



United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

In Reply Refer To:
FWS/R4/ES

MAY 04 2005

Memorandum

To: John Hefner, ES Supervisor, FWS, Atlanta, GA
Dave Flemming, ES Supervisor, FWS, Atlanta, GA
Jay Slack, Field Supervisor, FWS, Vero Beach, FL
Dave Hankla, Field Supervisor, FWS, Jacksonville, FL
Gail Carmody, Field Supervisor, FWS, Panama City, FL
Sandy Tucker, Field Supervisor, FWS, Athens, GA
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Karen Mayne, Field Supervisor, FWS, Gloucester, VA
Thomas Cloud, Field Supervisor, FWS, Clear Lake, TX
Jerry Brabander, Field Supervisor, FWS, Tulsa, OK
Steve Parris, North Georgia Sub-Office, Fort Benning, GA
Strant Colwell, Coastal Georgia Sub-Office, Brunswick, GA
Jeff Reid, East Texas Sub-Office, Lufkin, TX

From: Assistant Regional Director, Ecological Services

Subject: Distribution of Memorandum

The attached memorandum, "Implementation Procedures for Use of Foraging Habitat Guidelines and Analysis of Project Impacts under the Red-cockaded Woodpecker (*Picoides borealis*) Recovery Plan: *Second Revision*", provides implementation guidance for use of the foraging habitat standards presented in the red-cockaded woodpecker recovery plan. The guidance has been through extensive regional office review and is now ready for wide distribution.

Please ensure that all of our private landowner partners (e.g., industrial forest landowners), Federal agencies (e.g., Forest Service, DOT, Army Corp of Engineers), National Wildlife Refuges, state cooperators, and any other constituents with populations of, or responsible for conservation/recovery of, red-cockaded woodpeckers are provided a copy of the guidance. You



are encouraged to either distribute the memo broadly immediately, or as you are contacted by constituents about their "next" RCW project.

Any questions you have regarding the application of the guidance should be directed to Ralph Costa, RCW Recovery Coordinator, at 864 656-2432. If you want an electronic copy, please request one from Ralph via e-mail at ralph_costa@fws.gov.

Attachment



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FISH AND WILDLIFE SERVICE

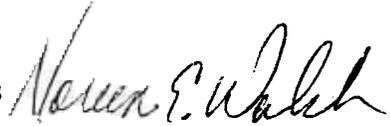
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From: Assistant Regional Director, Ecological Services 

Subject: Implementation Procedures for Use of Foraging Habitat Guidelines and Analysis of Project Impacts under the Red-cockaded Woodpecker (*Picoides borealis*) Recovery Plan: *Second Revision*

Introduction

The Fish and Wildlife Service approved the Red-cockaded Woodpecker (*Picoides borealis*) Recovery Plan: *Second Revision* (Plan) on January 27, 2003. The Plan provides two sets of foraging habitat guidelines: the recovery standard and the managed stability standard. The purposes of this memo are to: (1) explain how to implement the foraging habitat guidelines, and



(2) provide recommendations on preparation of biological assessments (BA), biological evaluations (BE), and biological opinions for projects involving activities in Red-cockaded Woodpecker (RCW) habitat.

Foraging Habitat Guidelines

Allocating Foraging Habitat

Foraging habitat is best allocated to specific clusters by following individual groups to ascertain which portions of forest stands they are using. Essentially, this process identifies the group's territory. Acquiring such data-intensive knowledge is generally far beyond the resources of managers and researchers, but may be required for some projects.

An alternative approach has been developed using geographic information systems (GIS), based on the recommendation within previous foraging guidelines (Fish and Wildlife Service 1985) that all foraging habitat be allocated within 0.5 miles of the center of the cluster. The technique consists of first creating 0.5 mile radius foraging circles around the center of each cluster, and then applying tabular data of stand characteristics to determine availability of foraging habitat within the newly created circular polygon. Where foraging circles overlap, the area of overlap is partitioned into equal sections and allocated accordingly. Technical resources are available to assist managers and researchers in partitioning the complex overlaps that are common in areas with high cluster densities (Lipscomb and Williams 1996, 1998). Complete and partitioned foraging circles are referred to as foraging partitions or, simply, partitions. Recent research has demonstrated that foraging partitions accurately portray the actual territories of RCW groups (Convery and Walters 2004).

