

Resolute FP US Inc.
Central Appalachian Critical Biodiversity Area (CACBA)
Information for Wood Suppliers, Loggers, and Forest Landowners

Background

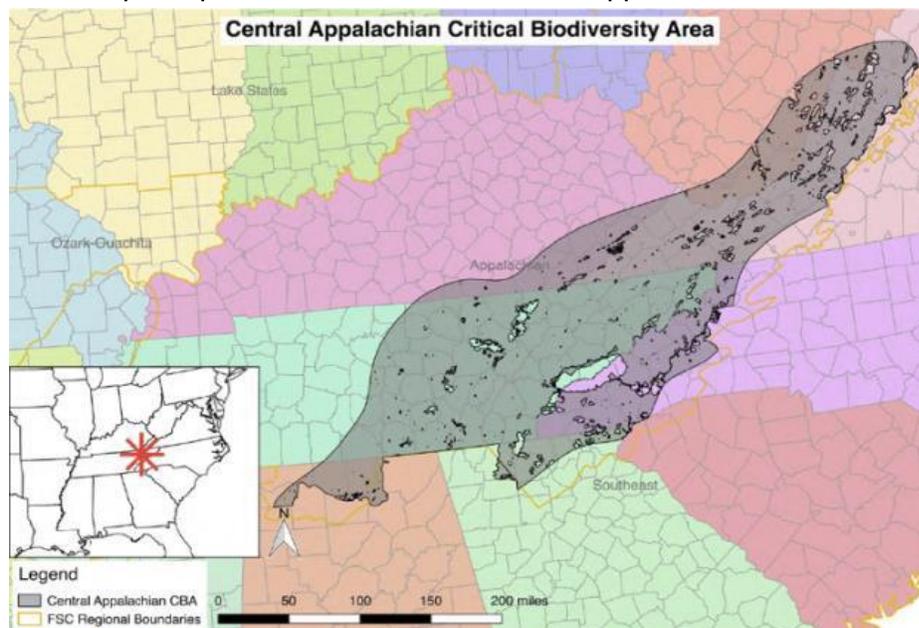
The Forest Stewardship Council® (FSC) National Risk Assessment for the Conterminous United States of America (FSC-NRA-USA V1-0) has identified the Central Appalachian Critical Biodiversity Area (CACBA) as an area of “specified risk” for certain High Conservation Values (HCVs). An HCV is a biological, ecological, social, or cultural value of outstanding significance or critical importance. The CACBA is considered an HCV because it contains a high overall species richness, diversity, or uniqueness within a defined area compared to other sites within the same biogeographic area.

Forest management and harvesting activities may continue to be conducted within the area of specified risk as long as certain items of concern are addressed. The purpose of this document is to provide information to wood suppliers, loggers, and forest landowners so that they can be informed of the values of concern, what the threats to them are, and information they may consider in order to mitigate or address the threats in implementation of their forest management or harvesting operations (**focus on info in red outline on reverse**).

Summary of the Central Appalachian CBA

This CBA corresponds with the higher elevation portions of World Wildlife Fund’s ‘Appalachian Mixed Mesophytic Forest’ area, one of their Global 200 biodiversity areas. The broadleaf forests and aquatic habitats drive the region’s biodiversity. The forests are significant in the diversity of different forest types that occur and within them the large number of different tree species that occur, along with incredibly diverse understories and associated wildlife species. The geologic history, change in elevation, and diverse topography and climate have resulted in a very large number of microhabitats within the region – each with a unique biodiversity. Additionally, the mountains served as a refuge for northern species during the last ice age, and due to the changes in elevation that reflect changes in the climates at different latitudes, the area can harbor a mix of both traditionally more northern and more southern species within the same broad geographic area. The area is particularly diverse in songbirds, salamanders, land snails, amphibians and herbaceous plants. It also represents one of two regions left in the world where relics of ancient mesic forest still exist. The region’s freshwater systems are together considered to be the richest temperate freshwater ecosystem in the world, representing the highest richness and endemism in mussels, fish, crayfish and other invertebrates for the entire world. The southern running riverine systems allowed many aquatic species to escape the glaciers of the last ice age and then re-establish afterward.

