly address the needs of the distinct subpopulations, NRS divided the Reservation into two regions, East and West. The western subpopulation was deemed relatively stable with 184 active clusters, so a less intensive management strategy was pursued, emphasizing ecosystem management. The eastern subpopulation had only 33 active clusters and was in a critical state of decline. Intensive management was required to reverse this downward trend. Artificial cavity recruitment cluster construction was initiated in 1993 (Hardesty et al. 1997b) on the eastern and central portions of the Reservation. A donor population was developed within the more stable western subpopulation, and subadult pairs and single birds are still being used to fill suitable breeding vacancies in the eastern subpopulation. In addition to ecosystem management measures, intensive mechanical hardwood control and sand pine removal was initiated within the eastern subpopulation area.

Between 1995 and 2000, the RCW population growth rate averaged 6 percent annually, and the overall population increased by 31 percent. Annual population growth rates ranged from 2 percent in less intensively managed non-critical areas to 12 percent in the most intensively managed areas. Social structure also improved, lessening the potential for a demographic collapse within the eastern subpopulation; however, in 2002, this subpopulation was not considered stable (Walters 2000).

From 2000 through 2005, population growth slowed considerably (Figures 4 and 5). However, the RCW population on Eglin grew during 2006 and 2007 at a rate that is consistent with

meeting recovery goals. Currently, Eglin’s population is at **366** active clusters. The average increase in active clusters over the past 13 years is 4.1% and has ranged from 0 to 7.8% (**Figure 4**).

Eglin’s NRS, through consultation with the Service (USFWS 2005), have established two categories of population goals. The Installation Regional Recovery Goal (IRRG) is the number of RCW groups identified by the Service as the installations contribution to regional recovery. The RCW Recovery Plan (USFWS 2003) has established this goal at 350 PPGs. A PPG is defined as an adult female and adult male that occupy the same cluster whether or not they are accompanied by a helper, attempt to nest, or successfully fledge young (USFWS 2003).

In larger RCW populations such as Eglin, which cannot be sampled completely in one year, the number of PPGs can be estimated by sampling the number of active clusters. The Recovery Plan specifies that the number of active clusters is generally 1.1 to 1.4 times the number of PPGs. Thus an estimated 400 to 500 active clusters is necessary to contain 350 PPGs. This ratio of active clusters to PPGs in any particular population depends upon the proportion of solitary males, captured clusters (a cluster that does not support its own group of RCW but contains active cavity trees in use or kept active by birds from neighboring cluster), and also on the estimated error of the sampling scheme of the population. Eglin AFB’s specific data for the years 1996 to 2003 indicate that a population of **437 active clusters can sustain 350 PPGs**. This determination is made with the anticipation that approximately 20 percent of all clusters will be captured or occupied by solitary males and is well within Recovery Plan guidance. Future monitoring conducted at Eglin over time could result in an adjustment of the target of active clusters needed to sustain 350 PPGs.

In addition to the IRRG goal of 350PPG/437active clusters, Eglin’s RCW Operational Component Plan establishes a Mission Flexibility Goal (MFG). The MFG is a target that exceeds the recovery goal to provide for mission flexibility. **The MFG is established at 450 PPGs or 562 active clusters (Figure 5).**

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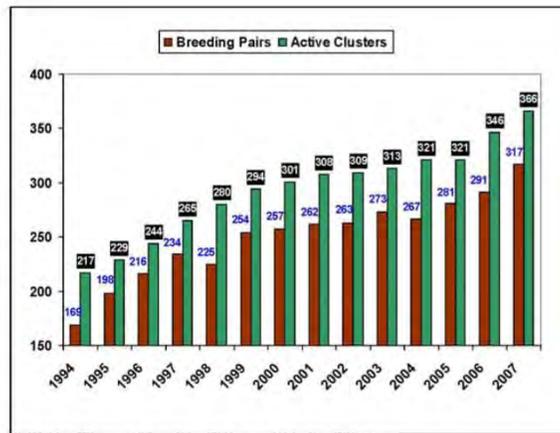


Figure 4. Eglin's Current Breeding Pairs and Active Clusters.



Figure 5. Eglin Recovery Goal and Mission Flexibility Goal.

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Factors affecting species environment within the action area

Within the Action Area, the Service has identified two categories of factors that ultimately affect the status and distribution of the RCW. These two categories are: 1) Mission Impacts and, 2) Habitat Loss/Degradation.

1. Mission Impacts: Mission activities likely have the most significant impacts on the RCW and its habitat. Mission activities on Eglin can be sub-divided into two broad categories; testing activities (as well as other operations involving aircraft) that occur on and around established test areas (such as, but not limited to bombing ranges) and ground exercises involving troop and vehicle maneuvers and live fire training that may occur on test areas, firing ranges, and throughout the reservation's interstitial areas.

Potential impacts resulting from testing operations include noise impacts from aircraft or munitions, expenditure of chemical materials through the use of munitions, chaff, flares and grenades, and escaped wildfires burning cavity trees and nests or impacting foraging habitat. Impacts from testing operations are described in detail in Eglin's August 2004 *Biological Assessment for Air to Ground Gunnery Exercises for Test Area A-77, A-78, A-79, and B-7* (U.S. Air Force 2004a). Based upon implementation of the avoidance and minimization measures identified in the BA, the Service concurred with Eglin's determination of "Not Likely to Adversely Affect" for the air to ground gunnery exercises (U.S. Air Force 2004b).

Ground exercises involving troop and vehicle movement may lead to impacts from noise and habitat degradation. Impacts could result from troop and vehicle travel within RCW buffer zones, hand digging of hasty individual fighting positions, firing of small arms, .50 caliber blanks, other artillery and hand grenades, use of smoke grenades, simulators and flares, bivouacking, and establishing command posts. Ground training involving pyrotechnics may ignite wildfires which could damage or destroy RCW cavity trees. Impacts from ground movement are described in detail in the March 2003 Environmental Assessment (EA) and accompanying BA (U.S. Air Force 2003; U.S. Air Force 2003a) for the Amphibious Ready Group Marine Expeditionary Unit (ARG/MEU) Readiness Training Exercise and corresponding Biological Opinion issued by the Service on April 15, 2003 (USFWS 2003). Avoidance and minimization measures identified in the ARG/MEU BA (U.S. Air Force 2003a) include, (but are not limited to) adherence to the 1996 U.S. Army Guidelines for the RCW on Army Installations (U.S. Army 1996, updated in Army, 2006). An important aspect of the Army Guidelines is the recognition of a 200 foot buffer zone around RCW clusters where certain activities such as bivouacking, excavating, tree removal, establishing command posts and use of certain munitions and firearms are prohibited. Certain transient activities (those of less than two hours in duration) through buffer areas such as foot traffic and vehicle use of existing roads is permitted (U.S. Army 1996, updated 2006).

2. Habitat Loss/Degradation: Loss of habitat and habitat degradation due to development, construction, and maintenance of buildings, facilities, roads, and new ranges or range expansion may have an impact on the RCW population in the action area. These activities

could result in a loss of foraging habitat or loss of potential or actual cavity trees. Increasing development near RCW trees may also result in a reduction in prescribed burning, which would lead to the degradation of foraging habitat for the RCW.

Sand pine encroachment within the Sandhills vegetative community can also result in habitat loss. Sand pine is the biggest threat to the health and management of Eglin's Sandhills community (U.S. Air Force 2003). In the absence of frequent fire, this native invasive pine rapidly colonizes a site, reproduces as early as five years, and quickly modifies the fuel bed to reduce the efficacy of future prescribed burns. Monitoring data and research have conclusively shown that sand pine represents the greatest threat to Eglin's Sandhills ecosystem, and thus the greatest long-term threat to RCW recovery (U.S. Air Force 2003b).