Foraging Habitat Standards

The recovery standard (see pages 188-189 in Plan) defines "good quality foraging habitat" and is a description of the desired future condition of RCW foraging habitat, particularly on any properties (private, state or federal) involved in species recovery. Today, many RCW territories do not meet this standard. The recovery standard, when applied at both the foraging partition and population scale will provide the landscape considered necessary to achieve recovery within individual populations. The recovery standard is not used to evaluate the anticipated level of incidental take related to project impacts on foraging habitat.

The managed stability standard (see pages 292-294, Appendix 5 in the Plan) defines the minimum foraging habitat requirements considered necessary to avoid foraging habitat-related incidental take. That is, it identifies the quantity and quality of foraging habitat necessary for a group to survive and reproduce based on foraging habitat alone. Satisfying the managed stability standard does not account for potential adverse effects related to activities that may result in harassment, e.g., logging in a cluster during the nesting season. Wide-scale, i.e., population or property-level, implementation, or application, of the managed stability standard will not allow us to achieve recovery of the species because it will: (1) not ensure nesting habitat or good quality foraging habitat over the long term, (2) not, over the long term, prevent population

fragmentation with subsequent problems related to demographic stochasticity and perhaps genetic variability, and (3) based on (1) and (2) above, not support a population's long-term survival or ability to achieve recovery. Because our understanding of foraging habitat requirements is not yet sufficient to identify the specific level of foraging resources at which a population changes from stable to increasing, the various characteristics of the managed stability standard are based on existing minimum amounts of foraging resources of groups known to be surviving and reproducing over at least short time periods (DeLotelle et al. 1987, DeLotelle et al. 1995, Hooper and Lennartz 1995, Butler 2001, unpublished Service data).

Conducting Foraging Habitat Analyses

In the past, project-related impacts to RCW foraging habitat were assessed using the Guidelines for Preparation of Biological Assessments and Evaluations for the Red-cockaded Woodpecker (Henry 1989) (Bluebook) for federal lands and the Red-cockaded Woodpecker Procedures Manual for Private Lands (Costa 1992). With approval of the Plan, both sets of guidelines became obsolete and are no longer in use. Future foraging habitat analyses will be conducted using a computer based process called the Foraging Matrix (Matrix), which evaluates the overall quality of foraging stands and their associated partition.

Until the Matrix is completed, foraging habitat analyses will be conducted on a case-by-case basis in consultation with the Service's appropriate Field Office and the Red-cockaded Woodpecker Recovery Coordinator.

Each stand within a partition is evaluated as to its suitability using the Matrix. Stand-level characteristics assessed in the Matrix include basal area and number of pines of varying diameters, percent herbaceous ground cover, height and density of hardwood midstory, percent of canopy hardwoods, stand age, fire return interval, and season of last prescribed burn. Once all stands have been evaluated, totals are derived and the overall suitability and quality of the partition is determined. Partition level characteristics assessed in the Matrix include total acres of foraging habitat (good quality and managed stability), total acres of pine greater than 30 years old, and number of contiguous foraging acres.

The Matrix does not address project-related: (1) impacts to nesting habitat, (2) amount or results of fragmentation, (3) RCW harassment/disturbance, (4) impacts to RCW group demography, or (5) impacts to the RCW neighborhood (discussed below). These additional factors, and potentially others, would be suggested as appropriate for assessment during development of BAs and BEs to fully evaluate project-related impacts to RCW groups, neighborhoods, and populations (see below). The Service and other partners are currently finalizing the Matrix.

Use of Foraging Habitat Guidelines

Private Land

Although not required, the Service recommends managing to the recovery standard for those populations on private land that are: (1) involved in recovery, (2) being managed to increase

population size, or (3) participating in conservation partnerships with the Service, e.g., safe harbor. The managed stability standard should be used for instances in which a landowner cannot manage to the recovery standard. If a private landowner will meet the managed stability standard the Service will indicate that no incidental take will occur, based on the quantity and quality of foraging habitat remaining post-project. However, other project-related impacts, for instance disturbance in the cluster during the nesting season, may require an incidental take permit.

