United States Government

MEMORANDUM

Date: January 2014

To: Robert Tawes, Chief, Division of Conservation and Classification, Southeast Region

From: Jim Boggs, Field Supervisor, Arkansas Ecological Services Field Office, Conway, AR

Subject: Biological Opinion Addressing Incidental Take Permit Application Submitted by Potlatch Forest Holdings, Inc. for the Red-Cockaded Woodpecker on Property Located in Ashley, Calhoun, Clark, Cleveland, Drew, Grant, Hempstead, Jefferson, Lincoln, and Nevada Counties, Arkansas.

This document transmits the Fish and Wildlife Service's (Service) biological opinion (BO) of the proposed incidental take permit (ITP) application for property located in Ashley, Calhoun, Clark, Cleveland, Drew, Grant, Hempstead, Jefferson, Lincoln, and, Nevada, Counties, Arkansas and its effects on the red-cockaded woodpecker (*Picoides borealis*; RCW). The ITP would authorize translocation of RCWs into a Conservation Area (CA) and associated timber harvest on Potlatch lands outside the CA, following translocation and incidental take as a result of that action. The ITP would also authorize the accidental cutting of an unknown cavity tree during timber harvest; it is estimated that no more than three trees may be accidentally cut during the term of the ITP.

This BO is based on information provided in the November 2010 Habitat Conservation Plan (HCP) prepared by the applicant, the ITP application, telephone conversations, field investigations, and other sources of information. An administrative record of this consultation is on file at this office.

Consultation History

On June 7, 2005, Potlatch sent a letter to the Service discussing the need and desire to create a RCW CA and a new HCP. Potlatch has a signed HCP from 1995.

On August 2, 2005, Service personnel met with Potlatch personnel to discuss consolidating RCWs into a CA, and the problems Potlatch will face with habitat management. They toured several active clusters to view foraging habitat and cavity trees. Thinning and burning were

improving habitat in the proposed CA. The Service suggested 200 acres/cluster with 120 acres of foraging habitat available at all times, and 80 acres of regeneration.

In a letter dated December 5, 2005, Potlatch requested Service concurrence on a RCW baseline of 15 potential breeding groups (PBG) and one single bird group (SBG), with a long term goal of 30 RCW groups in the CA. They also requested RCW management activities completed since August 2004 be credited towards mitigation requirements associated with a new HCP. They wanted assurances for their current habitat management activities consistent with objectives of a new HCP. In a letter dated April 4, 2006, the Service's Arkansas Field Office concurred with Potlatch's request.

On December 12, 2006, Potlatch entered into a conservation easement with The Nature Conservancy (TNC) on the Moro Big Pine Conservation Easement. The purpose of this easement is to ensure the property, a working forest, be retained in perpetuity in its current natural forested condition; to identify, maintain and protect any native and/or rare plants, animals or plant communities, and allow wildlife and timber management activities. The boundary of this easement closely matches the CA boundary.

On January 23, 2007, Service biologists discussed separating the HCP and Environmental Assessment (EA), consolidation of groups, and development of a safe harbor agreement (SHA) prior to termination of HCP. A follow up phone call on September 10, 2007, occurred between Service biologists discussing review of HCP.

On January 10, 2011, Potlatch submitted their draft HCP and ITP application to the Arkansas Field Office (ARFO). On August 23, 2011, ARFO transmitted a memorandum to the Regional HCP Coordinator certifying Potlatch's ITP/HCP application, and transmitting the formal application package (application form, fee, draft EA, and draft HCP dated November 2010).

The Notice of Availability for the Draft EA and HCP was published in the Federal Register on June 10, 2013.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

The Service proposes to issue a section 10(a)(1)(B) incidental take permit to a private landowner, Potlatch, based on Potlatch's application package and associated HCP. A detailed project description is found in "A Habitat Conservation Plan for Red-cockaded Woodpeckers on Potlatch Lands in Arkansas" and is summarized below. The action area (covered lands) is approximately 419,278 acres of land owned by Potlatch in Ashley, Calhoun, Clark, Cleveland, Drew, Grant, Hempstead, Jefferson, Lincoln, and Nevada Counties, Arkansas. The action area will be addressed as "covered lands".

In 1995 Potlatch developed a Red-cockaded Woodpecker Habitat Conservation Plan, and the Service issued an ITP. The objective of this plan was to formally and publicly dedicate Potlatch's RCW conservation activities. The plan also would be used for educational and training purposes of employees engaged in timber management operations, as well as other private landowners who may benefit through understanding management of endangered species and forests. Potlatch wanted to stipulate its contribution to the range-wide recovery of this endangered species in concert with the Service.

Per the original Potlatch HCP, forty-four (44) active and inactive clusters were present on Potlatch lands in 1995. It is unlikely the population increased from 23 clusters in 1976 to 44 in 1995. These additional clusters are probably the product of additional survey effort. As of November 1, 2010, 17 PBG and 4 solitary bird groups (SBG) were on Potlatch lands. There is no single reason for the decline from 44 clusters to the current 19; however it is likely a combination of several factors. Demographic isolation, habitat degradation resulting from fire exclusion and cavity kleptoparasites are all likely factors contributing to population declines. A likely critical factor for decline was the small, fragmented RCW population that was vulnerable to local extirpation. The original HCP did not permit the consolidation of RCW into a CA.

Potlatch proposes to implement a new RCW habitat conservation plan that will provide increased flexibility and efficiency in managing their timberlands. The HCP includes actions necessary to minimize and mitigate the impacts of any incidental take of RCWs occurring as a result of timber harvest and management and HCP implementation on the covered lands. The proposed HCP would consolidate Potlatch's scattered RCW groups into a Conservation Area (CA) managed specifically for RCWs. The CA is 13,122 acres of timberland in Calhoun County, Arkansas. Incidental take of RCWs outside of the CA would be mitigated for by the creation of RCW groups within the CA. Once mitigation requirements have been met for a RCW group, the cluster and foraging habitat outside the CA would be clear cut. Those areas will be regenerated and subsequently managed as pine plantations and thereafter would not be available for re-occupation by RCWs. Currently, there are three RCW PBGs and two SBGs located outside the proposed CA. Within the CA, there are currently 11 PBGs and three SBGs. This includes 7 PBGs created as a result of implementation of RCW conservation measures since 2003. Since the CA has the capacity to support more RCW groups than needed to mitigate for take outside of the CA, Potlatch may utilize that excess capacity to establish a RCW conservation bank for other private parties. Should Potlatch wish to proceed with a RCW conservation bank, the bank would be established in accordance with the Service's 2003 conservation banking policy.

Habitat Management in the Conservation Area

Potlatch will locate and design up to 35 RCW territories within the CA. The CA consists of 13,122 acres of Potlatch land. RCW territories will be a minimum of 120 acres of foraging habitat. The cluster area will have a minimum size of 10 acres, depending on the number and location of cavity trees, and a 200 foot buffer. Clusters will be thinned to 50-80 square feet of basal area (BA) in pine 10 inches diameter at breast height (dbh) or greater, and all overstory and midstory hardwoods within 50 feet of active cavity trees, and pine regeneration within 20 feet of active cavity trees, will be removed. All timber harvesting operations (skidding, forwarding,

hauling, road building, etc.) will occur outside of the nesting season (April 1- July 15). If the total measurable basal area of hardwood is greater than 10 square feet per acre and/or the height of the hardwood midstory exceeds 7 feet, then control measures will be scheduled for the cluster. Prescribed burning will occur on a one to five year rotation, and employ both growing season and non-growing season burns. Cavity trees will be protected from fire by raking around trees. Where prescribed fire is not effective, herbicide will be used to control hardwood midstory. Cavity inserts will be installed as necessary to maintain at least four suitable cavities in each cluster, using the technique described in Allen (1991). Restrictor plates also may be used to prevent destruction of cavity entrances.

The total measurable foraging habitat will be maintained at 40 – 80 square feet of BA. The hardwood component within the foraging area will not exceed 10 square feet of BA. Foraging habitat will be maintained in an open forest condition by controlling hardwood encroachment in the midstory. All foraging habitat will be within 0.5 mile of the cluster center and at least 50 percent within 0.25 mile of the cluster center. Foraging habitat will not be separated by more than 200 feet of non-foraging habitat from the cluster stand. Hardwoods adjoining any streams will be reserved as needed to protect water quality. Commercial timber thinning in foraging habitat will be conducted by selective cutting whenever a sufficient volume of pine trees in excess of the minimum required is available.

Potlatch believes, if properly managed, the CA can support up to 35 RCW groups, based on providing a minimum 10-acre cluster and total territory of 120 acres (a few territories will be larger). Clusters and territories will be mapped in their GIS to mark the boundaries in the field. Over time, Potlatch will monitor the birds and likely learn more about actual use of territories. If groups change their habitat use pattern, Potlatch will incorporate those changes into the GIS. Cluster redesignations will encompass the aggregate of active and usable inactive cavity trees, surrounded with a 200-foot buffer, and will encompass at least 10 acres.

All of the area described in this plan is located in loblolly pine and loblolly-shortleaf pine forests types. Three types of silvicultural management systems will be used in this area, even-aged, two-aged, and uneven-aged.

Even-aged management has been used in the CA in the past. These pine plantations may continue to be managed as even-aged stands, but some may be allowed to grow and use the two-aged management system to align these stands with surrounding RCW foraging habitat conditions. Even-aged management also may be used in the case of a natural disturbance destroying all or part of a stand. Some even-aged stands may be allowed to grow to meet requirements of cluster and foraging stands. These even-aged stands may be managed as recruitment sites and meet requirements of the cluster and foraging sites. Sections of these stands may be managed as even-aged and other parts will be managed as two-aged stands.

Two-aged management will be employed in the clusters and foraging habitat of each RCW group. This system will provide an overstory of older aged pine trees, another age class of trees in the stand, and open conditions to allow for herbaceous ground cover. Naturally occurring pine

stands will be managed using these systems and some even-aged stands may be managed as two-aged stands in the future.

Uneven-aged (or 3+ age classes) will be used in a few areas to regenerate stands (Smith 1986, Helms 1998). Most uneven-aged management will occur outside the RCW foraging and cluster areas. Prescribed fire will be limited until after sufficient pine regeneration has been established in the stand. When fire is reintroduced to these stands, some pine regeneration will be killed resulting in a midstory of pine saplings within sufficient spacing to allow some sunlight to reach the forest floor.