EFFECTS OF THE ACTION

Factors to be considered

The proposed action has the potential to impact the RCW from direct physical impacts, noise and human presence (ground operations, munitions use, and air operations), and habitat impacts (land clearing, fire suppression, road improvements, and wildfires). Effects on RCWs that could result in take in the form of harassment from both timber clearing and construction include demographic disturbance due to habitat fragmentation causing potential dispersal impediments. Cumulatively, these stressors have the potential to negatively affect certain RCW clusters, primarily in the 7SFG(A) cantonment and Group 1 range area, where RCWs will be subject to the combination of land clearing, fire suppression, wildfires, noise, and human presence. Changes in the ability to meet long-term and short-term recovery goals were based on examination of current population density and pre- and post-project habitat capabilities and are summarized at the end of the section **Species' response to the proposed action**.

Proximity of action: The action will occur within and near active and inactive clusters and foraging habitat (**Figure 6**).

Distribution: BRAC activities that may impact RCWs, RCW trees, and RCW foraging habitat on Eglin AFB include the 7SFG(A) cantonment area, 7SFG(A) SOF ranges, 7SFG(A) infrastructure, 7SFG(A) ground training areas, JSF cantonment area, JSF flight paths, JSF munitions drop test areas, and the surrounding interstitial areas (**Figure 6, 7 and 8**).

Timing: BRAC activities within RCW habitats will take place throughout the year, including the RCW nesting season (April-July). RCWs are non-migratory birds, so activities during any time of the year have the potential to affect RCW behavior. Activities during the nesting season increase the possibility of disturbance to nesting RCWs. Ground training, munitions use, cantonment activities, and flight training will occur year-round. Land clearing and construction will only occur during the initial phase of BRAC activities, but may take place at any time of the year. Due to closures associated with ground training, munitions use, and cantonment activities, prescribed burning in these areas may be restricted during portions of the year, and in some cases, throughout the year.

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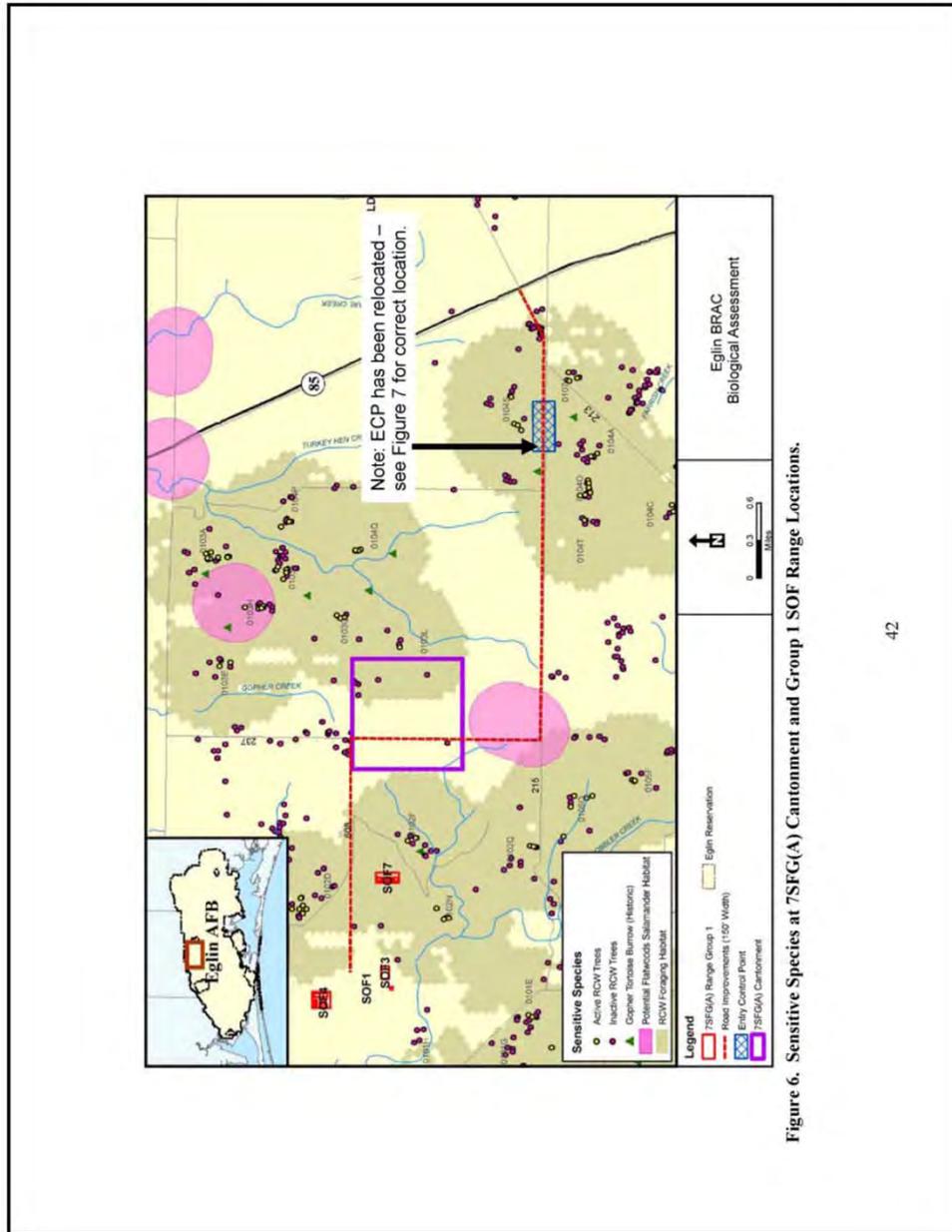
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Nature of the effect: The effects of the activity may alter RCW nesting and foraging behavior, and may result in the damage or destruction of active and inactive trees in wildfires. Foraging habitat and inactive trees will be cleared for cantonment and range areas, and certain areas of foraging habitat may become degraded from reduced and restricted management to the point that they can no longer support RCWs. Increased fragmentation between the eastern and western RCW populations will occur.

Duration: The clearing from the 7SFG(A) cantonment area is a one time occurrence and expected completion is within 2 years. BRAC activities will have a long-term presence at Eglin. This could result in regular disturbance to the RCW populations within the training areas. Degradation of RCW foraging habitat due to fire suppression will be a gradual process, stretching over many years. Cavity tree mortality as a direct or indirect result of the wildfires will affect individual RCWs over a longer period. The duration of this effect will depend on how soon suitable cavities become available nearby to replace those that are lost. We expect long term, if not permanent, increased fragmentation between Eglin's eastern and western populations of RCWs.

Disturbance frequency: We expect short-term disturbance from construction activities within the cantonment areas. We expect RCWs to experience occasional decreased nesting and hatching success from any repeated disturbance, resulting from training activities conducted near active trees during the nesting season. We expect decreased reproductive success in 7SFG(A) SOF range area and the area adjacent and east of the 7SFG(A) cantonment area as restricted and reduced management (regular prescribed fire) are expected. The frequency of closures would increase over the current level with a likely decrease in burning frequency.

Disturbance intensity and severity: Areas to be cleared for the SOF ranges, 7SFG(A) cantonment area and associated infrastructure will severely affect RCW connectivity on a local scale from direct clearing and reduced management within adjacent clusters. However, each of the impacted clusters will retain many acres of quality foraging habitat. The flight paths and test areas used for munitions drops are already in use for Eglin missions, but would be used more intensively with the introduction of JSF flight training. Decreased prescribed burning near the 7SFG(A) cantonment area, SOF ranges, and ground training areas due to safety concerns and closures would lead to a gradual degradation in RCW foraging habitat and may ultimately make these areas unsuitable foraging habitat.