State Land

Although not required, the Service recommends that all state properties, particularly those involved in recovery criteria, manage under the recovery standard. Service Field Offices should work closely and cooperatively with state natural resource agencies as they prepare, or implement existing, statewide and property-specific RCW management plans. Currently, many such final and draft state plans already incorporate the recovery standard. Similar to private lands, the managed stability standard will be used to determine if any habitat-related incidental take is anticipated due to project impacts to foraging habitat.

Federal Land

Under section 7(a)(1) of the Endangered Species Act (Act), federal agencies have a responsibility (i.e., “federal agencies shall”) to use their authorities to carry out programs for the conservation of listed species. Therefore, federal land management agencies harboring RCWs should be managing their RCW populations using the recovery standard, although, on a project-by project basis, incidental take for specific RCW groups can be authorized through section 7(a)(2) consultation. Most federal agencies (and most state agencies) have prepared (or are/will be preparing) plans that incorporate guidelines for conservation of their RCW populations by managing at the recovery standard in Land and Resource Management Plans (in the case of U.S. Forest Service) (LRMPs), Integrated Natural Resource Management Plans (in the case of military installations) (INRMPs) and Comprehensive Conservation Plans (in the case of National Wildlife Refuges) (CCPs).

As previously noted, many RCW partitions currently do not meet the recovery standard. However, the majority of federal properties harboring RCWs have indicated they will manage their forests and RCW populations to achieve this standard. Nonetheless, in specific circumstances a federal project may be proposed that would result in habitat not meeting the recovery standard.

If a particular proposed project on federal lands will result in foraging habitat lower than that described by the managed stability standard, incidental take may occur. With few exceptions (e.g., effects are expected to be discountable or insignificant; also see below), BAs and BEs prepared for formal consultation under the Act, would be expected to make an “is likely to adversely affect” determination if, post-project, the foraging habitat remaining does not meet the managed stability standard. Based on this determination (and the action agencies’ request for formal consultation), the Service would conduct formal consultation and authorize incidental

take, as appropriate (assuming the anticipated loss of groups would not likely jeopardize the continued existence of the species; see below), for RCW groups not meeting the managed stability standard.

In very rare circumstances, and on a case-by-case basis with support of local demographic data (e.g., comparing mean group size and reproductive output of affected groups with population means), it may be appropriate for an action agency to make an "is not likely to adversely affect" determination for projects that reduce foraging habitat in partitions that: (1) currently do not meet the managed stability standard, or (2) are currently above but will go below the standard post-project. Populations or select geographic areas where this may be applicable, because birds have adapted to habitat conditions not meeting the managed stability standard, may include forests devastated by hurricanes, e.g., the Francis Marion National Forest, or habitats comprised of very low basal area and with smaller diameter trees, e.g., south central Florida. In these cases, further small, i.e., discountable or insignificant, reductions of foraging habitat may not result in loss of groups, given the local evidence that many groups, after multiple generations, have adapted to habitat below the managed stability standard. Because the Matrix can be adapted as needed to account for different foraging standards, conducting foraging habitat analyses in these populations or select geographic areas will follow the same procedures outlined earlier.

Based on the above two examples, and other scenarios that may exist, some projects should be assessed not only using the managed stability standard as a guide, but also local RCW population demographic data as it relates to the current landscape. Existing landscapes, because of catastrophic events, past land use history, or ecological reasons, may not, and may never, "meet" the managed stability standard. Therefore, making "is likely to adversely affect" determinations, based solely on the managed stability standard, may not always reflect the use of the best scientific information available.

Federal Projects on Private Lands Involving Federal Agencies with No RCW Land Based Recovery Responsibilities

When a federal nexus exists on private lands, e.g., an Army Corps of Engineers 404 permit is required or Federal Highway Administration funding is involved, but the federal agency has no land-based recovery responsibilities, the managed stability standard will be used to evaluate project-related impacts to determine if take, related to foraging habitat, is likely to occur.

Preparation of Biological Assessments, Evaluations, and Opinions

Introduction

Biological Assessment and BE documents are prepared by the action agency to help them determine if their actions would adversely impact federally listed species. The Service has recommended [see 50 Code of Federal Regulations {CFR}402.12(f)] that their contents include the following:

- (1) The results of an on-site inspection of the area affected by the action to determine if listed or proposed species are present or occur seasonally.
- (2) The views of recognized experts on the species at issue.
- (3) A review of the literature and other information.
- (4) An analysis of the effects of the action on the species and habitat, including consideration of cumulative effects, and the results of any related studies.
- (5) An analysis of alternate actions considered by the Federal agency for the proposed action.