Habitat Management outside of the Conservation Area

RCW groups outside of the CA will be managed as the same in the CA until Potlatch chooses to spend a mitigation credit and shift the responsibility into the CA.

Population Consolidation within Conservation Area

The purpose of Potlatch management efforts in the CA is to recruit the formation of new groups. This will be done in two ways: (1) management of unoccupied territories and recruitment clusters within the CA, including installing artificial cavities, will tend to induce the formation of new groups; and (2) translocation of subadult RCWs from Potlatch groups both inside and outside the CA to form new groups in restored habitat within the CA. Translocations will follow translocation guidelines established in the RCW Recovery Plan (Service 2003). Establishment of these new groups and subsequent management to enhance new groups within the CA represents establishment of mitigation credits for incidental take of RCWs associated with translocation of RCWs and harvest of their habitat outside the CA.

Successful mitigation at recruitment clusters occurs with establishment of either a new PBG or a SBG. Potlatch will translocate RCWs into recruitment clusters according to methods described by Hess and Costa (1995) and the RCW Recovery Plan (Service 2003). Translocations will be performed first to augment recruitment clusters occupied by a SBG to form new PBGs, and second, to augment unoccupied territories. To augment a SBG, a juvenile non-breeding bird of the opposite sex will be captured from another group from inside or outside the CA, and released in a suitable cavity in the recruitment cluster. Other translocations will consist of moving unrelated pairs of juvenile males and females to an unoccupied recruitment cluster to form a new PBG. Juveniles may be translocated from either inside or outside the CA.

Potlatch will maintain an HCP mitigation account for consolidating the RCW population within the CA as incidental take proceeds outside the CA. All credits earned for creating a new PBG or a SBG must be verified and the Service notified before Potlatch may utilize a credit for incidental take or mitigation banking. To utilize a credit, Potlatch must debit its account and notify the Service of such action.

Before Potlatch can translocate members of a PBG into the CA and harvest habitat at the group's former territory, Potlatch must have a PBG credit in its mitigation account. Potlatch may

translocate a SBG and harvest its former habitat either prior to or after establishment of mitigation credit. If harvest of habitat in the former territory of a SBG occurs before there is sufficient mitigation credit in the mitigation account, Potlatch will incur a mitigation debt (i.e., negative account balance) that must be fulfilled after translocation and harvest. Thus, with respect to PBGs, the HCP is "pay-as-you-go," with mitigation always being completed in advance of any incidental take. With respect to any negative balances in the SBG portion of the account, Potlatch remains responsible for maintaining the appropriate number of designated territories within the CA.

The "in-kind" mitigation credit system has been used by the Service for previous HCPs. A SBG Mitigation Credit is established when a non-breeding RCW male or female is successfully translocated to or induced to occupy a recruitment cluster, and remains there for a minimum of 6 months (including the breeding season), but where no new potential breeding group is formed. A PBG Mitigation Credit is established when: a non-breeding RCW is successfully induced to occupy a recruitment territory with an existing SBG to form a new potential breeding group; a solitary resident RCW is successfully augmented with a translocated mate to form a new potential breeding group; an unrelated male and female are successfully induced to occupy a recruitment cluster to form a new potential breeding group; or an unrelated male and female are successfully translocated to the recruitment cluster to form a new potential breeding group. All successfully established mitigation credits will be documented with information on the type of credit, recruitment territory location, cavity trees occupied, dates of monitoring and evidence for new group formation, source or origin of any translocated birds comprising the new group, and bird banding data for individuals in the group.

Efforts to form a new PBG at a recruitment cluster, by either induction or by translocation of an unrelated pair, may result in only one bird occupying the cluster. In such instances, a SBG mitigation credit can be added to the mitigation account, and when the solitary-bird can be augmented with a mate during subsequent breeding seasons, by induction or translocation, a PBG credit may be added to the account (and the solitary-bird portion of the account debited). Only one mitigation credit will be established at each recruitment cluster, as either a SBG or a PBG. Once a new PBG is established and credited at a cluster, any future change in the identity of individuals forming the breeding group will not constitute an additional potential breeding group credit. Similarly, a future change from the credited potential breeding group to a SBG will not result in an additional SBG mitigation credit. A mitigation credit for a SBG can be "exchanged" for a PBG credit if the new solitary bird is successfully augmented by translocation or induction in subsequent years to form a new PBG.

Monitoring

Within the CA, Potlatch will annually collect and update data on each cluster's activity status; number of cavity trees; numbers of active, inactive and abandoned cavities; stocking; and hardwood conditions. Potlatch will monitor the banded birds in each group, capture and band any unbanded adults or juveniles, and monitor nesting activity and reproduction. Birds will be banded with both aluminum Service leg bands and plastic color leg bands.

Periodic surveys during the breeding season will be conducted to document the formation of new groups at recruitment territories. To verify successful formation of a PBG, Potlatch must document evidence of copulation, nesting, eggs, or the formation of a pair bond as indicated by the presence of both birds at the recruitment cluster for a 6-month period including the breeding season (April 1 to July 15). Through monitoring, Potlatch must also demonstrate males and females do not consist of birds from another cluster in the CA that subsequently moved to occupy the recruitment cluster. To verify the successful establishment of a new SBG, monitoring must document the bird remained at the recruitment territory for a 6-month period, including the breeding season.

Annual monitoring of foraging habitat conditions will be conducted on the same schedule as the current Potlatch inventory manual (for example, each stand inventories once in a five year period and/or 20 percent of the total unit area surveyed annually). A database of all the inventories (pine BA, midstory conditions, etc.) silvicultural activities and annual cluster surveys will be maintained for all clusters.

Mitigation for Accidental Cavity Tree Destruction

Potlatch will make every effort possible to avoid accidentally destroying an active RCW cavity tree. All forestry personnel working in potentially suitable RCW habitat will have periodic training on how to recognize RCW cavity trees. While cruising or marking timber in potential RCW habitat personnel also will be surveying for unknown cavity trees. Should a suspected tree be found any ongoing operation will cease until a qualified person can determine if the suspect tree is actually a RCW cavity tree and if so, if it is active. Previous comprehensive RCW surveys and ongoing cavity tree surveys will minimize the chance that an unknown cavity tree will be cut. During prescribed burning activities efforts will be made to protect known cavities from fire.

Should an undocumented, active RCW cavity be cut during a normal timber harvesting operation on Potlatch forestland or land Potlatch has purchased the timber or destroyed (i.e. fire into cavity and tree completely scorched) as a result of a prescribed burn, a qualified person will determine whether the tree cut or burnt is a RCW cavity tree and if it is active. If the tree is found to be inactive, a search will be completed of the remaining forest stand to determine if a RCW group is located within the stand. If no active RCW evidence is found the site will be determined to be abandoned and the operation will resume. If the tree is found to be active, two artificial cavity inserts will be installed within a 48 hour period and the timber harvesting operation will be stopped. If an active cavity tree is damaged by prescribed burning, a determination will be made as to the damage and likelihood of the tree surviving. If the damage is extensive and the tree is likely to die, two artificial cavity inserts will be installed within a 48 hour period. Should insufficient habitat remain to support the RCW group (as set forth by the Standard for Managed Stability, Appendix 5: Private Lands Guidelines, Red-cockaded Woodpecker Recovery Plan, Second Revision, 2003) a mitigation obligation will be added to the CA baseline (assuming this is not a baseline group) and RCWs remaining at the site will be translocated to a vacant CA

RCW Baseline and Transactions for Mitigation of Incidental Take

The number of RCW territories Potlatch must manage on the covered lands under the HCP is termed the baseline. That baseline is 15 PBGs and one SBG within the covered lands. The Service and Potlatch agreed to create a baseline of 16 groups, even if Potlatch grew the population prior to completion of this HCP. The baseline may be increased should Potlatch assume a mitigation obligation from a third party after going through the Service's conservation banking process or purchase additional land with RCWs on it.

The long range goal is for baseline groups to be entirely within the CA. Potlatch will maintain designated territories in the CA at least equal in number to the baseline number. Consolidation of RCWs into the CA may occur only after (1) the specific group or groups outside of the CA to be incidentally taken are identified by Potlatch; (2) the Service concurs the proposed action is consistent with the consolidation priority described in the HCP; and (3) in the case of a PBG, a mitigation credit is available to apply to the group. It is expected all mitigation will be completed in 10 years or less.

Potlatch will give the Service 60-day advance notice of the planned consolidation, and the current status of its mitigation credit account. The Service shall notify Potlatch within 30 days of such notice if the Service finds the proposed consolidation is inconsistent with the HCP or with the mitigation accounting set forth by Potlatch. In either case, the Service shall provide Potlatch with data to support their finding(s). Prior to consolidating a RCW group into the CA, Potlatch either will translocate into the CA all resident RCWs or give the Service 60-day notice to allow the Service or its agents to capture and remove the group to another property.

Potlatch will maintain records documenting the transactions for establishment and use of mitigation credits, mitigation banking, and baseline. That information will include the geographic location and composition of the group for which the credit was used, the location and composition of the group in the CA whose credit was used, correspondence or communication by the Service concurring with the assignment and transaction, and the date the assigned group was actually consolidated.

Removal of RCW Habitat for Groups in Excess of the Baseline

Once consolidation is complete, Potlatch may incidentally take any groups in the CA that have increased due to effective conservation management above the baseline number of groups, with the exception that no timber harvest will occur within any group's territory during the breeding season. If Potlatch has incurred a mitigation debt for SBGs, they must bring the balance in the solitary-bird mitigation account back to zero using available PBG credits before determining whether there are any excess groups above the baseline.

Excess groups will be monitored and documented using the same methods and criteria as groups within the CA. Upon the formation of an excess group, Potlatch will inform and provide the Service with data for verification. Also, Potlatch will provide at least 60-day prior notice of the intent to harvest timber within the territory of an excess group, allowing the Service or its agents to capture and translocate the RCWs in that group to other property.

When the term of the HCP expires, Potlatch may decide to enroll in the Service's Safe Harbor Program (SHA). If the HCP expires before the SHA is in place the baseline will increase to the number of PBGs on the covered lands at that time.