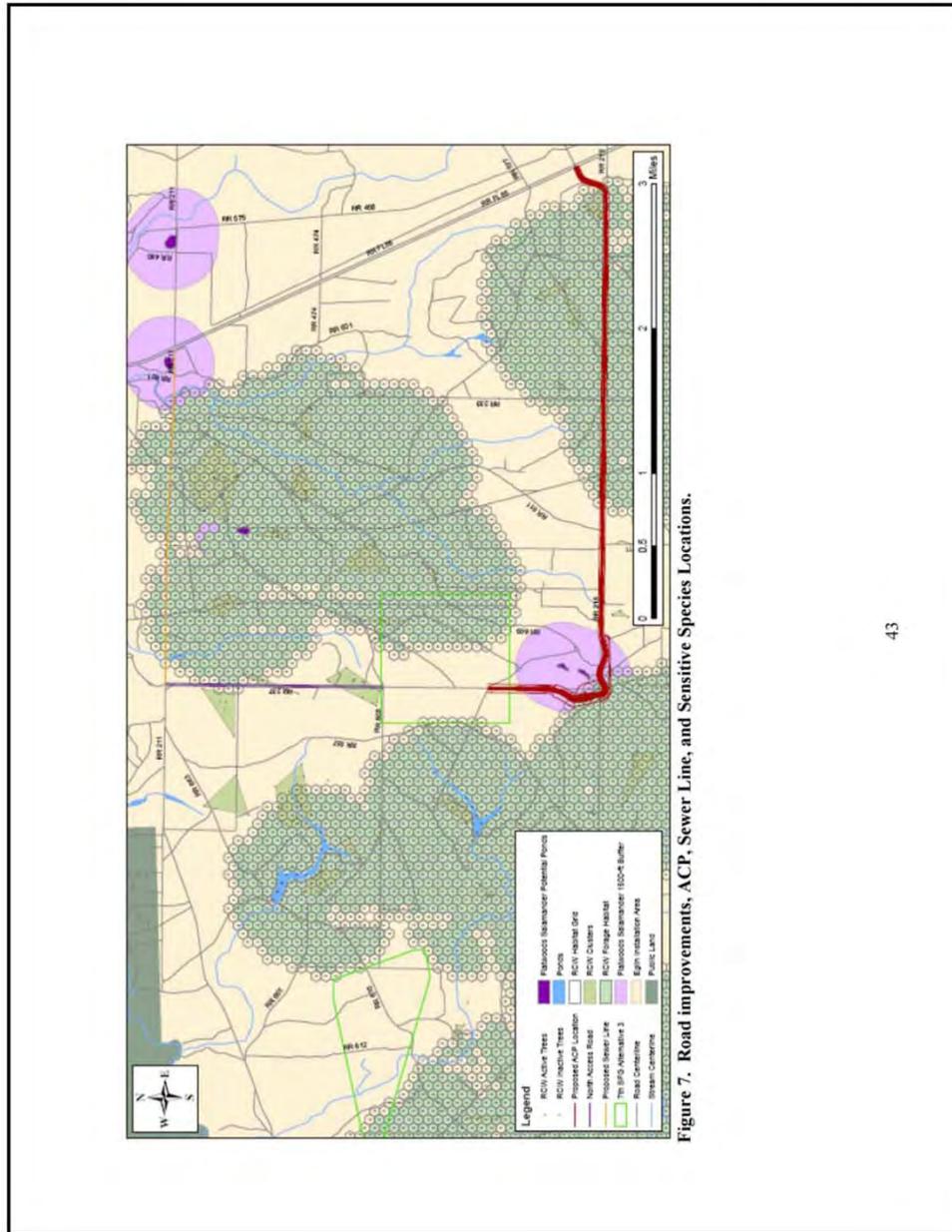
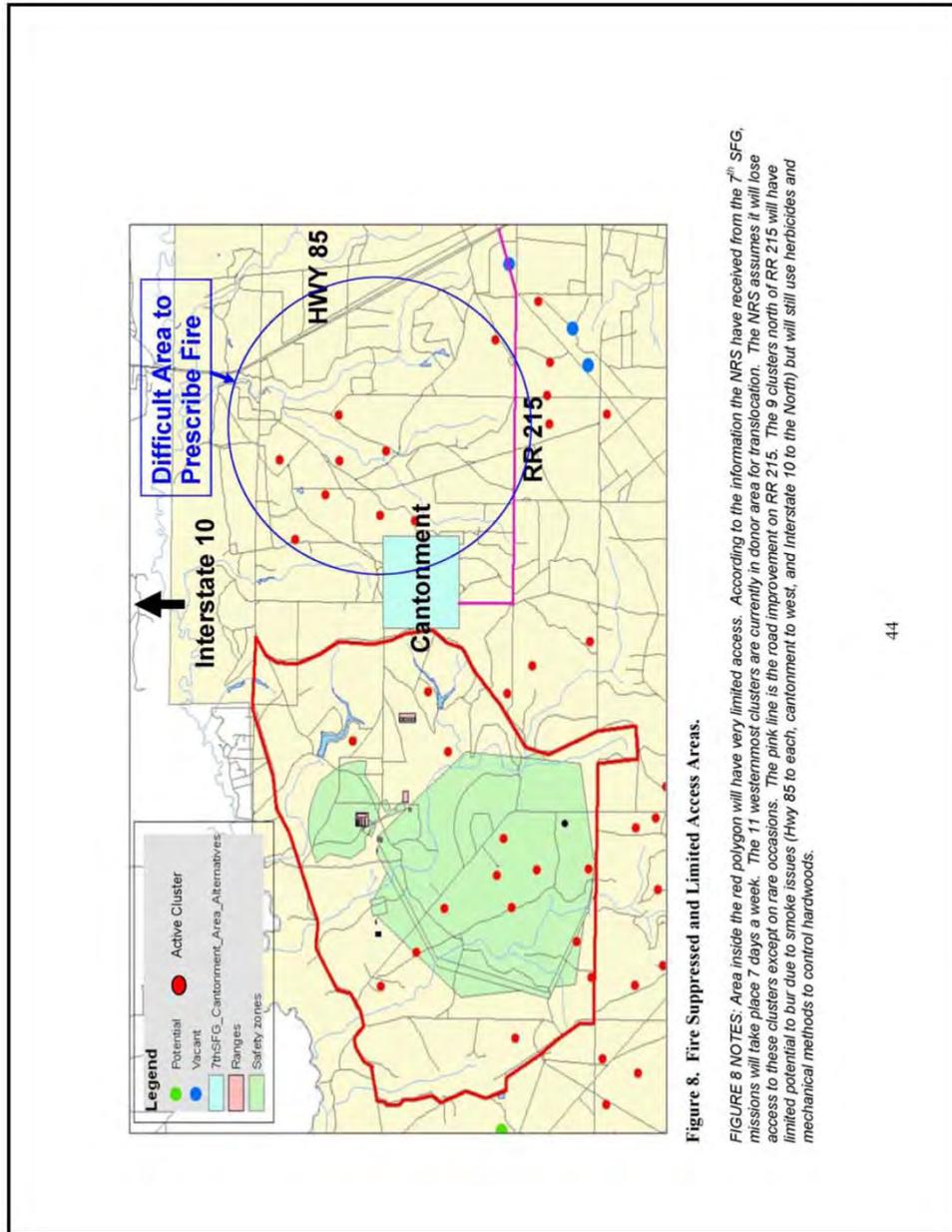


Figure 7. Road improvements, ACP, Sewer Line, and Sensitive Species Locations.