However, since the Service cannot tell an action agency what must be included in their BA/BE, we indicate that the items in 50 CFR 402-14(c) are recommended to be included. These items are required for having a complete package for initiation of formal consultation and include the following:

- (1) A description of the action to be considered;
- (2) A description of the specific area that may be affected by the action;
- (3) A description of any listed species or critical habitat that may be affected by the action;
- (4) A description of the manner in which the action may affect any listed species or critical habitat and an analysis of any cumulative effects;
- (5) Relevant reports, including any environmental impact statement, environmental assessment, or biological assessment prepared; and
- (6) Any other relevant available information on the action, the affected listed species, or critical habitat.

Therefore, we need to refer to the initiation package when discussing the effects determination made by the action agency and when requesting information needed for determination of incidental take.

Background

Prior to release of the Plan, the Bluebook was used to guide the development of RCW BAs, BEs, and section 7 consultations. Bluebook analyses were primarily based on existing foraging habitat data from the first revision to the RCW recovery plan, approved in 1985. As such, Bluebook analyses only considered potential project-related impacts to RCW groups based on loss of nesting or foraging habitat. However, since 1985, we have gained a tremendous amount of additional knowledge about RCWs and habitat relationships; all of which is presented in the Plan. Therefore, this new information must now be used to assess the impacts of projects on RCWs.

Our new knowledge includes information on: (1) minimum foraging habitat requirements (i.e., the managed stability standard), (2) relationships between group fitness and population density, (3) relationships between the probability of persistence of populations and their size and configuration, i.e., groups sparsely vs. densely aggregated, (4) dispersal behavior, e.g., distances, outcomes, etc., (5) effects of fragmentation on dispersal, (6) sizes of populations necessary to

withstand the threats of demographic, genetic, and environmental threats, and (7) RCW group fitness as it relates to both quality (i.e., stand structure, including the understory plant community) and quantity of foraging habitat. This additional information should be used to conduct more thorough and comprehensive project-level analyses.

Process

Following are descriptions of parameters and concepts to be considered for each project analysis. The specific details of how each, and which, level of analysis is conducted are not provided in this memo because those details will vary by project and, therefore, must be considered on a case-by-case basis. Potentially, five levels of analysis are available for each project: (1) foraging partition, (2) group, (3) neighborhood, (4) population, and (5) recovery unit. The levels are analyzed in the order presented above. Depending on the results of the previous level, additional analyses may or may not be necessary. Each level is described and discussed below.

Foraging Partition Level Analysis

Partition analysis will involve using the Matrix, when completed, to determine what quantity and quality of foraging habitat exists pre-project and what will remain post-project. Essentially, this analysis identifies whether partitions affected by the project will meet the managed stability standard, recovery standard, or be somewhere in-between, post-project. On any ownership, if a partition will not meet the managed stability standard, a determination of "is likely to adversely affect" will normally be appropriate. If, as a result of this determination, incidental take is anticipated, a group-level analysis would also be appropriate.

Because recovery cannot be achieved managing partitions (at the population or property scale) at the managed stability standard, on federal populations it is necessary to determine if partitions will meet the recovery standard. Foraging habitat analysis will identify whether the partition: (1) currently meets the standard, (2) has the potential to meet the standard, e.g., has the quantity and potential quality, via habitat improvements, or (3) will never meet the standard, e.g., because due to population density the partition is, and will remain, below 120 acres. Having insufficient acreage to meet the standard should be a relatively uncommon occurrence, given that most federal property population goals were established at 200 acres of suitable (or potentially suitable) pine habitat per RCW group. However, in high quality habitat, some groups can be densely aggregated resulting in partitions having less than 120 acres.