Training

Potlatch, wildlife biologists, foresters, and/or technicians charged with RCW management will conduct periodic training sessions to include the following topics: RCW field identification, cavity identification and status, all conditions and requirements imposed by this plan, record keeping, revisions, and cavity survey techniques and assessments. Logging contractors will either attend the same training or receive on-the-ground instruction/training by Potlatch personnel administering logging activities. Other contractors and lessees (e.g., hunting clubs) will be informed of the HCP. Training in field identification of likely cavity trees based on their overall morphology and appearance will be emphasized to avoid or minimize accidental marking and cutting of such trees. If appropriate, Potlatch may seek the guidance of Service personnel in such training and development of course content.

Changed Circumstances

The ability to attain the HCP's biological goal may be affected by two circumstances: 1) an inadequate capacity in the CA to completely consolidate the population on covered lands, and 2) adjusting foraging habitat requirements and management with adaptive management techniques if future data indicates Potlatch's nesting and foraging habitat criteria are inadequate. Potlatch will monitor conditions within the CA to detect changed circumstances and determine whether to implement contingency plans developed to adapt management practices under the HCP. Changed circumstances represent unexpected but anticipated events or outcomes that do not conform to the goals and objectives of this HCP. Changed circumstances include: (1) occurrence of wildfire or a southern pine beetle (SPB) outbreak in the CA; or (2) a severe weather event (i.e. tornado, hail, high winds) in the CA. If a wildfire or SPB outbreak occurs in the CA, Potlatch will suppress the wildfire or implement control measures for SPB, as applicable. Prompt response, as provided for in the HCP, is the only appropriate response. Contingency plans to address these changed circumstances are detailed below.

Wildfire and infestation of cluster trees by the SPB are two naturally occurring events that could reduce otherwise suitable habitat in the CA and require quick response to minimize the potential for damage to or destruction of RCW habitat. Potlatch will respond appropriately to such threats to RCW habitat within the CA. Cavity trees killed by either wildfire or SPB will be replaced within 15 days of the event unless the scale of the event prohibits otherwise. Potlatch will provide the Service with documentation of the event (nature, location, and control measures) within 30 business days of the occurrence. The Service will have 30 days to review the documentation and schedule an inspection of the occurrence area. If some habitat is lost due to wildfire or major beetle infestations, Potlatch will evaluate the loss and determine if current or anticipated cluster sites need to be relocated.

Adaptive Management

In contrast to Changed Circumstances, where changes are anticipated and responses are known, adaptive management is employed when the exact nature of changes or necessary responses to such changes cannot be precisely predicted. Adaptive management applies the concept of experimentation to design and implementation of natural resource plans and policies (Lee 1993) and begins with the central tenet that management involves a continual learning process that cannot be conveniently assigned to "research" and "regulatory compliance" activities (Walters 1986).

It is unlikely, due to the long history of research and management of RCWs, circumstances will arise for which a response has not already been developed or information currently available from research to answer residual questions regarding how RCWs respond to changes in their environment. However, adaptive management judiciously applied would likely increase the potential for success within the CA and potential that useful information will be gained from RCW responses to management activities.

Implementation, Assurances and Reporting Requirements

Potlatch will bear the cost of forest and land management activities required to implement this plan. Potlatch also will be responsible for costs associated with monitoring the RCW population, banding, augmentation, translocation and any other activities necessary to meet the requirements of this plan. Implementation of this HCP will be governed by the ITP between Potlatch and the Service, and funded by Potlatch as part of ongoing operations of Potlatch's. The HCP defines the roles and responsibilities of the parties and provides a common understanding of actions that will be taken for the conservation of the listed and unlisted species and their habitats during implementation of the HCP. As a part of the HCP implementation, in addition to ongoing reporting and notifications required by the HCP, Potlatch shall provide an annual report within 30 days after the end of each calendar year that the HCP is in effect; a more comprehensive report will be provided every 5 years. Upon reasonable advance notice from the Service, Potlatch will make personnel responsible for implementing the HCP available to meet with the Service to discuss any concerns or improvements sought in reporting and implementing the HCP.

The HCP shall remain in effect for 30 years from the date the ITP is issued and includes 5-year comprehensive reviews and annual reports. Upon termination of the HCP, all groups on the covered lands will be managed according to the ESA requirements that may exist at the time of termination, as applicable to private landowners.

STATUS OF THE SPECIES

Species description

The U. S. Department of the Interior (USDI) identified the RCW as a rare and endangered species in 1968 (USDI, 1968). In 1970, the RCW was officially listed as endangered (Federal Register 35:16047). With passage of the Act in 1973, the RCW received the protection afforded listed (endangered) species under the Act. No critical habitat has been designated.

The RCW is a small woodpecker about 8 inches in length, with a wingspan of about 14 inches, weighing about 1.7 ounces (47 grams). Its coloration is black and white, with a ladder back, and is distinguished from other woodpeckers by its black capped head and nape, surrounding large, white cheek patches. Adult males possess a tiny red streak or tuft of feathers, the cockade, in the black cap near each ear and white cheek patch. The small cockade usually is covered by the black crown, except when protruded during excitement, and is not readily visible except upon close examination or capture. Adult males and females are not readily distinguishable in the field. Juvenile males have a red crown patch until the first molt, which can be distinguished from the black crown of juvenile females (USFWS 2003).

Life History

The RCW is a territorial, non-migratory, cooperative breeding species (Lennartz et al. 1987; Walters et al. 1988). It is unique in that it is the only North American woodpecker that exclusively excavates its cavities for roosting and nesting in living pines. Usually, the trees chosen for cavity excavation are infected with a heartwood decaying fungus (*Phellinus pini*) (Jackson 1977; Conner and Locke 1982). The heartwood associated with this fungus and typically required for cavity excavation is not generally present in longleaf pine and loblolly pine until 90 to 100 and 75 to 90 years of age, respectively (Clark 1992a; Clark 1992b). Large trees also are required because the cavity is constructed and placed entirely within heartwood where pine resin will not flow. Each group member has its own cavity, although there may be multiple cavities in a cavity tree. RCWs chip bark and maintain resin wells on the bole around the cavity where the fresh flow of sticky resin is a deterrent against predatory snakes (Rudolph et al. 1990) and indicates an active cavity tree. The aggregate of cavity trees, surrounded by a 200-foot, forested buffer, is called a cluster (Walters 1990). Cavities within a cluster may be complete or under construction (starts) and either active, inactive or abandoned. Clusters with one or more active cavity tree are considered as active RCW clusters.

Red-cockaded woodpeckers live in social units called groups. This cooperative unit usually consists of a monogamous breeding pair, offspring of the current year, and 0 – 4 adult helpers (Walters 1990). Helpers typically are 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). Some large populations have instances, although very infrequent, of female helpers (Walters 1990; Delotelle and Epting 1992; Bowman et al. 1998). Some clusters are only occupied by a single adult male, which are classified as single bird groups.

The RCW is territorial and each group defends its home range from adjacent groups (Hooper et al. 1982; Lignon 1970). The defended territory includes habitat used for cavity trees and foraging. RCWs feed mostly on variety of arthropods, particularly ants and wood roaches, by foraging predominately on and under the bark of larger and older living pines (Hooper 1996; Hanula and Franzreb 1998). Males tend to forage in crowns and branches, while females commonly forage on the trunk. Dead and dying pines are important temporary sources of prey,

and hardwoods are used occasionally. Group members forage together each day in parts of their territory.

RCWs have large home ranges relative to their body size. RCWs tend to forage within 0.5 miles of their cluster. RCW groups forage within a home range that is highly variable, from as little as 86 acres to as much as 556 acres (Conner et al. 2001; USFWS 2003). Home range size is variable within and between populations, but tends to reflect foraging habitat quantity and quality, boundaries of adjacent RCW territories, and possibly cavity tree resource availability (Conner et al. 2001; USFWS 2003).

Because of the foraging behavior of RCWs, a 0.5-mile radius is used to conduct survey areas, prior to clearing or removing any potential RCW habitat, to identify any unknown RCW clusters that may be affected. The 0.5-mile survey area provides a high probability that any unknown clusters will be identified that potentially use habitat within the area to be affected. This is based on RCW foraging ecology and behavior, the limitations of natural cavities to population growth at Fort Benning, the ecology of RCW population growth via the formation of new clusters/groups, and relationship of habitat used for foraging within 0.5 miles of a cluster center.

A 0.5-mile radius circle around a cluster center encompassed an average of 91% of the actual home ranges of RCW groups in a North Carolina study (Convery and Walters 2003). Thus, unknown Ft. Benning clusters identified by surveys within 0.5 miles of the edge of clearing or construction likely will have the vast majority of their foraging habitat somewhere within this 0.5 mile area.

About 90 percent of potential breeding groups (PBG) nest each year. A PBG is an adult male and female with or without helpers occupying the same cluster. The nesting season occurs from April to July. Females usually lay 3 or 4 eggs in the cavity of the adult male. The short incubation period lasts approximately 10 days, and eggs hatch asynchronously. Nestlings fledge after 24 to 29 days, although all nestlings rarely survive to fledglings. Partial brood loss of nestlings is common in RCWs, although number of hatchlings successfully fledged tends to increase with group size. Also, older and more experienced breeders have greater reproductive success (number of fledglings), which is maximized at about 7 years of age, after which it declines sharply at 9 or greater years of age (Reed and Walters 1996).. About 20 percent of nests will fail completely, without producing a single fledgling. Groups with helpers experience whole brood loss less frequently than breeding groups without helpers. Renesting rates are geographically and annually variable. In good years, up to 30 percent of breeding groups will renest. Productivity of second nesting is lower.

Subadult/juvenile females from the current year breeding season normally disperse prior to the next breeding season, or are driven from the group's territory by the group (see Walters et al. 1988, for additional sociobiological/cooperative breeding information). Juvenile females remain at their natal territory to assume the breeding vacancy of the female only when the breeding male dies and the breeding female disperses or dies. Breeding females will disperse, creating a breeding vacancy, when her male offspring inherit the male breeding position (incest avoidance). Dispersing juvenile females move to nearby RCW territories in search of a breeding vacancy.

These females either become breeders in a territory, or floaters among more than one territory where they are not associated with a single group.