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Analyses for effects of the actionDirect effects**Direct Physical Impacts to the RCW**

The potential exists for an RCW cavity tree to be hit by munitions used during 7SFG(A) activities on the SOF ranges, JSF strafing at TA B-75 and TA C-62, and JSF bombing at TA B-82 and TA C-52E. No RCW trees are within the impact zones for JSF munitions, thus there is limited potential for direct physical impacts to active cavity trees at any of the four test areas. Where there is a high risk of projectile damage to foraging or nesting habitat, range layout will be modified/shielded to protect RCW foraging and nesting habitat (U.S. Army 2006).

Pyrotechnics and munitions have the potential to impact RCW health if ingested or accumulated in soils and water. Potential effects on RCWs from the use of flares are inhalation of flare ash and ingestion of or contact with the chemical constituents of flares. The toxic effects of flare ash residue were tested on mammals, plants, and fish with concentrations of flare ash representing the high range that would be found in a pyrotechnic test area. Results indicated that the effects of flare ash residue are very minimal and not particularly dangerous to the environment (U.S. Air Force 1997). The resultant addition of chemical constituents of flares is not of sufficient quantities to change soil, water, or air chemistry.

RCWs could be potentially exposed to dye-colored smoke through inhalation, ingestion, direct contact, or bioconcentration. The most likely opportunity for such exposure will be immediately after the smoke has been dispelled, but since RCWs will most likely leave the immediate area during training exercises, the likelihood of direct exposure to toxic levels of emissions will be low. Ingestion or inhalation of particles in sufficient amounts to cause harm is unlikely because of the wind-driven distribution of smoke particles.

To minimize potential impacts, the 7SFG(A) and JSF will follow the *Management Guidelines for RCWs on Army Installations* (U.S. Army 2006), and the avoidance and minimization measures that are a part of the proposed action.

Harassment

RCWs may be affected by noise and human presence associated with 7SFG(A) cantonment and range operations and JSF range operations. Indirect impacts to RCWs could occur from the physical presence of personnel or equipment within foraging habitat, or from noise associated with munitions, vehicle, or aircraft use. Impacts could include changes in nesting behavior and feeding. Certain training activities may disrupt the ability of RCWs to roost or nest (or conduct nesting activities such as incubating, brooding, feeding) if conducted in proximity to cavity trees. Vehicle movements and other training activities near RCW clusters will potentially create noise and disturbance that could affect the RCW. Delaney et al. (2002) monitored nesting RCWs as a convoy of vehicles passed; birds did flush as a result of the passing of the convoy but returned shortly thereafter (10 minutes). Vehicle use associated with 7SFG(A) training along existing

roadways does not represent a novel noise and disturbance source such that RCWs would abandon the area. Birds near these areas are likely acclimated to the presence of vehicles.

Annual updates of *Eglin's Threatened and Endangered Species Component Plan* identify the current number of clusters subject to training restrictions. The NRS will coordinate with the 46 Test Wing (TW) and Service to determine locations of protected clusters based on biologically sound principles to reduce risk of disturbance, demographic isolation, and habitat fragmentation, while minimizing effects on training operations. Protected clusters subject to training restrictions include active clusters (captured clusters, solitary birds, and PBGs) and currently inactive recruitment clusters in areas of the Eglin reservation where training will occur. All current and future recruitment clusters with the "supplemental" designation are exempt from training restrictions regardless of population status (U.S. Air Force 2006).

For protected clusters in areas of the Eglin reservation where training will occur, buffers for all suitable cavity or cavity start trees will be marked. RCW trees will be marked prior to any field maneuvering training by the 7SFG(A). Warning signs will be posted and will be constructed of durable material, ten inches square (oriented as a diamond), white or yellow in color. The RCW graphic and the lettering "Endangered Species Site" and "Red-cockaded Woodpecker" will be printed in black. The lettering "Do Not Disturb" and "Restricted Activity" will be printed in red. All lettering will be 3/8-inch in height. Warning signs will be posted at reasonable intervals along the 200-foot perimeter of cavity trees facing to the outside of the buffer zone and along roads, maintained trails and firebreaks, and other likely entry points into the buffer zone.

Eglin follows the *Management Guidelines for the Red-Cockaded Woodpecker on Army Installations* which details activities that are allowed and those that are restricted near active RCW trees (U.S. Army 2006). Military training within 200 feet of marked cavity trees is limited to military activities of a transient nature (less than two hours occupation), and military vehicles are prohibited from occupying a position or traversing within 50 feet of a marked cavity tree, unless on an existing road or maintained trail or firebreak. Prohibited activities within the 200-foot buffer include bivouacking, excavating, digging, and establishing command posts.

Land clearing, large machinery operation, and construction may disturb individuals or clusters. Foraging RCWs may avoid areas where construction is occurring. Pioneering RCWs may be affected by noise from daily operations and not colonize or immigrate to new areas near the cantonment site. This could affect the growth of the RCW population around the proposed cantonment area. Loud noises during nesting season (April – July) may affect RCW reproduction. Certain range roads in proximity to RCW foraging habitat would have an increased amount of traffic both during construction and daily operations, potentially creating noise levels that would affect RCWs.

Suitable habitat appears to outweigh any negative influences associated with noise due to construction or military bombing. Observations have indicated that many animals become adapted to human activities and noises (Busnel 1978). Scientists who have researched the effects of noise on wildlife report that animals may initially react with a startle effect from noises, but

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roadways does not represent a novel noise and disturbance source such that RCWs would abandon the area. Birds near these areas are likely acclimated to the presence of vehicles.

Annual updates of *Eglin's Threatened and Endangered Species Component Plan* identify the current number of clusters subject to training restrictions. The NRS will coordinate with the 46 Test Wing (TW) and Service to determine locations of protected clusters based on biologically sound principles to reduce risk of disturbance, demographic isolation, and habitat fragmentation, while minimizing effects on training operations. Protected clusters subject to training restrictions include active clusters (captured clusters, solitary birds, and PBGs) and currently inactive recruitment clusters in areas of the Eglin reservation where training will occur. All current and future recruitment clusters with the "supplemental" designation are exempt from training restrictions regardless of population status (U.S. Air Force 2006).

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adapt over time, so that even this behavior is eradicated (Busnel 1978). Based on the fact that the RCW population continues to grow at Eglin, including areas in close proximity to test areas, it appears that they have adapted to all of the noises associated with the military mission, including supersonic booms. Noise from proposed construction will have less impact than other activities that already occur on the Reservation.

Munitions noise may also affect the RCW through changes in nesting behavior and feeding. In a study at Fort Stewart, RCWs did not flush (i.e., take flight) when the distance of small arms fire was greater than 152.4 meters and the noise level was less than 80 dB. The distance between a 7SFG(A) range and the closest active RCW tree is over 400 meters. Overall, Delaney et al. (2002) found that military training exercises of short duration (less than two hours) conducted near active RCW cavity trees did not significantly affect the ability of the individuals to successfully reproduce. Activity longer than two hours was not tested.

Ordinance noise is categorized as high-explosive impulse noise, such as occurs from live bombs or artillery. The sound and pressure of a detonation can temporarily or permanently affect hearing, injure or kill an animal depending on the proximity of the animal to the source. Inert and live bombs (Guided Bomb Unit [GBU]-12) will be dropped by the JSF on existing targets on TA B-82 and TA C-52E. Potentially harmful levels of noise could extend outward to active cavity trees. Although brief, exposure to this noise carries a risk of acoustic discomfort. Noise impacts to RCWs could result in non-lethal harassment. RCWs will be most sensitive during nesting season (01 April to 01 July); noise could directly affect eggs and could cause nest abandonment by adults.