As noted earlier, because recovery cannot be achieved managing partitions at the managed stability standard, we strongly encourage federal populations (and state and private populations involved in recovery) to reach, within the limitations of natural habitat, their designated recovery population size, by managing all partitions at the recovery standard. Therefore, it is critical that these property managers identify, and then track, the capability of all partitions to meet the recovery standard. This will ensure that a sufficient number of territories will be available to achieve their recovery population goal in the future. When such tracking identifies that the "next" project will impact (although the project may or may not result in incidental take of one or more groups) the ability of the population to reach its recovery population goal with all required

partitions retaining the ability to reach the recovery standard, the agency should consider changes in the overall RCW management strategy or population goal. In these cases, reevaluation of the property's programmatic management plan (e.g., LRMP, ESMP, or CCP) would be appropriate.

Group Level Analysis

Group level analysis involves examining a project's impact on the demographic health of a group. Demographic health is related, in part, to quality and quantity of foraging habitat. Recent research (see pages 50 - 53, 186 - 187, and Table 13 in Plan) has improved our understanding of relationships between RCW group fitness (e.g., reproductive success, group size, adult survival) and habitat quality. We know that the structure of foraging habitat is important to fitness and influences habitat selection. Red-cockaded woodpecker fitness and selection of habitat increases if foraging habitat is burned regularly, has an open character and herbaceous groundcovers, and contains large old pines. Additionally, as habitat quality increases, the amount of foraging habitat used, i.e., home range size decreases.

Various references are available, and should be used in preparation of BAs and BEs, that document the relationships between RCW fitness and habitat quality and quantity. They include: Engstrom and Sanders (1997), Hardesty et al. (1997), James et al. (1997, 2001), Walters et al. (2000, 2002), and various others (see Table 13 in Plan and bibliography at <http://rcwrecovery.fws.gov>). The recovery standard, by incorporating the above aspects of habitat quality, identifies what is necessary to: (1) sustain (over the long term) normal/average (at least under today's altered habitat conditions) group fitness, (2) support population growth, and (3) ultimately achieve recovery.

In addition to habitat quality and quantity, group demographic health is also related to configuration of suitable habitat, which influences degree of group isolation. Isolation affects group fitness, i.e., size and reproductive potential. Published literature on group demographic health as it relates to population density and size is not extensive. However, several references are available to help determine what density of groups is considered necessary to maintain demographic health, i.e., avoid isolation, of individual groups. To date, most studies have evaluated individual group fitness based on the number of groups within 1.2 miles of the target group. References covering this topic include: Conner and Rudolph (1991), Hooper and Lennartz (1995), Beyer et al. (1996), Crowder et al. (1998), and others (see bibliography at <http://rcwrecovery.fws.gov>). Additionally, population-specific density data and its relationship to group demographic health should be used for project analyses if it is available. If, post-project, affected groups will be isolated, a determination of "is likely to adversely affect" may be warranted. The basic question to be asked is, "Will the project result in a reduction in group density that will affect the size and reproduction of remaining groups?" If, as a result of an "is likely to adversely affect" determination, incidental take is anticipated, a neighborhood level analysis would normally be appropriate.

Group demography is also related to the ability of dispersing birds (mostly subadults) to locate potential breeding vacancies or acquire helper status. Successful dispersal is affected by habitat fragmentation. Therefore, projects that result in fragmentation may, depending on the scale

(size), location, and configuration of the impact, result in disruption of dispersal opportunities. Without sufficient numbers of dispersing birds to fill breeding vacancies or become helpers, group size and reproductive potential can be reduced. The effects of fragmentation on group and population health have been examined in several studies. References include: Conner and Rudolph (1991), Rudolph and Conner (1994), Ferral (1998), and others (see bibliography at <http://rcwrecovery.fws.gov>). Relevant literature and any available local data should be reviewed and used to assess potential project-related fragmentation impacts on group health.

The elimination of unoccupied (i.e., outside any partition), but suitable, pine habitat near an active RCW territory would not typically result in incidental take, unless that loss results in isolation of the group(s). Under most circumstances, loss of unoccupied habitat would warrant a “no effect” determination. However, an “is likely to adversely affect” determination may be warranted if such habitat loss could be demonstrated to have indirect effects on nearby groups. For example, because of the project-related fragmentation, the offspring produced by a breeding group would be hampered in their ability to successfully disperse and fill breeding vacancies in other nearby groups. Additionally, based on the anticipated amount of unoccupied habitat to be lost, the Service may request an opportunity to discuss the property’s programmatic plan (e.g., LRMP, ESMP, or CCP), to determine if the project may cause a potential change in the RCW population goal.