Juvenile males remain in their natal territory or disperse. Those that remain become helpers or, if the breeding male dies before the next breeding season, breeders. Dispersing juvenile males search for positions as breeders in nearby territories where they either become breeders, helpers, or floaters.

Most adult male helpers remain on their natal territory as helpers, where about 15 percent will inherit the territory as a breeding male in any given year. Some adult helpers disperse to other territories becoming breeders, solitary males, helpers, or floaters. However, breeding males are highly territorial and most will remain even without a breeding female. In contrast, about 10 percent of breeding females will break the pair-bond between breeding seasons and disperse to another territory as a breeder with a different male (Walters 1988; Daniels and Walters 2000).

Population Dynamics

RCW population size during a given year is the number of surviving adults, plus the number of surviving offspring produced, the number of immigrants to the population, and minus the individuals that dispersed from the population. These are the demographic rates of birth, death, immigration, and emigration that affect population dynamics. However, RCW population dynamics are significantly affected by the cooperative breeding system and behavior of territorial RCW groups with helpers. The spatial distribution and aggregation of groups affects the likelihood that breeders in a group will be replaced upon their death or dispersal by other RCWs. All of these factors regulate population size, stability, and viability as mediated by the effects of habitat, genetics, demographic and environmental stochasticity, and environmental catastrophes.

Population Size

RCW population size is commonly measured as the number of groups instead of the number of individuals. The number of PBGs is an important metric for population dynamics and persistence. A single-bird (male) group is a solitary territorial male at a cluster without a female. Single-male groups, while not breeders also are important because a large proportion of single-bird groups are indicative of a declining population. Although the total number of birds in a population can be measured or estimated, this number includes non-breeding adults as helpers and floaters. Population measures of all individuals does not account for group and territory dynamics or the buffering effect of helpers as a replacement pool for breeders.

A PBG is determined by confirmation of nesting or careful observation of a coexisting adult pair in the cluster and territory in the absence of nesting or during the non-nesting season. Single-male groups are determined using the same observational methods of following birds during foraging in the early morning after they have exited their cavities.

In the absence of data for the number groups and group composition, the number of active clusters is an index estimate of population size (number of groups). An active cluster is a group

cluster where fresh resin from RCW activity at a suitable cavity occurs on one or more cavity trees. An active cluster may be occupied by PBG or a single-male group. In large populations, the number of PBGs and single-male groups frequently are estimated by an active cluster census from which there is a random sample determining the number and composition of groups. The proportion of PBGs and single-male groups in the sample is extrapolated to the total number of active clusters to estimate the total number of PBGs and single-male groups.

The term "population" is applied for RCWs in various contexts, just as it is for other species. A RCW population can be the number of clusters or groups occupying a particular geographic area or on a specific property managed by a particular agency or entity. However, RCW population size is most important as an attribute of a biologically functional population of spatially distinct demographic and/or genetic groups (e.g., Wells and Richmond 1995). Demographically, a RCW population is strongly affected by the dispersal distances of males and females from their natal group or group territories that search for and compete for breeding vacancies at other groups. Dispersing juvenile and helper males rarely move and assume breeding vacancies at clusters located more than 2 miles from their natal or group site at North Carolina study sites (Daniels 1997; Walters 1988). Juvenile females from the same study areas (North Carolina sandhills and Camp Lejeune) are capable of longer forays, becoming breeders at clusters up to 3.7 miles away (Walters et al. 2008). In western Florida (Eglin Air Force Base), from a study with a smaller number of observations, adults disperse an average distance of 1.1 mile, juvenile females 2.0 miles, and juvenile males 5.0 miles (Hardesty et al. 1997b). Thus, the spatial structure and distribution of groups is a crucial factor defining a demographically functional RCW population and its size (see Population Stability for further information).

RCW populations under natural conditions increase in size (number of group territories) by two primary processes; pioneering and budding. Pioneering is the creation of new cavities and colonization of a new, previously unoccupied territory. Pioneering rarely occurs under current conditions, with rates (new groups) of only 0.06 to 1.5 percent per year (USFWS 2003). Budding is the creation of a new group by subdividing an existing group territory and its cavity trees, usually by a group helper or an immigrant male (Conner et al. 2001). Annual budding rates also are low, from 0.6 to 2.1 percent.

Population Variability

The attributes for which RCW populations are variable reflect environmental variation at different scales. The effects of variability in population size, spatial distribution of groups, and demographics on population stability and persistence are described in the following sections on population stability, range-wide trends, and threats. This section addresses the nature of variation and RCW response. RCW populations experience environmental variation within and between physiographic regions, ecosystems, forest communities, forest stands, and individual trees. However, the fundamental ecology of RCWs remains the same where populations occupy fire-maintained, open pine forests, with pine of sufficient age and size for cavities and foraging.

Most RCW populations reside in the longleaf pine ecosystem where longleaf pine historically dominated the forest community, providing cavity resources and foraging substrate. Populations

in other vegetation types occur in the western, northern interior and southernmost regions flanking the longleaf pine ecosystem. Populations in the West Gulf Coastal Plain occupy loblolly pine forests in parts of southern Arkansas, east Texas, and Louisiana on flatwood terraces and more dissected upper terraces where loblolly pine was dominant or with shortleaf pine as a natural community type (e.g., Moore and Foti 2005; Moore and Foti 2008). Shortleaf pine-dominated communities currently with RCWs are in portions of the coastal plain in east Texas, the Ouachita Mountains of Arkansas and eastern Oklahoma, the Piedmont and Cumberland Plateau of Alabama, and the Georgia Piedmont. In south Florida, RCWs persist in hydric pine flatwoods dominated by South Florida slash pine (*Pinus elliottii* var. *densa*). In northeastern North Carolina and southeastern Virginia, small populations remain associated with pond pine (*Pinus serotina*) communities and pocosins.

Variation among forest ecosystems is not known to significantly alter RCW population demographics or dynamics under natural conditions. However, variation in habitat quality and quantity is associated to some extent with some forest community types. For example, longleaf community types and forest structure vary in response to soil moisture and drainage, from xeric excessively well-drained types on deep sandy soil, to wet types in flatwoods and savannas with seasonally perched water tables (Peet and Allard 1993; Christensen 2000). The density and size of longleaf pine is reduced at these most xeric and wet communities or sites, which reflects slower pine growth rates than at more productive mesic sites and community types. Similarly, the size and density of South Florida slash pine in hydric flatwoods also is reduced relative to more productive sites. The average RCW home range size tends to be greater at such xeric and wet communities or sites in Florida than more productive pine sites in Georgia and South Carolina (Nesbitt et al. 1983; DeLotelle et al. 1987, 1995; Epting et al. 1995; Hardesty et al. 1997).

However, home range size of groups also varies within populations and among years and seasons. Within populations, the largest home ranges are about the twice the size of the smallest (Conner et al. 2001). Home range size has been related to the area of suitable habitat within 1.24 miles of the cluster, pine basal area, pine density, pine density greater than 9.84 inches dbh, RCW group density, hardwood midstory, and other factors (Hooper et al. 1982; DeLotelle et al. 1987; Bowman et al. 1997; Hardesty et al. 1997; Walters et al. 2000, 2002). Variation in home range size reflects a response to habitat quality, where more is generally required in low quality habitat, and less is needed in high quality habitat.

RCWs selectively forage in their home ranges on larger and older pines more frequently than their availability relative to younger and smaller trees in small habitat patches, patches within stands, and stands within the landscape (Zwicker and Walters 1999; Walters et al. 2002). The degree of preference and the composition of large, intermediate, and small trees vary within and among home ranges and the sites where these factors have been studied. Overall, RCWs preferentially use pine 12 – 20 inches dbh, prefer trees greater than 20 inches dbh, use trees less than 20 inches dbh depending on the availability of larger trees, and avoid trees less than 12 inches dbh when larger trees area available (Walters's et al. 2000).

RCW group fitness or reproductive success is directly and indirectly affected by the age and size of available pine, as well as the development of the herbaceous plant ground cover. RCW group size, productivity (fledglings produced), or both is positively related to an increase in the density of old and large pine and the herbaceous ground cover. It is negatively related to an increasing density of small young pine, intermediate-size pine, and the density and height of the hardwood midstory (Conner and Rudolph 1991; Rudolph and Conner 1994; Hardesty et al. 1997; Engstrom and Sanders 1997; James et al. 1997, 2001; Walters et al. 2002). Group size affects productivity because the number of fledglings increases with group size, generally with an average of two fledglings in groups of 4 – 5 adults and helpers, and 1 fledgling on average with groups of just two breeding RCWs (Conner et al. 2001).

Habitat quality is not a function of any single attribute. For example, RCW fitness is not solely related to the number, basal area, or density of pine greater than 10 inches dbh (Hooper and Lennartz 1995; Beyer 1996; Wigley et al. 1999; James et al. 2001; Walters et al. 2002). Collectively, the attributes of RCW habitat use affecting RCW fitness are the characteristics of habitat structure, which include the density and size-class distribution of pine. High quality RCW foraging habitat consists of an open fire-maintained pine forest, with no or a sparse midstory of hardwood or pine, low densities of small pine (less than 10 inches dbh), moderate densities of medium-sized (10 – 14 inches dbh) and large (greater than14 inches dbh) pine, at least low densities of old growth pine, and a well-developed herbaceous plant ground cover (James et al. 2001; Walters et al. 2002). Understanding the contribution of old growth to habitat quality has been limited by the rarity of this habitat, although RCWs from the old-growth Wade Tract in southern Georgia have the smallest average home ranges and the greatest average group size and productivity known. Thus, old growth is expected to be an important element of habitat quality, both for foraging and cavity resources.

Variation in habitat quality occurs within and between populations, much of which is attributable to current and past forest management and land use practices. On a broader geographic scale, population-level differences in RCW mortality and fecundity also exist, apparently independent of habitat quality (Conner et al. 2001). RCWs in southern and coastal RCW populations tend to have lower productivity and greater survival rates than more northern and inland populations (Lennartz and Heckel 1987; DeLotelle and Epting 1992). These differences may be due to lower winter temperatures and survival with greater reproductive effort in northern populations, and life history evolution in more favorable southern climates where greater survival and lower annual reproduction are responses to increased competition (Conner et al. 2001).