The RCW is nesting successfully in close proximity to TA B-82 and on TA C-52E, where munitions use already occurs. Similar exposures are likely occurring on occasion throughout these test areas and other test areas on the Reservation with no known detrimental impacts on the overall population. Eglin NRS personnel have observed no difference in RCW productivity or survival from those clusters located near an active range or those far away. Compared to noise, habitat quality seems to be more influential in determining RCW productivity, survival and population stability (U.S. Air Force 2007).

Noise impacts from large-caliber weapons (20-millimeter and above) have been studied at Fort Stewart, Georgia. Delaney et al. (2002) noted that RCWs did not leave their nests when large-caliber weapons noise was greater than 700 meters away. Observations closer than 500 meters were not made. The noise level was measured at 102 dB (unweighted sound exposure level [SEL]). The closest targets to active RCW trees on TA C-62 and TA B-75 are 1,200 and 1,000 meters away, respectively.

A small number of road improvements such as asphalt or widening are planned to provide proper access to the 7SFG(A) cantonment area and ranges. Construction noise associated from road improvements may affect RCWs temporarily. As discussed previously, compared to noise, habitat quality seems to be more influential in determining RCW productivity, survival and population stability (U.S. Air Force 2007). Temporary noise from road improvements will not

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impact RCWs provided the road workers follow the *Management Guidelines for RCWs on Army Installations* (U.S. Army 2006), and the avoidance and minimization measures that are a part of the proposed action to reduce the potential for noise impacts to the RCW.

Aircraft noise from JSF training has the potential to affect the RCW. Most commonly, the reaction of birds to aircraft noise, particularly when the aircraft is visible to the animal, is some degree of startle response, one response being flushing (i.e., abruptly leaving a nest) (Gladwin et al. 1988). In this case, a bird could theoretically leave its nest open to predation, thereby affecting reproductive success (Larkin 1996).

Low-level flights over RCWs would expose the birds to high SEL levels. The noise and visual presence associated with these low-level flights have the potential to impact RCWs, particularly during nesting season (April to June) when birds may be flushed from their nests, possibly affecting reproductive success. However, brooding birds are less likely to respond to noise with a flight response than roosting birds, and the average time away from the nest after a noise-induced flight was less than five minutes (Bowles et al. 1995).

Delaney et al. (2002) measured responses of the RCW to low-level aircraft noise at Fort Stewart. Researchers did not see a flight response when helicopters were greater than 30 meters from nests and the noise level was less than 102 SEL. Fixed-wing aircraft did not elicit a flushing response when located further than 600 meters (0.38 mile) away with noise levels less than 90 SEL. However, the study did not test for RCW response at distances less than 600 meters or at noise levels greater than 90 SEL, so it is possible that RCWs could tolerate louder, closer noises. The 600-meter, 90-SEL measurement should not be viewed as an absolute threshold, only as an example of conditions during which the RCW did not flush.

At the airfields where takeoffs and landings would occur, the nearest RCW foraging habitat is approximately 1,610 meters (1 mile) from Duke Field, 9,660 meters (6 miles) from Choctaw Field, and 4,830 meters (3 miles) from Eglin Main Base. On the Eglin Range, RCWs southeast of Duke Field may be exposed to high SEL levels during JSF takeoffs, landings, and touch and go-type operations. Due to the orientation of flight paths, no RCWs should be affected by F-35 flights in the Choctaw Field and Eglin Main Base areas.

Restricted airspace at Eglin Range areas (R-2914 A/B, R-2915 A/B/C, and R-2919 A/B) allows military flights to ground level. However, JSF aircraft in these areas are not expected to fly at altitudes lower than 500 feet AGL and would generate noise levels similar to those generated on the lowest segments of VR-1082 and VR-1085. Currently, the F-15 aircraft flies as low as 500 feet AGL; and C-130, V-22 and various types of helicopters fly at altitudes less than 500 feet AGL in these areas.

Birds that live near airfields and under established flight paths are likely accustomed to the types of noise disturbance produced by aircraft, and in some cases it appears that the presence of suitable habitat outweighs the disturbance of loud noises (U.S. Air Force 2007). While introduction of the F-35 will increase the noise and activity levels at the airfields and along

existing flight paths, increases will be gradual, allowing birds to acclimate to the noise. RCWs may exhibit a temporary flight response initially until they become accustomed to the increased noise levels.

To minimize potential impacts, the 7SFG(A) and JSF will follow the *Management Guidelines for RCWs on Army Installations* (U.S. Army 2006), and the avoidance and minimization measures that are a part of the proposed action.

Habitat Impacts

An independent Oracle-based Geographic Information System (GIS) tool (model) has been developed as a foraging habitat assessment tool for Eglin to estimate the available foraging resources without sampling the entire Reservation (U.S. Air Force 2006). Eglin NRS has consulted with the Service on the guidelines for the habitat conditions and foraging requirements for RCWs on Eglin. Eglin NRS personnel use the guidelines identified in the *Threatened and Endangered Species Component Plan* (U.S. Air Force 2006) when determining whether consultation with the Service is required. Table 4 (Foraging Habitat Variable Standards for Red-cockaded Woodpeckers) is a comparison of the current Recovery Plan foraging standards and Eglin specific standards.

Table 4. Foraging Habitat Variable Standards for Red-cockaded Woodpeckers.

Measure	USFWS Recovery Standard (public lands)	USFWS Managed Stability Standard (private lands)	Eglin Recovery Standard	Eglin Managed Stability Standard
Acres	200-300	75	300	150
Density (stems per acre)	18 > 14 in dbh	None	20 > 10 in dbh	None
Density total (stems per foraging area)	None	None	6,000 > 10 in dbh	3,000 > 10 in dbh
Basal Area (ft ² per acre)	20 > 14 in dbh	40-70 > 10 in dbh	20 > 10 in dbh	None
Basal Area total (ft ²)	None	3,000 > 10 in dbh	6,000 > 10 in dbh	4,000 > 10 in dbh
Distance from cluster	0.5 mile	0.25 mile	0.5 mile	0.3 mile
Midstory height	7 ft	7 ft	7 ft	7 ft
Ground cover	>40% herb	None	> 40% herb	None

> = greater than; < = less than; dbh = diameter at breast height; ft² = square feet; in = inch

The first column contains the values defined in the Recovery Plan as the Recovery Standard for public lands. The second column contains the values defined in the Recovery Plan as the Managed Stability Standard for private lands in order to protect existing groups (USFWS 2003a). The last two columns are recommendations for Eglin's Recovery Standard and Managed Stability Standard. A No Effect determination would be made if a cluster's foraging resources exceed Eglin's Recovery Standard after the completion of a proposed action. A Not Likely to Adversely

Affect determination would be made if a cluster's foraging resources fall between Eglin's Recovery Standard and Eglin's Managed Stability Standard after the completion of a proposed action. A Likely to Adversely Affect determination would be made if a cluster's foraging resources fall below Eglin's Managed Stability Standard after the completion of a proposed action. Also, if the proposed action affects less than one percent of the foraging resources, and the foraging resources are above Eglin's Managed Stability Standard, then no consultation would be required.

The proposed action may impact RCW habitat from tree clearing, road improvements, fire suppression, and wildfire. Land clearing activities within RCW foraging habitat at the proposed 7SFG(A) cantonment area and 7SFG(A) Group 1 ranges will result in the loss of RCW foraging habitat.