Map of Specified Risk Area for Central Appalachian CBA



Identified threats to the Central Appalachian CBA

<u>Mixed Mesophytic Forests</u>	<u>Aquatic Habitats</u>
<p>Historically, forest management activities threatened and had significant negative impacts on the Mixed Mesophytic Forests of this CBA and there are lasting impacts from these activities today.</p> <p>Currently, however, widespread threats from forest management activities are not identified. Instead, the priority threats to the forests as a whole include: climate change, pollution from mining, new highways and utility rights-of-way, ORV recreation, and overpopulation of deer.</p>	<p>In addition to threats associated with agriculture, development, and mining, the following threats were associated with forest management:</p> <p>Hydrologic alteration partially due to forestry practices and conversion from hardwood forests to non-native planted pine (which may include ditching as a practice in wetter areas), reduced water quality partially due to loss of near-stream forested habitat and sedimentation associated with forestry practices and lack of BMP implementation, and severe erosion of river banks.</p>

Information that may be considered for forest management activities in areas of specified risk

1. Be sure to implement state best management practices (BMPs) for forestry, particularly with regard to streamside management zones (SMZs) and stream crossings.
 - Be especially mindful to use wider SMZs along steeper slopes, i.e., use the width recommended in the BMP manual for the amount of slope.
 - Be especially mindful of areas along steep riverbanks or streambanks.
2. Avoid conversion of aquatic habitat areas, or associated SMZs, to non-native planted pine.
3. Ditching for silvicultural purposes to the extent that it results in significant hydrologic alteration of aquatic habitat is not a common practice in the CACBA (such ditching is, rather, most often practiced the lower Coastal Plain). Therefore, minor drainage used for road construction and/or drainage of excess surface water from non-aquatic habitat areas are not likely to be a threat, so long as BMPs are implemented.
 - Typically, BMPs for minor drainage recommend: (1) installing ditches to a depth, spacing, and number that is sufficient to remove excess surface water; (2) designing ditches in a way that minimizes ditch maintenance; (3) emptying ditches into areas where the runoff will be diffused and filtered by the forest floor before reaching a natural channel; (4) maintaining ditches only as frequently as necessary to keep the drainage system functioning; and, (5) ensuring that ditch spoil does not impede surface flows.

Sources of further information

- Published state BMP manuals for forestry can be found on the websites of state forestry agencies.
- Information about state programs for forestry BMPs can be found on the websites of:
 - The National Association of State Foresters, <https://www.stateforesters.org/bmps/>
 - The Southern Group of State Foresters, <https://www.southernforests.org/water>

Resolute wood suppliers should contact your Resolute forester for further evaluation if operating in an area you have questions about.

Note: Information from the “Summary of the CACBA” and “Identified Threats to the CACBA” sections, and the map of the CACBA, were taken from a document published by FSC-US in preparation for regional meetings held during the summer of 2018.

This document was developed by Resolute FP US Inc. and was **last updated 2019-10-30**. It is anticipated that updates to this document will be made as further information on the CACBA becomes available. Additional hard copies or PDF in electronic format may be obtained by sending an email request to kevin.gallagher@resolutefp.com.

Resolute FP US Inc.
Southern Appalachian Critical Biodiversity Area (SACBA)
Information for Wood Suppliers, Loggers, and Forest Landowners