Genetically, most variation is partitioned (greater than 86%) among individuals within populations, rather than among populations (14%), according to allozyme (Stangel et al. 1992; Stangel and Dixon 1995) and random amplified polymorphic data (Haig et al. 1994, 1996). Population heterozygosity remains comparable to other bird species. Unique alleles are not known to distinguish populations. The genetic structure of populations is significantly, although weakly, spatially heterogeneous (overall $F_{ST} = 0.14$, p less than 0.0001, Stangel et al. 1992; $F_{ST} = 0.19$, p less than 0.0001, Haig et al. 1994), but somewhat more structured than in most non-endangered birds (Haig et al. 1994). Genetic distance (dissimilarity) tends to increase as the geographic distance between populations (Stangel 1992; Haig et al. 1994, 1996) increases. Mean

heterozygosity among populations is relatively high and comparable to other species, although allelic diversity in some small populations is reduced (Stangel et al. 1992). These genetic characteristics are generally expected by a historically widely distributed species that only relatively recently has become reduced in fragmented populations (USFWS 2003). However, inbreeding depression recently has been detected within a relatively large population, adversely reducing rates of hatching and fledgling survival (Daniels and Walters 2000).

Population Stability

Viable RCW populations are robust and highly persistent, in contrast to a population vulnerable to future declines and extirpation. RCW population viability depends on a sufficient number of stable groups to avoid adverse effects of inbreeding, and impacts from stochastic genetic demographic, environmental, and catastrophic events (Shaffer 1981). Inbreeding depression is a consequence of breeding among closely related adults producing offspring with deleterious homozygous recessive alleles that reduce fitness. Genetic drift is the loss of alleles and genetic diversity by the fluctuation of gene frequencies from random mating events. Demographic stochasticity is the random or chance variation in survival and reproductive rates. Environmental stochasticity is variation in vital demographic rates and processes in response to annual, seasonal, or other changing environmental events such as rainfall, temperature, predation, food resources, and other factors. Catastrophes are naturally occurring but infrequent events such as hurricanes, tornadoes, and large-scale pine beetle outbreaks that affect mortality, reproduction, or other features of RCW population dynamics at a greater magnitude over a shorter period. All of these factors operate simultaneously to affect RCW population dynamics and viability. Small populations are particularly more sensitive to exacerbating effects of these stochastic factors (Shaffer 1981; Soule 1987, Clark and Seebeck 1990), which can drive local extirpation or extinction (Gilpin and Soule 1986).

Population viability analysis (PVA) is a quantitative assessment of the future status of populations based on the factors affecting population growth, decline, persistence, and extirpation (Morris and Doak 2002). Common PVA approaches modeling population growth and decline as a demographic and environmental function of rates of reproductive and survival of offspring and breeding adults do not adequately represent the RCW cooperative breeding system and group dynamics. Mortality rates vary among breeding males and females, juveniles, male helpers, male and female floaters. Furthermore, group size and breeder age affects productivity, and surviving helper males, floater males, juvenile males, and juvenile females have different life stage transition probabilities of becoming breeders.

Heppel et al. (1994) used a stage-based deterministic model, without stochastic effects, of males (without females) to evaluate some of these dynamics. However, they recognized that a spatially explicit, individual-based population model (SEPM) was needed to accurately simulate the dynamics of helper males filling breeding vacancies in or near their group territory, as well as the effects of juvenile and adult male and female dispersal to other territories. SEPMs simulate the movement and fate of each individual in a population depending on its status. SEPMs are currently the best available and most accurate models simulating RCW population dynamics and viability (e.g., Letcher et al. 1998; Daniels et al. 2000; Walters et al. 2002b).

RCW SEPMs have revealed significant effects of spatial structure and distribution of groups on viability. This reflects the relatively short dispersal distances of male juveniles and helpers (2 miles); and females (3.7 miles) to inherit breeding vacancies in nearby territories (Walters 1988, Daniels 1997, Walters et al. 2008). Thus, groups located at greater distances and at lower densities are much less likely to sustain breeding pairs, becoming demographically isolated and more vulnerable to local extirpation.

The performance of the RCW SEPM described in the following sections has been compared by model predictions relative to actual data sets from two populations (Schiegg et al. 2005). Predictions for most parameters were highly accurate, although the model is sensitive to female and male search range and dispersal behavior (e.g. Letcher et al. 1998), where it tends to overestimate dispersal success. The model assumes no habitat limitations or effects on any of the parameters.

Demographic Stochasticity

With the added effects of demographic stochasticity, Letcher et al. (1998) found that small populations with 49 highly aggregated groups are stable over 100 years, and smaller populations of 25 highly aggregated groups were highly persistent for about 60 years. Highly aggregated groups share common territorial boundaries. Even smaller, highly aggregated populations of 20 and 10 groups have good persistence for 20 years, although population growth rates are less than 1.0 and slowly declining (Crowder et al. 1998). Highly aggregated populations of 49 groups are more stable than minimally aggregated populations of 169 or 250 groups. Populations with less than 100 groups that are not highly aggregated decline and are not viable. Regardless of the aggregation or clumping of the modeled populations in their study (Letcher et al. 1998), populations of 500 groups were viable. Also, moderately aggregated groups of 250 were stable.

The density of populations with 49, 100, and 169 groups modeled on the simulated landscape (189,776 acres) at different aggregations by Letcher et al. (1998) represented the density of known populations, respectively, from Croatan National Forest (1 group per 3,873 acres), Marine Corp Camp Lejeune (1 group per 1,898 acres), and the North Carolina Sandhills (1 group per 1,123 acres) landscapes. Species with populations of 50 or more individuals generally are not vulnerable to declining and extirpation by demographic stochasticity (Meffe and Carroll 1994). However, spatial structure strongly affects viability of RCW populations with fewer than 50 groups under stochastic demographic fluctuations. The strong persistence of highly aggregated RCW populations with less than 50 groups reflects the demographic effect of a nonbreeding class (helpers) of individuals. Variation in breeder mortality is dampened by helpers that replace breeders. Fluctuating periods of greater breeder mortality tends to reduce the size of the helper class instead of reducing the number of breeding groups (Walters et al. 2002).

Environmental Stochasticity

RCW environmental stochasticity is represented by the variation in demographic rates and group make-up among years. The RCW SEPM with demographic and environmental stochasticity (Walters et al. 2002) used the same simulated landscape (189,776 acres) as Letcher et al. (1998), although only populations of 25, 49, 100, 250, and 500 groups were modeled at minimally (random) aggregated and moderately aggregated densities. Moderately aggregated groups reflected the level of aggregation Walters et al. (2002) considered as likely representative of most current RCW populations. Two higher levels of density were investigated, while controlling for the effects population size.

Overall, Walters et al. (2002) concluded that RCW population persistence and viability in response to demographic and environmental stochasticity was similar to that of comparable populations affected only by demographic stochasticity. The added effects of environmental stochasticity were relatively small compared to viability analysis of other species. Once again, the nonbreeding class of helpers in the RCW cooperative breeding system had a buffering effect on breeder mortality and loss of breeding groups.

RCW populations of 250 and 500 groups were stable and viable at moderately aggregated and random patterns of group clumping. Populations of 100 groups are viable only at the highest levels of aggregation. Populations of 25 and 49 groups persisted longer at the highest aggregation and densities, but none were long-term viable and the probability of extinction (no surviving territories after 100 years) ranged from 0.15 to 1.0.

Inbreeding

Daniels et al. (2000) used a RCW SEPM to assess potential inbreeding effects with demographic and environmental stochasticity to viability in small populations of 25, 49 and 100 groups with a moderate level of group aggregation. In earlier studies, Daniels and Walters (2000) documented actual effects of inbreeding depression in RCWs to reduced egg hatching success and fledgling survival. However, the SEPM to assess potential inbreeding effects did not directly incorporate reductions in RCW fitness to demographic variables. Instead, Daniels et al. (2000) computed coefficients of kinship for each breeding pair (inbreeding coefficient of offspring) and mean kinship of RCW pairs to identify pairs that were unrelated, moderately related, and closely related. Kinship by pedigree analysis was compared to inbreeding estimates from population genetics models.

Daniels et al. (2000) found that inbreeding depression is a serious viability threat to small, isolated, and declining RCW populations. RCW populations of 25 and 49 groups declined, as in other RCW SEPMs. The stable population of 100 groups was only marginally persistent over their 50-year simulation period, and may not have been stable if simulated for a 100-year period. The mean percentage of closely related breeding pairs increased for all populations. Closely related breeding pairs were most prevalent in populations of 25 and 49 groups, which were at risk of extremely high inbreeding. However, two or more immigrants to these populations per year could stabilize a declining trend and reduce significantly the number of closely related breeding pairs.

Catastrophes

Hurricanes, tornadoes, and southern pine beetles are the primary catastrophic events affecting RCW population stability. These events damage or destroy habitat, reducing the number of breeding groups by the loss of cavity trees and foraging habitat.

Hurricanes are the greatest catastrophic threat, as indicated by their frequency, widespread distribution, intensity, and effects (Hooper and McAdie 1995). Hurricane Hugo, a category IV storm, destroyed about 87 percent of RCW cavity trees in the Francis Marion National Forest, reducing the estimated pre-storm population of 477 active clusters to 277 clusters with at least one remaining cavity tree (Hooper et al. 1997; Watson et al. 1997). The Francis Marion population, at that time, was one of the largest. Populations half the size could have been extirpated. Coastal populations, particularly small populations, are highly vulnerable while the most inland populations are at least risk. RCW populations in the Croatan National Forest (SC), Francis Marion National Forest (SC), Apalachicola National Forest (FL), DeSoto National Forest (MS), Eglin Air Force Base (FL), and Conecuh National Forest (AL) and nearby regions are the most vulnerable based on hurricane return periods and intensity (Hooper and McAdie 1995).

Southern pine beetle epidemics adversely affect loblolly pine much more than longleaf, which have greater resin production and resistance to attack. The loss of off-site planted loblolly pine, which was planted in much of the historic longleaf pine range, as well as loblolly in its natural habitat, can be locally significant. More than 50 RCW groups lost all loblolly cavity trees in the Sam Houston National Forest in the 1980s, where more than 300 cavity trees were killed by beetles between 1982 and 1984 (Conner et al. 2001). Loss of cavity trees in small populations with limited cavity trees can be locally severe, leading to a reduction in breeding groups and potentially threatening local extirpation in small populations.