Based on the calculations of the Eglin RCW model, the foraging habitat loss to RCW clusters 102F and 101B from tree clearing for the Group 1 ranges will be 10.2 acres and 2.0 acres, respectively (Table 5). As shown in Table 5, 502.8 acres (Cluster 102F) and 582 acres (Cluster 101B) of foraging habitat will remain, which is above the Managed Stability Standard and the Recovery Standard (NRS GIS 2007; U.S. Air Force, 2006). The foraging habitat loss to cluster 103L from the tree clearing for the 7SFG(A) cantonment area will be up to 173 acres, leaving 255 acres of foraging habitat, which is above the Managed Stability Standard and below the Recovery Standard for Eglin (NRS GIS 2007; U.S. Air Force, 2006) (Table 5). Even through the foraging habitat loss to cluster 103L from the tree clearing for the 7SFG(A) cantonment area will leave 255 acres of foraging habitat according to Eglin's model, the entire western portion of the foraging habitat may be cleared affecting the dispersal and available habitat near the cluster (see Figure 6). Also, the cluster would be within 150 meters of the edge of the cantonment which would have personnel, vehicles, and construction noise which may also cause harassment issues with this cluster along with loss of foraging habitat. It is estimated that this cluster would be the only cluster affected by the land clearing and the cluster would be negatively affected and "take" to that cluster would be anticipated. All other land clearing (i.e. road improvements) would remove a small percentage of available habitat and no "take" would be expected on all clusters except 103L due to habitat clearing.

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Table 5. Acres of RCW Foraging Habitat Cleared.

Location	Cluster	Foraging Habitat Cleared (Acres) ¹	Foraging Habitat Remaining (Acres)
7SFG(A) Group 1 Ranges	102F	10.2	502.8
	101B	2	582
7SFG(A) Cantonment	103L	173	255
Range Road 215 Improvement East of Cantonment	107J	15.5	374
	104S	49.5 acres	506.5
	104O	5	249
	104T	8.5	303
Range Road Improvement West of Cantonment	102D	10	616
	102F	10	495

¹Shows maximum acreage potentially cleared NRS GIS, 2007

A small number of road improvements such as asphalt or widening are planned to provide proper access to the 7SFG(A) cantonment area and ranges. Road improvements have the potential to remove foraging habitat. Only a small portion of foraging habitat may be lost to each cluster (Table 5), and the closest active RCW tree is located over 200 meters from the proposed road improvements. All criteria will be above the Recovery Standards set for the Eglin RCW population except for clusters 103L and 104O (U.S. Air Force 2006).

Up to 28 inactive RCW trees may be cleared for BRAC ranges, cantonment areas, and munitions storage (Table 6). The inactive trees to be cleared for the Group 2 ranges and the MSA are located at least five miles from the nearest active RCW tree, and no good foraging habitat is located near the trees. RCWs do not fly this great a distance, particularly with no foraging habitat available. If tree clearing is to occur during nesting season, Eglin will screen each inactive cavity tree during the breeding season to verify no trees have been recolonized.

Table 6. Maximum Number of Inactive RCW Trees to be Cleared.

Location	Inactive RCW Trees Cleared (Max #)
7SFG(A) Cantonment	9
7SFG(A) Group 2 Ranges Near TA C-52W	3
JSF MSA	16

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Munitions use at the 7SFG(A) SOF ranges, JSF strafing at TA B-75 and TA C-62, JSF bombing at TA B-82 and TA C-52E, and flare use at various locations over the Eglin Range will increase the number of wildfires. Additionally, increases in mission activity at the ranges will make it more difficult to conduct prescribed fires, resulting in a likely increase in the number and intensity of wildfires. Wildfires can be both beneficial and harmful to native species and habitats. Fires under the proper conditions have a beneficial effect on RCW habitat by maintaining good quality understory conditions. However, wildfires may result in negative impacts to RCW habitat and RCW cavity trees in areas that have not been burned within the last few years or if fires occur under dry conditions. Such conditions result in "hot" fires that could damage normally fire-resistant longleaf pines, and could result in the destruction of RCW cavity trees and trees used for foraging. The test areas where JSF live munitions use will occur have been used for years as bombing and strafing ranges. These test areas have regular mission-related fires which keep fuel levels low and hot fires to a minimum. These test areas have good RCW habitat around them, as demonstrated by the number of RCW clusters in the surrounding areas.

The 7SFG(A) and JSF will work with the NRS to develop Wildfire Operational Plans to identify high wildfire risk conditions and notification procedures that units will follow to engage fire response personnel when needed. Munitions and pyrotechnics use will follow Eglin's Wildfire Specific Action Guide Restrictions (U.S. Air Force 2006) which rate fire danger from low to extreme. During days with low fire danger, there are no restrictions on missions, but on days with extreme fire danger, no pyrotechnics are allowed without prior approval from the Wildland Fire Program Manager at the Eglin NRS. These restrictions during extreme fire danger will reduce the likelihood of a mission-induced wildfire. Avoidance and minimization measures will reduce the potential for impacts to RCWs; however, even with implementation of these measures, additional wildland fire positions will be needed to respond to the increased number of wildfires.

As stated previously, increased mission activity at TA B-75, TA C-62, TA B-82, and TA C-52E will limit the ability of the NRS to conduct prescribed burns. In addition, development of the 7SFG(A) cantonment area and Group 1 ranges in the middle of a fire-dependent sandhills habitat will limit the ability of the NRS to conduct prescribed burns in the area. While wildfires may sometimes provide beneficial results in fire-adapted habitats, they just as easily can cause damage if they burn too hot; thus, prescribed fire is the preferred method for managing RCW foraging habitat in the Sandhills. Eglin NRS will not be able to burn the area as frequently or as well due to smoke management problems with the cantonment area and ranges. The Eglin NRS will prioritize prescribed fire as resources allow, however, the quality of the RCW foraging habitat around the 7SFG(A) cantonment area and Group 1 ranges would likely degrade if there is fire suppression, with no alternative means (herbicides or mechanical) to control midstory vegetation. A decrease in the frequency of prescribed fires (to reduce fuel loads) may also lead to an increase in the number and severity of wildfires surrounding the ranges, which have the potential to damage RCW cavity trees.

Although the proposed action may limit the ability of the NRS to conduct prescribed burns in the area, through coordination with 7SFG(A) and mission personnel, it may be possible to conduct enough burns in the area to continue RCW habitat maintenance. Additional manpower would be required to burn these areas and to coordinate with 7SFG(A) personnel at the cantonment area and ranges. Alternate means of controlling undergrowth are also available and could be used in burn restricted area. These methods include using specific herbicides that target understory or midstory vegetation and mechanical means. The methods may maintain the open understory preferred by RCWs but data show that productivity declines with just the use of herbicides (Hess 2007). RCWs will be impacted due to the difficulty in conducting prescribed fire and associated degradation of the habitat over time.

If the 7SFG(A) uses Group 1 ranges daily, as proposed, then the Eglin NRS will lose access to that area for monitoring and will have to drop 11 clusters from Eglin's donor area. This will lower Eglin's ability to translocate birds to the eastern subpopulation or to other partners in the Southern Range Translocation Cooperative. Also, Eglin will lose about six potential cluster sites, which may in the short term affect Eglin's ability to reach recovery since this area already has suitable habitat and other areas will need to wait for habitat management.

Eglin will continue to implement guidelines for habitats throughout the Reservation to maintain and improve potentially suitable habitat for the RCW. Guidelines prohibit the cutting of pine trees unless previously approved by NRS biologists. Units will be instructed to immediately report to range control known damage to any marked cavity or cavity start tree and/or any known extensive soil disturbance in and around RCW clusters; range control will notify NRS biologists immediately. Within three working days of notification, the Eglin NRS will reprovise a cavity tree if one is destroyed due to training activity. If a unit causes damage to training land within a cluster, the responsible unit will coordinate with the NRS to repair damage as soon as practicable (normally within three working days of notification). All digging for military training activities in RCW habitat management units will be filled and inspected upon completion of training. Training guidelines will be actively enforced through training and natural resources enforcement programs, prescribed in chapters 1 and 11 of Army Regulation 200-3 (U.S. Army 1995), and installation range regulations.