Neighborhood Level Analysis

If, based on partition or group level analyses, an “is likely to adversely affect” determination is made, a neighborhood analysis will typically be warranted (see page 197 in Plan). Basically, neighborhood groups are those groups not directly impacted by the project, but which occur adjacent to, or within the dispersal distance of, groups that are directly affected by the project. By adversely affecting quantity and quality of foraging habitat (landscape configuration), and thereby, the survival or stability of individual groups, e.g., by disruption of dispersal opportunities, projects may affect the health and distribution of RCW groups at a larger scale, the neighborhood. Neighborhood size can vary by project (see below).

Normally, if an action agency’s proposed project is at a scale that warrants a “not likely to adversely affect” determination for RCWs at the partition or group level, it is not likely to cause an effect at the neighborhood level unless loss of that habitat could be demonstrated to have indirect effects on the adjoining groups (e.g., the offspring produced by a breeding pair would be hampered in their ability to successfully disperse). Again, a larger scale impact could reduce a Federal agency’s ability to achieve their recovery goal. Under these circumstances, the Service would request an opportunity to discuss the property’s programmatic plan, i.e., their LRMP, INRMP, or CCP.

Habitat fragmentation can affect dispersal of individuals in adjacent and nearby groups, and the likelihood that breeding vacancies can be filled. Demographic viability of groups, neighborhoods, and populations (see below) is primarily dependent on the ability of group members to disperse. If dispersal opportunities are limited or inhibited by a project, even if adequate foraging habitat remains post-project for individual groups, the status, size, and

reproduction of neighborhood groups may be affected. Neighborhood analyses provide further information on whether the population may or may not be able to reach its population goal.

The potential for adverse neighborhood impacts increases: (1) with quantity of habitat lost, (2) in smaller versus larger populations, (3) as percent (per unit area) of fragmentation increases, and (4) as patches of non-foraging, forested habitat, e.g., regeneration harvests, or non-forested habitat, e.g., rights-of-way, become more non-linear in shape. The attributes used to assess impacts to RCW neighborhoods include neighborhood density and size, location and configuration of fragmentation, and potential impacts of fragmentation on dispersal opportunities. Published literature (Conner and Rudolph 1991, Rudolph and Conner 1994, Crowder et al. 1998, Ferral 1998, and others; see bibliography at <http://rcwrecovery.fws.gov>) and local, population-specific data, if available, should be used to assess whether project-related impacts on RCW neighborhoods is likely.

The size of the neighborhood to be evaluated for a project is determined on a project-by-project basis and is primarily a function of the project's overall scale and the forested habitat in the area. For example, clearing 1,000 acres of forest for a multi-purpose weapons range on a military installation would directly affect the clusters, if any, in the 1000-acre project footprint. Additionally, because of the potential to disrupt dispersal with such a large clearing and its subsequent military use, the indirect effect may involve a neighborhood containing dozens of other active clusters adjacent to the proposed range's edge. Additionally, numerous other RCW groups may be considered part of the neighborhood if they are, for example, within the population's mean RCW dispersal distance (e.g., 3 miles) of the proposed range's edge. In contrast, widening an existing road by 20 feet through a forest, while potentially reducing foraging habitat quantity in some clusters, may not trigger a neighborhood-level analysis.

Population Level Analysis

This analysis assesses whether the "is likely to adversely affect" determination (and associated anticipated loss of groups), based on the foraging partition, group, and/or neighborhood analyses, will potentially result in the population's inability to meet its recovery goal. If a federal landowner cannot meet its recovery goal based on project-related impacts, the Service would request an opportunity to discuss the property's programmatic plan (e.g., INRMP, LRMP, CCP, or ESMP) with the federal landowner to provide additional input and assistance to the agency in meeting their responsibilities under section 7(a)(1) of the Act. Additionally, if a federal recovery population cannot meet its recovery goal (see Table 8 in Plan), a recovery unit level analysis would typically be conducted (see below).