Status and Distribution

Reasons for listing

The RCW was one of the first listed species, added as endangered in 1970 in accord with the 1969 Endangered Species Conservation Act. The factors or reasons for listing were not included in that proposed list (35 FR 16047-16048) of over 90 fish and wildlife species. In 1971, the first RCW symposium described information on status, threats, and reasons for decline (Thompson 1971). These factors included loss of forest habitat by commercial forest management practices, with cutting cavity trees, loss of mature pine by short rotation forest silviculture, a reduction in historic range and abundance, and agriculture and urbanization.

The precipitous decline of RCWs was caused by an almost complete loss of habitat. Prior to European settlement, the number of RCW groups inhabiting longleaf pine forests and all southern pine forests has been estimated at 920,000 (USACE 2008) and 1.5 million (USFS, D. Conner et al., 2001), respectively. Fire-maintained old growth pine savannahs and woodlands that once dominated the Southeast (92 million acres pre-European settlement; Frost 1993), on which the RCWs depend, no longer exist except in a few small patches (less than 3.0 million

acres today; Frost 1993). Longleaf pine ecosystems, of primary importance to RCWs, are now among the most endangered systems on earth (Simberloff 1993; Ware et al. 1993).

Loss of the original pine ecosystems was primarily due to intense logging for lumber and agriculture. Logging was especially intense at the turn of the century (Frost 1993). Two additional factors resulting in the loss of the original pine systems in the 1800's and earlier were exploitation for pine resins and grazing of free-ranging hogs (Wahlenburg 1946, Frost 1993). Later in the 1900's, fire suppression and detrimental silvicultural practices had major impacts on primary ecosystem remnants, second growth forests, and consequently on the status of RCWs (Frost 1993, Ware et al. 1993, Ligon et al. 1986, 1991, Landers et al. 1995). Additionally, longleaf pine suffered a widespread failure to reproduce following initial cutting, at first because of hogs and later because of fire suppression (Wahlenburg 1946, Ware et al. 1993).

Threats

Primary threats to species viability for RCWs all have the same basic cause: lack of suitable habitat in a fire-maintained ecosystem. On public and private lands, the quantity and quality of RCW habitat are impacted by past and current fire suppression and detrimental silvicultural practices (Ligon et al. 1986, 1991, Baker 1995, Cely and Ferral 1995, Masters et al. 1995, Conner et al. 2001). Serious threats stemming from this lack of suitable habitat include: (1) insufficient numbers of cavities and continuing net loss of cavity trees (Costa and Escano 1989, James 1995, Hardesty et al. 1995), (2) habitat fragmentation and its effects on genetic variation, dispersal and demography (Conner and Rudolph 1991), (3) lack of good quality foraging habitat (Walters et al. 2000, James et al. 2001), and (4) fundamental risks of extinction inherent to critically small populations from random demographic, environmental, genetic, and catastrophic events (Shaffer 1981, 1987).

RCWs and population size are significantly limited by the availability of cavity trees and suitable, stable clusters. The natural growing season fire regime has been lost due to fire suppression and landscape alterations that have altered the availability of lightning-flammable fine plant litter fuels. In the absence of prescribed fire, fire intolerant hardwoods survive and grow to midstory or higher levels in the forest canopy. RCWs, being sensitive to midstory hardwood encroachment, will abandon their cavities and clusters due to hardwood encroachment (Conner and O'Halloran 1987; Costa and Escano 1989).

Recovery Criteria

Recovery criteria in the 2003 Recovery Plan have been formulated on the basis of 11 recovery units delineated according to ecoregions. Populations required for recovery are distributed among recovery units to ensure the representation of broad geographic, ecologic, and genetic variation in the species. The wide geographic distribution reduces the threat of catastrophic habitat destruction and population loss by hurricanes. The distribution of populations and recovery units also will facilitate periodic RCW immigration and emigration among populations, which will be required to offset or reduce the loss of potential adaptive genetic variation within populations by drift.

Population sizes identified in recovery criteria are measured as the number of potential breeding groups (PBG). A PBG is an adult female and adult male that occupy the same cluster, with or without one or more helpers, whether or not they attempt to nest or successfully fledge young. A traditional measure of population size has been number of active clusters. Potential breeding groups is a better measure of population status, because this is the basis of population dynamics in this species and number of active clusters can include varying proportions of solitary males and captured clusters. Estimates of all three parameters—number of active clusters, proportion of solitary males, and proportion of captured clusters—are required to support estimates of PBGs.

To assist in the transition between these two measures, a range of numbers of active clusters considered the equivalents of the required number of PBGs is provided. Estimated number of active clusters is likely to be at least 1.1 times the number of PBGs, but it is unlikely to be more than 1.4 times this number. Thus, an estimated 400 to 500 active clusters will be necessary to contain 350 PBGs, depending on the proportions of solitary males and captured clusters and also on the estimated error of the sampling scheme.

Each recovery unit consists of various designated primary core, secondary core, and essential support populations. Most populations reside on Federal lands where the largest remaining populations tend to occur and the largest land base and resources for management are available. All or parts of each recovery population are on designated Federal, State, or private properties for management.

The 13 primary core populations consist of at least 350 PBGs, the 10 secondary core populations each have at least 250 PBGs, and the 16 essential support populations each have from 15 to 100 PBGs. As the largest populations, the primary core populations will be robust and viable against the threats of extirpation by demographic stochasticity, environmental stochasticity, and inbreeding depression. They are more likely to sustain genetic diversity and avoid adverse losses by genetic drift than smaller secondary core and essential support populations. Secondary core populations are of sufficient size to avoid inbreeding depression and are robust against demographic and environmental stochasticity. Essential support populations, the smallest, will remain potentially vulnerable to inbreeding and demographic and environmental stochasticity. The extent of this risk will depend on the density and aggregation and PBGs in each support population. Essential support populations will require more intensive long-term management, including RCW translocations.

Downlisting to threatened status will be considered when each of the following six criteria has been attained. Four of these six criteria have been fully attained.

> **Criterion 1**. There is one stable or increasing population of 350 potential breeding groups (400 to 500 active clusters) in the Central Florida Panhandle.
>
> This criterion has been met. The Apalachicola Ranger District, one of the five properties comprising the Central Florida Panhandle Primary Core population, harbors more than

350 PBGs.

Criterion 2. There is at least one stable or increasing population containing at least 250 potential breeding groups (275 to 350 active clusters) in each of the following recovery units: Sandhills, Mid-Atlantic Coastal Plain, South Atlantic Coastal Plain, West Gulf Coastal Plain, Upper West Gulf Coastal Plain, and Upper East Gulf Coastal Plain.

The criteria have been attained at three (Sandhills, Mid-Atlantic Coastal Plain, and South Atlantic Coastal Plain) of the six recovery units required to have a population with 250 PBGs.

Criterion 3. There is at least one stable or increasing population containing at least 100 potential breeding groups (110 to 140 active clusters) in each of the following recovery units: Mid-Atlantic Coastal Plain, Sandhills, South Atlantic Coastal Plain, and East Gulf Coastal Plain. Note that these populations would be different from those required in Criterion 2 above.

This criterion has been met. Each of the listed recovery units contains at least one population (different from the populations listed under Criterion 2 above) that harbors at least 100 PBGs.

Criterion 4. There is at least one stable or increasing population containing at least 70 potential breeding groups (75 to 100 active clusters) in each of four recovery units, Cumberlands/Ridge and Valley, Ouachita Mountains, Piedmont, and Sandhills. In addition, the Northeast North Carolina/Southeast Virginia Essential Support Population is stable or increasing and contains at least 70 potential breeding groups (75 to 100 active clusters).

Only the Sandhills recovery unit contains a population harboring at least 70 PBGs, in the North Carolina Sandhills West Essential Support population, that would not be needed to satisfy either Criterion 2 or 3. Continued population growth is required to fulfill this criterion in the three other populations in other recovery units.

Criterion 5. There are at least four populations each containing at least 40 potential breeding groups (45 to 60 active clusters) on State and/or Federal lands in the South/Central Florida Recovery Unit.

This criterion has been fulfilled.

Criterion 6. There are habitat management plans in place in each of the above populations identifying management actions sufficient to increase the populations to recovery levels, with special emphasis on frequent prescribed burning during the growing season.

Although Criterion 6 is referring to the need for populations to have such plans when they achieve their size goals, the majority of the populations required for delisting already have

management plans that address habitat management (e.g., prescribed burning) and population monitoring. These plans are generally updated at 5-year intervals. The plans take the form of Integrated Natural Resource Management Plans (military), Land and Resource Management Plans (U.S. Forest Service), Comprehensive Conservation Plans (national wildlife refuges), and property-specific State wildlife management area and forest land plans.

According the Service's RCW Recovery Coordinator, all downlisting criteria could be fulfilled by 2030 if populations required for incomplete criteria continue to grow in the future at rates observed during the past 10 years.

Range-wide Trends

The decline of the RCW from the time of European settlement through the 1980s has been well documented and is directly related to loss and degradation of its old growth pine habitat (Figure 5). However, this range-wide decline has been halted and reversed. In the 1990's and through today, in response to intensive management based on a new understanding of population dynamics and new management tools, e.g., artificial cavities (Copeyon 1990; Allen 1991) and translocation (Costa and DeLotelle 2006), most public land populations and those private land populations in partnerships with the Service were stabilized and many showed increases.

Species-wide, the population trend of the RCW is increasing in response to management of recovery populations as well as private landowner management programs under Safe Harbor Agreements. In 1993/1994, the range-wide population was estimated at 4,694 active clusters, in 2006 it was 6,105, and as of 2013 at least7000 active clusters. The range-wide Safe Harbor program as of 2013 consisted of 402 enrolled landowners managing about 2.5 million acres of habitat with 855 active clusters. For designated recovery populations, mostly on federal lands, average annual population growth rates were positive for 37 (95 percent) of the 39 designated recovery populations during the most recent 5-year growth period (2007-2012) for which data is available. Overall, designated recovery populations increased from 4799 to 5864 active clusters during the 2007 – 20012 5-year growth period, at an overall average annual geometric rate of 0.041 ($r = 0.041$, 4.1 percent). Of the 39 designated populations for recovery, the recovery population size objective has been attained at four of 13 primary core populations and seven of the 16 essential support populations. Although designated recovery populations are increasing, large recovery populations remain rare with only 6 (15 percent) greater than 250 active clusters.