Species' response to the proposed action

This biological opinion is based on effects that are anticipated to the RCW (adult RCWs, young RCWs, active RCW trees, inactive RCW trees, foraging habitat) as a result of: 1) land clearing of foraging habitat and inactive trees, 2) the physical presence of humans, equipment, and vehicles within foraging habitat, 3) noise from munitions, aircraft, equipment, humans, and vehicles in foraging habitat, 4) wildfires damaging or destroying active RCW trees, and 5) degradation of RCW foraging habitat due to increased difficulty in conducting prescribed fire.

Land clearing may directly affect up to 284 acres of foraging habitat for nine RCW clusters, and up to 28 inactive RCW trees may be cleared for BRAC ranges, cantonment areas, and munitions

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storage; no active RCW trees will be cut. Habitat degradation associated with the difficulty in conducting prescribed fire may affect approximately 14,900 acres of foraging habitat and 66 active trees within the BRAC footprint. Ground training activities, and associated noise and human presence, would occur over a 53,592 acre area and may disturb RCWs residing there; however, implementation of the 2006 Army Guidelines will minimize this potential. Noise associated with munitions and aircraft may disturb RCWs; however, the presence of quality habitat appears to outweigh any harassment impacts from noise.

Due to the importance of the Eglin's RCW population regionally (Eglin is a core population (USFWS 2003), reductions in quality foraging habitat may affect future growth potential because Eglin would not be able to put recruitment clusters in previously designated areas, potentially delaying Eglin's population recovery. Eglin will likely lose the ability to use targeted clusters as donors for translocation. If a comparable donor site, providing a similar number of birds for translocation, is not located, Eglin's rate of growth as well as partners in the Southern Regional Translocation Cooperative may be affected.

Nine clusters located east of the proposed cantonment area, north of RR 215 (Figure 8), west and adjacent to Hwy 85 and south of I-10 are threatened by reductions in the ability to conduct prescribed fire. Reductions in prescribed fire may negatively affect these nine RCW clusters (2.5 birds per cluster = 22.5 birds) on Eglin through group isolation, habitat fragmentation, habitat degradation, and loss of foraging habitat, but group demography, population level, and recovery unit level would not be affected. The nine clusters and their associated foraging habitat provide potential connectivity between the east and west subpopulations.

Localized loss of habitat, degradation of habitat, or noise impacts to the RCW can have a cumulative impact when viewed on a regional scale if that loss or impact is compounded by other events with the same end result. Analysis of potential impacts has identified minimal potential for noise impacts to the RCW, provided user groups implement management actions and regulatory requirements (i.e., 2006 Army Guidelines). RCWs near existing Eglin test areas appear to be acclimated to the loud noises associated with the test areas, with the presence of quality habitat being a greater determinant of cavity tree location than noise.

Eglin AFB has the largest RCW population in the western portion of the Florida Panhandle, with 366 active clusters. Together with Blackwater River State Forest and Conecuh National Forest, there are over 400 active clusters in the western Florida Panhandle. Direct land clearing for BRAC would impact less than 0.1% of the 210,000 acres managed for RCWs on Eglin. Additionally, Blackwater and Conecuh maintain approximately 28,000 acres of foraging habitat, and are actively restoring additional acreage to create potential RCW habitat. Up to 17 inactive RCW trees may be cut for BRAC and 1 inactive tree for the ALARNG SARC; however, there are almost 4,300 inactive RCW trees on Eglin. Regionally, the loss of 18 inactive RCW trees and less than 200 acres of RCW foraging habitat would not significantly impact RCWs.

Although upcoming land clearing would directly affect only a small portion of Eglin (approximately one percent), far-reaching indirect impacts may occur due to increased mission

activity (7SFG(A), JSF, and other user groups), new construction in previously undeveloped fire-dependent habitats, and continued development in the communities surrounding Eglin and other areas with RCW populations (i.e., Conecuh National Forest). The primary cumulative impact to RCWs would be related to reductions in prescribed fire. The RCW is dependent on fire to maintain quality habitat. The long-term effectiveness of alternate management techniques such as mechanical or chemical understory control is uncertain, but would be employed in RCW foraging habitat where prescribed burning was restricted.

Due to the importance of the Eglin RCW population regionally (Eglin is a core population), reductions in quality foraging habitat may affect future growth potential because Eglin would not be able to put recruitment clusters in previously designated areas, potentially delaying Eglin's population recovery. Also, Eglin would likely lose the ability to use a number of clusters as donors for translocation, which may affect not only the potential for Eglin's population to grow but also other partners in the Southern Regional Translocation Cooperative because Eglin may not be able to provide as many birds for translocation.

Cumulatively, reductions in prescribed fire may negatively affect RCWs through group isolation, habitat fragmentation, habitat degradation, and loss of foraging habitat, but group demography, population level, and recovery unit level would not be affected. Although negative impacts would occur to RCWs, overall, upcoming BRAC actions would not be significant. Implementation of management actions, regulatory requirements, and an increase in Eglin AFB prescribed fire support would further reduce the potential for negative impacts to the RCW.

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 project are not considered in this opinion because they require separate consultation pursuant to section 7 of the ESA.

Towns surrounding the Eglin AFB continue to expand which increases potential management restrictions, mostly in the form of limited abilities to conduct necessary prescribed burning. Frequency and intensity of fires may be restricted which further reduces potential or optimal RCW foraging habitat, whether for existing or expanding clusters.

CONCLUSION

After reviewing the current status of the RCW, the environmental baseline for the Action Area, the effects of the proposed BRAC actions and the cumulative effects, it is the Service's biological opinion that the BRAC actions, as proposed, are not likely to jeopardize the continued existence of the RCW. No critical habitat has been designated for this species, therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation under 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 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 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 Eglin AFB so that they become binding conditions of any grant or permit issued to the participants of each action, as appropriate, for the exemption in section 7(o)(2) to apply. Eglin AFB has a continuing duty to regulate the activity covered by this incidental take statement. If Eglin AFB (1) fails to assume and implement the terms and conditions or (2) fails to require the participants of each action to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Eglin AFB 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

Construction associated with the proposed BRAC actions will remove 284 acres of suitable and potentially suitable foraging habitat from nine active RCW territories with cluster 103L losing approximately 173 acres of suitable habitat. The Service anticipates that no direct take of individual or group of RCWs or their cavity trees will occur as a result of this project. The Service recognizes that some of the effects of the action on RCWs, when evaluated one cluster at a time, would not rise to the level of take based on effects to individual clusters and groups. However, the combined effects of habitat loss within the affected territories associated with the project may affect the function of the 11 clusters to the west of the proposed cantonment area by reducing connectivity with the nine clusters to the east of the proposed cantonment area. The primary effects of this take are the diminished ability for demographic exchange of an undetermined number of individual RCWs between the western and eastern clusters by intersecting cantonment and range areas in the middle as well as diminished habitat management from decreased or removal of prescribed fire throughout approximately 14,900 acres.

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Since no direct effects are expected to any cluster, the “take” is considered primarily in the form of harassment. Cluster 103L is the only cluster that could be distinguished under Harm due to the proximity of the cantonment area and removal of 173 acres of foraging habitat to the west of the cluster. This is considered a significant habitat modification and may result in impairing behavioral patterns such as feeding or sheltering. All of the nine clusters would be affected in the form of harassment due to a likely reduction in prescribed fire which could create a less favorable habitat condition for the clusters over time and disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Table 7 estimates the number of individuals affected by the BRAC actions. Eglin AFB has an average of 2.5 RCWs per cluster so clusters potentially affected are multiplied by 2.5 to best estimate number of individuals affected by the BRAC actions.