Calculating whether a population's recovery goal can be met sometime in the future, based on project-related impacts today, requires knowledge, or estimates, of the percent of: (1) inactive clusters, (2) solitary bird groups, and (3) captured clusters, at the time when the overall habitat-based population goal would likely be achieved. Values for these three parameters are subtracted from the population goal (measured in active clusters), along with the estimates of groups that are predicted to be lost due to project-related impacts, to determine if the required number of potential breeding groups can be achieved in the future. Alternatively, if managers do not have

population-specific demographic data, the Service will request that the agency manage a specific number of active RCW clusters to achieve their recovery goal (see page 140 in Plan).

Recovery Unit Level Analysis

Recovery units are geographic or otherwise identifiable subunits of the listed entity that individually are necessary to conserve genetic and demographic robustness, important life history stages, or some feature necessary for long-term sustainability of the overall listed entity. The recovery units established for RCWs are a surrogate for likely genetic variation and adaptation to local environments, because they are based on changing environmental conditions, i.e., they are geographic areas delineated according to ecoregions (physiographic provinces) (see pages 145 - 146 in Plan for additional details).

There are eleven designated recovery units for RCWs. All but two recovery units contain one or more core recovery populations and one or multiple support populations. The remaining two recovery units contain support populations only. Core populations are classified as primary or secondary based on available habitat and population size required for delisting. In addition to primary and secondary core populations, several support populations are considered essential to species recovery and as such are identified in delisting and downlisting criteria.

Maintaining viable populations within each recovery unit is essential to the survival and recovery of RCW as a species, across their range. Conservation of populations in all habitats, forest types, and ecoregions, represented within and by recovery units, is critical to species survival and recovery because these varied populations have crucial ecological and genetic values. The loss or reduction of the likelihood of survival and recovery of core and essential support populations within one or more of the designated recovery units could not only jeopardize the recovery goals for the individual recovery unit(s), but also jeopardize the recovery of the entire species (see pages 146 – 147 in Plan for additional details).

When the Service receives a request for formal consultation with an “is likely to adversely affect” determination, a biological opinion is prepared. In formulating a biological opinion using information provided in the request for formal consultation, it is necessary to determine if the effects upon the RCW are likely to jeopardize the continued existence of the species. To do this, consideration must be given to the number of groups that are likely to be lost (based on the partition, group, or neighborhood level analyses that were conducted) because of the proposed action. These anticipated losses were determined in the analyses and should be clear by reviewing the data provided in the initiation request. This loss must be evaluated in terms of the likely effect of that loss (i.e., the population level analysis) on the viability of the population involved in the consultation.

Jeopardy determinations are conducted at the recovery unit scale (see pages 147 - 149 in Plan). As previously noted, the loss or reduction of the likelihood of survival and recovery of core or essential support populations within a designated recovery unit could impact the recovery goals for the individual recovery unit(s). Therefore, for RCWs, actions that appreciably impair or preclude the capability of a recovery unit from providing the survival and recovery functions

identified for it in a recovery plan may represent jeopardy to the species. Such determinations are made on a project-by-project basis during formal consultation.

Via formal consultation, a determination would be made whether the amounts of anticipated incidental take for a project would appreciably reduce the likelihood of survival and recovery of a designated recovery population; that is, the population goal can no longer be achieved. The question to be asked is, "Will the loss appreciably reduce the likelihood of the recovery unit being able to meet its population goal?" The populations and properties that comprise each recovery unit, and their respective population goals, are displayed in Table 8 in the Plan. Recovery (goal and criteria) is defined on pages 140-145 in the Plan.

If, in the biological opinion, it is determined that the proposed action is not likely to jeopardize the continued existence of the species, the data provided with the request for initiation of formal consultation (or project analysis) can be used to determine the level of anticipated incidental take. Typically, the amount of incidental take anticipated will be equal to the number of groups anticipated to be lost based on the analyses conducted (e.g., partition, group, and/or neighborhood level analyses) in the review of data provided, plus any other groups that will be directly lost from partial or total loss of their nesting habitat or harassment. Typically, incidental take is expressed in the number of RCW groups anticipated to be lost, not in the number of birds, because group size fluctuates throughout the year based on fledglings produced, dispersal of subadults, acquisition of helpers, etc. If information is available on group status, e.g., a potential breeding group or a solitary male group, it should be used to further detail the incidental take.