Table 2. Population size (active clusters) by size-class in 2013 for 39 designated recovery populations.

Active Clusters	Populations	Percent	Cumulative Percent
1 – 15	3	8	8
16 – 30	3	8	15
31 – 50	5	13	28
51 – 100	11	28	56
101 – 250	11	28	84
251 – 350	0	0	84
351+	6	15	100

Status of species within southeast Arkansas

Immediately surrounding the action area, RCWs occur on The Nature Conservancy (TNC) lands in Arkansas and Louisiana, Felsenthal NWR in Arkansas, D'Arbonne NWR in Louisiana, and Warren Prairie Natural Area owned by Arkansas Natural Heritage Commission.

The RCW populations found in the coastal plain of southern Arkansas and northern Louisiana are small and fragmented. There are seven separate populations involving 77 groups (Table 1).

Table 3. RCW Populations in and Adjacent to Potlatch lands (August 2013)

Number of Groups and Ownership							
Potlatch	Felsenthal NWR	Felsenthal West – TNC	Warren Prairie NA ANHC	D'Arbonne and Upper Ouachita NWR	Molpus Timberlands	Deltic Timber Company	Total
19	13	23	7	5	2	8 - 10	77 (79)

Warren Prairie Natural Area

Warren Prairie Natural Area (WPNA) consists of 4,615 acres of a mix of pine and oak flatwoods, saline barrens, and bottomland hardwood. In 2011, Arkansas Natural Heritage Commission released five pair of RCWs in WPNA. In 2012, four more pairs and one single bird were translocated to WPNA. WPNA now supports six PBGs and one SBG. In 2013 three PBGs successfully fledged young. WPNA is approximately 30 miles from Potlatch's CA.

Felsenthal NWR

Potential RCW habitat at Felsenthal NWR consists of approximately 7,500 acres of upland loblolly pine, mostly westof the Ouachita River. About 44 percent of Felsenthal NWR land base consists of 40-acre stands, harvested prior to the establishment of the refuge, which are now between 17 and 24 years of age. The loblolly pine uplands were not harvested at the time of the Federal acquisition and now contain stands from 70 to 80 years of age. Thirteen active clusters occur at Felsenthal NWR, mostly aggregated on the upland terrace south of U.S. Highway 82. The composition of the groups is currently unknown. The Service manages those groups according to the recovery guidelines for Federal landowners (Service 2003). Territories on the refuge meet or exceed habitat stocking guidelines. Prescribed fire is used on 3-year cycles, on average, to control hardwood encroachment. The management goal for the Felsenthal NWR, under the Service's RCW Strategy and Guidelines for Refuges (Richardson *et al.* 1998), is to increase the population to 34 groups, establishing a "short-term" viable (hundreds of years) population with continued management.

D'Arbonne NWR and Upper Ouachita NWR

Within the 17,400-acre D'Arbonne NWR, there are approximately 2,500 acres of pine (mostly loblolly and some shortleaf) and upland hardwood, found mostly in the southern part of the refuge. Currently, four RCW groups occur in the southeastern part of the. These groups include two PBGs and two SBGs. Upper Ouachita NWR has one PBG. In the past, there have been as many as five PBGs within the refuge. The Service manages the existing RCW groups according to the recovery guidelines for Federal landowners, as described in the RCW Recovery Plan (Service 2003). The management goal for both refuges follows the Service's RCW Strategy and Guidelines for Refuges (Richardson et al. 1998) is to increase the population to five groups. This population would be managed as a support population.

The Nature Conservancy – Felsenthal West

Plum Creek sold their conservation area in Arkansas to the Nature Conservancy in 2011. This area is adjacent to Felsenthal NWR, and the birds in Felsenthal West and Felsenthal NWR are considered one population. TNC's management goal for the parcel is to increase the RCW population before transferring the entire tract to the Service. Habitat improvement work, such as burning and mid-story hardwood control, is underway. In 2013, Felsenthal West had 23 active groups, 21 PBG and two SBGs.

Analysis of the species/ critical habitat likely to be affected

RCWs are the only Federally protected species known to occur within the action area. Issuance of the ITP would affect RCWs both adversely (through permitting of habitat clearing) and beneficially (through the creation of a CA and subsequent consolidation of isolated groups). Therefore, both beneficial and adverse effects to RCWs will be considered further in this opinion.

ENVIRONMENTAL BASELINE

The environmental baseline is predicated upon an analysis of the accumulated effects of past and recent or ongoing human-induced and natural factors that have led to the current status of the affected listed species and their habitat. The environmental baseline incorporates: 1) past and present effects of all federal, state, or private actions or other human activities affecting the species; 2) anticipated effects to the affected species from all proposed federal projects that have already undergone formal or early section 7 consultations; and 3) effects of non-federal actions contemporaneous with the consultation process.

Status of the species within the action area

Within the action area there are 19 RCW groups, 14 PBGs and 5 SBGs. The action area (covered lands) is approximately 419,278 acres of land owned by Potlatch in Ashley, Calhoun, Clark, Cleveland, Drew, Grant, Hempstead, Jefferson, Lincoln, and Nevada Counties, Arkansas. RCW groups on the covered lands do not represent portions of a larger population that exists outside the affected environment, based on the population delineation criteria of the U.S. Forest Service (1995).

In 1976 there were 23 groups on Potlatch fee lands. At that time, the recovery plan had not been published, nor were there any private landowner guidelines for management. Shortly thereafter, cavity trees were marked with bands and protected from harvest. Clusters were defined as cavity trees plus a 3-chain buffer, and they began efforts to control midstory encroachment. Most Potlatch clusters are on rich, moist loblolly pine sites, where midstory encroachment by hardwoods and pine regeneration can be a chronic problem.

Potlatch has managed its pine stands using even-aged and all-aged systems. Pine stands associated with RCWs are managed under an all-aged system. The all-aged system is a selective harvesting which generally involves harvesting growth, or a fraction thereof, by removing poorer growing single trees or groups of trees in all size classes on a periodic basis. The goal is to maintain a stand with a reverse J-shaped diameter distribution that can sustain periodic cuts indefinitely. Continuous stand improvement is favored with this system by harvesting the poorest and the most mature stems. The remaining stems with greatest potential for improvement in size and quality are left to grow. Selection management allows for a gradual buildup of understocked stands, accelerated increment on the best trees, and a gradual increase in the proportion of each acre that is growing large, high value timber. Danger of severe damage from wildfire or insect attack is generally small because logging slash is of low volume and well scattered, and because there are seldom large areas of young, even-aged trees.

Per the original Potlatch HCP, forty-four (44) active and inactive clusters were present on Potlatch lands in 1995. It is unlikely the population increased from 23 clusters in 1976 to 44 in 1995. These additional clusters are probably the product of additional survey effort. As of November 1, 2010, 17 PBG and 4 SBG were on Potlatch lands. There is no single reason for the decline from 44 clusters to the current 21. Demographic isolation, habitat degradation resulting from fire exclusion and midstory encroachment and cavity kleptoparasites are likely factors contributing to population declines. A likely critical factor for decline was the small, fragmented RCW population that was vulnerable to local extirpation. In 2012, there were 19 active clusters in Bradley and Calhoun counties. Four of the 19 clusters had single birds. The RCW population found in the covered lands is small and fragmented.

Factors affecting species environment within the action area

The Service has identified two broad categories of factors that ultimately affect the status and distribution of RCW in the action area: demography and habitat deterioration. Small populations on private lands can be expected to continue to decrease largely due to demographic and/or geographic isolation, stochastic events acting on small populations, predation, and/or continuing habitat deterioration and loss of nesting and foraging habitat. Habitat loss and degradation are also threatening RCWs. Population simulations (using Crowder et al. 1998) indicate, in the absence of management, the RCW population on Potlatch lands will disappear within the next 10 years without active management and habitat enhancement. Without a new ITP, Potlatch will continue to comply with the ESA prohibitions against take.

EFFECTS OF THE ACTION

Factors to be Considered

The proposed action (i.e., duration of the issued ITP permit) will occur over the next 30 years. Some management actions (e.g., installation of artificial cavities, translocation, and midstory control in the CA) will have direct and immediate effects on RCWs in the CA. As previously evaluated, the methods to create new groups in the CA are scientifically and technically demonstrated procedures that would be fulfilled within the next 10 years. Other RCW groups (those isolated groups distributed across the covered lands) will be affected later. At that time, those RCWs may be directly affected by translocations and will be affected by loss of habitat which will be clear cut when appropriate mitigation credits have been established. Those stands will be regenerated and subsequently managed as pine plantations, and would no longer be available for re-occupation by RCWs. RCWs on the CA and adjacent NWRs will be affected by consolidation of RCWs into the CA, which would improve demographics for all populations in southeast Arkansas. Other actions (e.g., prescribed burning and establishment of recruitment clusters) will occur throughout the duration of the permit and will indirectly affect RCWs; those actions will promote the long-term development of RCW populations and habitat in the CA. Thinning and harvest within RCW foraging habitat will not occur in RCW clusters during the nesting season (except on existing roads). Prescribed burns would be conducted within the CA on a one to three year cycle. Finally, RCWs would be directly affected by stress as a result of monitoring, banding, trapping, and translocation activities. However, these disturbances are expected to be generally transitory and minor.

Analyses for Effects of the Action

The Service considered the beneficial effects of the applicant's minimization and mitigation plan. The Service also considered direct and indirect adverse effects on RCWs. The Service has determined there are no interrelated or interdependent actions apart from the action under consideration.

The effects of the proposed action involve four major activities: (1) the incidental take of five RCW groups and their habitat, not within the CA; (2) the creation and maintenance of a CA where 16 existing RCW groups would be sustained and 19 additional groups would be established through induction or translocation; (3) translocation of RCWs to create/augment new RCW groups in the CA, and subsequent monitoring of those groups; and (4) restoration, enhancement and maintenance of RCW habitat in the CA (management techniques used to achieve this include prescribed burning, selective cutting and herbicide use).