Incidental take is expected to be in the form of:

- (1) harm due to loss of foraging habitat from timber clearing for construction including loss of foraging habitat due to intraspecies competition;
- (2) harassment from the initial disturbance from construction;
- (3) harm from the diminished potential to use prescribed burning to maintain ecological functions in foraging habitat;
- (4) harassment from demographic isolation of clusters; and
- (5) harassment from disrupted dispersal due to habitat fragmentation caused by the project footprint.

The Service expects 9 RCW groups could be taken as a result of this proposed action. The incidental take is expected to be in the form of harm and harassment.

Table 7. The estimated number of individuals and habitat affected for the proposed project, based on the best available commercial and scientific information.

SPECIES	INDIVIDUALS*	HABITAT AFFECTED	CH DESTROYED
RCW	22.5* (9 clusters)	14,900 acres	NA

* *Individuals are estimated by using 2.5 individuals per cluster affected.*

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of expected take is not likely to result in jeopardy to the RCW. Critical habitat has not been designated for this species; therefore, the project will not result in destruction or adverse modification of critical habitat for the RCW.

Incidental take of RCWs is anticipated to occur temporarily during the construction of the cantonment area and road expansion and into perpetuity from restricted habitat management.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measure(s) are necessary and appropriate to minimize incidental take of RCWs within the Action Area:

1. Eglin's NRS shall implement the Conservation Measures outlined in the the BA as summarized in this document which is more inclusive than the Applicant's BA.
2. Eglin's NRS shall implement measures to reduce the probability of wildfires.
3. Eglin's NRS shall protect and manage RCW foraging habitat to the extent possible.
4. Eglin's NRS shall ensure that the Terms and Conditions are accomplished and completed as detailed in this Incidental Take Statement, including completion of reporting requirements.

TERMS AND CONDITIONS

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

1. Eglin's Natural Resource Staff shall determine the best placement for the buildings within the cantonment area while meeting military mission needs. Eglin's NRS should avoid Tier 1 and Tier II (as reference by Florida Natural Areas Inventory) longleaf pine habitats to the maximum extent possible while minimizing the footprint of disturbance to natural habitats to the extent possible.
2. Eglin's Natural Resource Staff shall work with the planning team to plan a "fire-wise", yet native plant, community within the cantonment area with the purpose of enabling prescribed fire up to and adjacent to the boundary of the cantonment area. Maintaining the maximum amount of longleaf pine trees within the cantonment area should also be given consideration during planning.
3. Provisions shall be taken during planning of buildings for construction within the cantonment area to include a "smoke-free" building to be used by those rangers sensitive to smoke (i.e. Asthmatics) that may be aggravated as a result of prescribed fire activities.
4. NRS shall apply necessary tactics, within reason, that will improve connectivity of the eastern and western RCW subpopulations on Eglin AFB through habitat management (fire and pine plantings) and cavity augmentation.
5. The 7SFG(A) and JSF shall work with the NRS to develop Wildfire Operational Plans to identify high wildfire risk conditions and notification procedures that units will follow to engage fire response personnel when needed.

- 6. Munitions and pyrotechnics use shall conform to Eglin’s Wildfire Specific Action Guide Restrictions, which rate fire danger from low to extreme.
- 7. Eglin NRS shall submit annual reports to the USFWS Panama City Field Office, 1601 Balboa Avenue, Panama City, FL 32405, describing actions taken to implement the Terms and Conditions of this Incidental Take Statement by January 15 of the following year of completing the proposed actions. This report shall also include information on the number of active cavity trees killed by wildfire, documented incidences of training related harassment or harm, number of acres of prescribed fire in RCW foraging habitat of the 9.0 clusters potentially impacted, and a description of the extent to which training activities limited RCW monitoring.
- 8. Upon locating a dead, injured, or sick individual of an endangered or threatened species, initial notification must be made to the Fish and Wildlife Service Law Enforcement Office located in Clermont, Florida at (352) 429-1037 within 24 hours. Additional notification must be made to the Fish and Wildlife Service Ecological Services Field Office at Panama City, Florida at (850) 769-0552 and to the FWC at 1-888-404-3922. Care should be taken in handling sick or injured individuals and in the preservation of specimens in the best possible state for later analysis of cause of death or injury.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes that no more than 22.5 RCWs will be incidentally taken (Table 8). If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Table 8. Summary of anticipated incidental take and estimated take following the implementation of the RPMs.

SPECIES	INDIVIDUALS	
	Project Take Level	RPM Take Level*
RCW	22.5	22.5

* The take level with implementation of the RPMs.

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Table 8. Summary of anticipated incidental take and estimated take following the implementation of the RPMs.

<i>SPECIES</i>	<i>INDIVIDUALS</i>	
	Project Take Level	RPM Take Level*
<i>RCW</i>	22.5	22.5

* *The take level with implementation of the RPMs.*

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help carry out recovery plans, or to develop information.

1. Continue to participate in the NW Florida Greenway Initiative and consider funding a research project that would model optimal corridors that will maintain maximum biodiversity and connectivity throughout Eglin AFB to better plan for future mission impacts. Consideration should be given to providing east and west connectivity as well as north and south corridors.
2. During midstory control efforts using hexazinone, particularly during the use of the ULW formulation, continue to monitor the response of native ground cover to treatment. Both short-term and long-term native ground cover response should be monitored. Comparison should be made to the ground cover of untreated areas as well as areas receiving other types of midstory control.
3. Implement year around, bi-monthly monitoring and protection actions of the state protected snowy plover so that federal protection of this species is not required in the future. Annual surveys will allow the Service to review trends in the population.
4. Continue habitat protection (including signage where necessary), predator control, and track survey monitoring of the Santa Rosa beach mouse.
5. In order to comply with the MBTA¹ and potential for this project to impact nesting shorebirds, Eglin NRS should follow FWC's standard guidelines to protect against impacts to nesting shorebirds during implementation of this project during the periods from February 15 - August 31 of each year.

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

The Migratory Bird Treaty Act (MBTA)

The Fish and Wildlife Service will not refer the incidental take of red-cockaded woodpecker 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 specified here.

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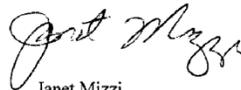
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REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in this biological opinion. As written 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; [22.5 individuals over time] (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 later 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 until reinitiation.

The above findings and recommendations constitute the report of the Department of the Interior. If you have any questions about this opinion, please contact Patty Kelly, of our Panama City Field Office at (850) 769-0552 x228.

Sincerely,



Janet Mizzi
Deputy Field Supervisor

cc:

Will McDearman, RCW Coordinator, Jackson, MS
Robin Boughton, FWC, Avian Coordinator, Ocala, FL
Mary Ann Poole, FWC, Office of Policy and Stakeholder Coordination, Tallahassee, FL
Ken Graham, FWS, Ecological Services, Atlanta, GA (electronic version only)

¹ The Migratory Bird Treat Act (MBTA) implements various treaties and conventions between the U.S., Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory bird. Under the provisions of the MBTA it is unlawful "by any means or manner to pursue, hunt, take, capture or kill any migratory bird except as permitted by regulations issued by the Fish and Wildlife Service. The term "take" is not defined in the MBTA, but the Service has defined it by regulation to mean to pursue, hunt, shoot, wound, kill, trap, capture or collect any migratory bird, or any part, nest or egg or any migratory bird covered by the conventions or to attempt those activities.

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Panama City Field Office/P. Kelly/bas/c:public server/Patty/BRAC Final BO 7/11/08

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