Direct effects associated with implementation of the proposed action's translocation/augmentation and recruitment program will include disturbance to adult, nestling, fledgling, and juvenile RCWs in conjunction with monitoring, banding, trapping, and translocation activities. Those effects will be minimized by requiring field consultants employed by Potlatch to be properly certified, permitted, and experienced to conduct those activities. Potlatch employees or consultants will possess a Service section 10(a)(1)(A) permit to inspect cavities, install artificial cavities, capture and band nestlings and adults, and translocate subadults

and adults. The Service requires minimum training requirements to qualify for these permits. Any death, injury or harassment to RCWs as an incidental consequence of these activities has been authorized by a programmatic intraService consultation and biological opinion on the issuance of these permits for these activities. The annual percentage of RCWs actually killed or injured is very small given the extensive number of permits for these activities being implemented for RCW recovery and management and the large number (1000+) birds handled annually. Typically less than 12 RCWs are injured or killed annually under the rangewide program annually. Given the scope of activities by Potlatch, virtually no RCWs are expected to be injured or killed, although it remains a possibility. Any such injury or death, however, will be offset by the beneficial management to sustain an enhanced and more persistent population within the CA, without causing any actual population-level decline. The impact of the incidental take of RCW groups is effectively minimized and mitigated by the establishment of new groups in the CA. In addition, prior to consolidating a RCW group into CA, Potlatch either will translocate into the CA all resident RCWs or give the Service 60-day notice to allow the Service or its agents to capture and remove the group to another property.

Within the CA, approximately 13,122 acres of habitat will be managed for RCWs. Compared to the current distribution of groups on Potlatch property, the CA will significantly reduce group fragmentation and isolation. By increasing the density of groups in the affected environment and managing the habitat so it will remain suitable, the HCP substantially increases the likelihood fledgling males and other birds in the cooperative RCW breeding system will functionally disperse to become breeders at other territories (Heppell *et al.* 1994, Walters 1991). The net direct and indirect effect of consolidating the Potlatch population in the CA will increase the density and aggregation of potential breeding groups relative to their current density and distribution. In response, the stability and persistence of the Potlatch population will increase in response to stochastic demographic and environmental factors (e.g. Letcher et al. 1998, Walters et al. 2002, Schiegg et al. 2005) without a net loss to the number of potential breeding groups

Unrelated juvenile and female birds to be translocated to the CA will be produced by the breeding pairs inside and outside the CA. The HCP describes appropriate measures to evaluate the population structure and composition of groups each year to assess the potential need of offspring to replace breeders within a population segment. Offspring will be designated as available for translocation when their removal from the population segment is not likely to create a local breeding vacancy and adversely affect persistence of related groups.

Management to restore and maintain RCW habitat in the conservation area is crucial to the success of the HCP. Cluster and foraging habitat will be designated and managed to sustain 16 groups in the CA, as well as to restore and create 19 recruitment territories where new groups will be established. The methods and criteria used to maintain and restore cluster and foraging habitat represent standard management procedures for this species, as basically described in the Service's manual for private lands. In some instances, Potlatch may use the herbicides for forest vegetation management in the CA when prescribed fire is not effective. Habitat improvements, including establishment of recruitment clusters, hardwood midstory removal, and cavity insert installation, will be conducted by appropriate personnel and scheduled outside of the breeding season. Moreover, only manual operations using light equipment will be approved for habitat

improvement work, in an effort to minimize soil compaction and injury to tree boles and root systems. Hardwood midstory removal will directly benefit foraging habitat within clusters in the CA.

The proposed action, authorizing the incidental take of up to five groups, will result in a consolidated and managed population of at least 16 groups in the CA; those groups will persist for a 30-year period. The direct, indirect, and cumulative impacts of such harvest of timber are not adverse due to the conservation and mitigation objectives of the HCP. The plan actually benefits the species by sustaining the population in this area of its range where, otherwise, it will become extirpated in the foreseeable future.

The Service also will to authorize take for any future RCW groups established by Potlatch within the CA above the baseline as an incidental consequence of forest management with timber harvests. This provides an incentive for Potlatch to restore habitat and establish additional RCW groups required for mitigation by natural group induction and/or translocation at CA recruitment clusters at rapid rate without fear that additional RCW groups may restrict future management. This also is an incentive to restore and increase the CA population to its maximum capacity. By increasing the population size at a maximum rate and to capacity, the CA population will be larger and more aggregated with greater persistence and resistence to demographic and environmental stochasticity. The HCP and the ITP provides measures for notification and for potential salvage of any RCWs in groups above the baseline to minimize effects of reducing above-baseline groups, should Potlatch voluntarily decide to execute incidental take authority for these above-baseline RCWs.

Species' Response to the Proposed Action

As described previously, the five RCW groups on the covered lands (outside of the CA) could cease to exist within 15 years under current management practices. Potlatch proposes to harvest the timber within those clusters after mitigating for the take of those groups. Mitigation will occur in the CA through induction of RCW group formation by active habitat management (including artificial cavity installation) and RCW translocations. RCWs not translocated from clusters before timber harvest will experience reduced fecundity and increased mortality associated with the removal of nesting and foraging habitat and are unlikely to survive over the long term.

Establishment of recruitment clusters in unoccupied, suitable nesting habitat adjacent to, but not within, existing RCW territories has been shown effective for enhancing demographic expansion of RCWs. In addition, the induction of new groups into 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). This is supported by demographic data collected in the project area. PBGs have increased substantially in the CA as a result of conservation measures implemented in 1999, while there has been a significant increase in inactive sites outside of the CA.

The proposed HCP is based on established procedures successfully used in numerous other instances to alleviate/eliminate the demographic and habitat conditions that, eventually, would

cause the extirpation of RCWs by the consolidation of groups from an area of fragmented habitat to a managed area. Therefore, RCW responses to the management actions proposed in the HCP are expected to be increased reproductive success, and stabilization or growth of existing RCW populations in the CA.

CUMULATIVE EFFECTS

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

Timber management practices on private lands adjacent to the action area are the most significant cumulative effect likely to involve RCWs. Those practices negatively affect RCWs through degradation of nesting and foraging habitat. Without periodic prescribed burning or other active habitat management methods, the hardwood midstory will continue to encroach upon RCW habitat. If unchecked, such encroachment could lead to isolation and possible abandonment of RCW clusters.

CONCLUSION

The proposed HCP contains affirmative conservation measures as outlined in the Project Description above. The main focus of the mitigation plan is to mitigate in a way that increases the persistence and viability of the local RCW population on Potlatch lands. The proposed mitigation would enhance overall RCW recovery efforts by maintaining support populations, promoting dispersal and genetic interchange among RCWs in the region, and providing a potential source of birds to use in other population augmentation efforts.

The HCP and authorizing ITP will cumulatively compensate for the potential harm and/or harassment of the five RCW groups outside of the CA. The extent of the compensation measures in the HCP is in accordance with the Service's issuance criteria for ITPs.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed ITP and the cumulative effects, it is the Service's biological opinion that the issuance of ITP, as proposed, is 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 regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by FWS 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 FWS 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 proposed Potlatch HCP and its associated documents clearly identify anticipated impacts to affected species likely to result from the proposed taking and the measures that are necessary and appropriate to minimize those impacts. All conservation measures described in the proposed HCP and any section 10(a)(1)(B) permit or permits issued with respect to the proposed HCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR §402.14(I). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Act to apply. If the permittee fails to adhere to these terms and conditions, the protective coverage of the section 10(a)(1)(B) permit and section 7(o)(2) may lapse. The amount or extent of incidental take anticipated under the proposed HCP, associated reporting requirements, and provisions for disposition of dead or injured animals are as described in the HCP and its accompanying section 10(a)(1)(B) permit.

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Take that is intended, including capturing adults and nestlings for monitoring and translocation, is not incidental and therefore requires an ESA section 10(a)(1)(A) permit. All other take, such as that associated with the disappearance of translocated birds or death of birds caught in restrictors or artificial cavities, is not intended, and therefore is classified as incidental take and covered by this assessment.

The Service anticipates five RCW groups could be taken as a result of this proposed action. The incidental take is expected to be in the form of harm through habitat destruction and harassment through translocation.

While Potlatch will make every effort to avoid accidentally destroying an active RCW cavity tree; the potential exists for an active unmarked cavity tree to be cut during normal timber harvest or during prescribed burning activities. It is estimated that no more than three trees may be accidentally cut during the term of the HCP.

EFFECT OF THE TAKE

The Service determined that this level of anticipated take, consisting of five RCW groups, and three cavity trees is not likely to result in jeopardy to the species.

REASONABLE AND PRUDENT MEASURES/TERMS AND CONDITIONS

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. The Applicant's HCP described methods to mitigate impacts, to fund such methods, and to deal with unforeseen future circumstances. These actions represent reasonable and prudent measures the Service believes are necessary and appropriate to mitigate impacts. The Service believes those reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of RCW. Measures as described in the HCP (and in the Project Description above) constitute non-discretionary, binding terms and terms conditions of the authorizing permit that the Applicant must implement for the exemptions to the section 9 prohibitions against take to apply.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Service must comply with the terms and conditions described in the proposed HCP, together with the terms and conditions described in any section 10(a)(1)(B) permit or permits issued with respect to the proposed HCP, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. The terms and conditions are non-discretionary.

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 no more than five groups of RCWs will be incidentally taken. 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.

CONSERVATION RECOMMENDATIONS

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

The proposed HCP contains non-discretionary conservation measures for RCWs. In addition, the Service should continue to pursue HCP opportunities with private landowners similar to the proposed HCP that can meet their landowner management objectives and enhance the recovery of RCWs.

REINITIATION NOTICE

This concludes formal consultation on this action as outlined in the HCP. As required by 50 CFR 402.16, reinitiation of formal consultation is required if: (1) the amount or extent of

incidental take of five groups of RCWs is exceeded; (2) more than three cavity trees are accidentally harmed during the life of the HCP; (3) new information reveals effects of the action that may impact listed species or critical habitat in a manner, or to an extent not considered in this biological opinion; (4) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion, or (5) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Please contact staff biologist Erin Leone at 501-513-4472 if you require additional information.

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