Background

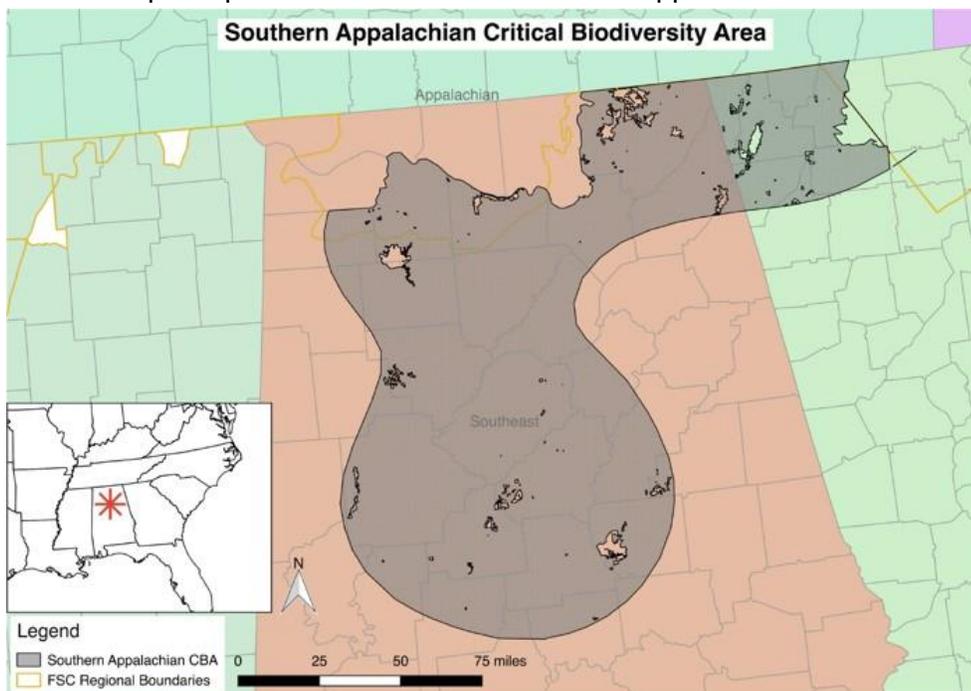
The Forest Stewardship Council® (FSC) National Risk Assessment for the Conterminous United States of America (FSC-NRA-USA V1-0) has identified the Southern Appalachian Critical Biodiversity Area (SACBA) as an area of “specified risk” for certain High Conservation Values (HCVs). An HCV is a biological, ecological, social, or cultural value of outstanding significance or critical importance. The SACBA is considered an HCV because it contains a high overall species richness, diversity, or uniqueness within a defined area compared to other sites within the same biogeographic area.

Forest management and harvesting activities may continue to be conducted within the area of specified risk as long as certain items of concern are addressed. The purpose of this document is to provide information to wood suppliers, loggers, and forest landowners so that they can be informed of the values of concern, what the threats to them are, and information they may consider in order to mitigate or address the threats in implementation of their forest management or harvesting operations (**focus on info in red outline on reverse**).

Summary of the Southern Appalachian CBA

Biodiversity values in the southern Appalachians include aquatic habitats, glades, and montane longleaf pine. Alabama is recognized as having the greatest number of freshwater species of mollusks and fish in the United States, and many of these species have very restricted distributions and specialized habitat requirements that make them highly vulnerable to extinction. The Cahaba River watershed is the center of the biodiversity hotspot, but the biodiversity area includes other smaller watercourses as well. Aquatic habitats driving this concentration of biodiversity include lakes, rivers, streams, bogs, swamps, ephemeral pools, fens, seeps, swamp forests, and wet meadows. Other drivers of biodiversity include glades and montane longleaf pine. Bibb County Glades (i.e. rock outcrops), exposed limestone glades, and sandstone glades in central Alabama have a high density of rare plants. These are open habitats that are dominated by upland herbaceous plant species. There is typically an absence of a tree canopy on glades, resulting in large amounts of sunlight and heat on the surface. Montane longleaf pine habitats occur in steep rolling topography historically maintained by fire, mostly outside of or on the edge of the Coastal Plain. Biodiversity values are driven in part by the understory plant community.

Map of Specified Risk Area for Southern Appalachian CBA



Identified threats to the Southern Appalachian CBA

<p><u>Aquatic Habitats</u> Numerous sources of information identify threats from forest management activities, particularly non-point source pollution in aquatic habitats (primarily sediments, but also fertilizers, herbicides, and pesticides, when mismanaged near water bodies), and disturbance to riparian zones.</p>	<p><u>Glades</u> Threats include grazing, non-native species, quarrying, root-digging, plant and animal collecting, removal of large rocks for landscaping, urban development, plowing for fire breaks, use as logging decks (resulting in soil/vegetation disturbance and soil erosion), conversion to other land uses, and ORV damage. No threats from forest management activities were identified.</p>	<p><u>Montane Longleaf Pine</u> Biodiversity values can be adversely affected by forest management activities via conversion of longleaf to other pine types, and the use of management techniques, including herbicide application that have the potential to inhibit native understory communities. As the bulk of the biodiversity exists in the understory of a longleaf pine system, restoration or maintenance of understory species composition is an essential component of longleaf pine conservation. It is possible to harvest in and sustainably manage longleaf pine systems and therefore timber management by itself is not considered a threat. Other threats include fire suppression, urban development, forest conversion, non-native species, and climate change.</p>
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Information that may be considered for forest management activities in areas of specified risk

1. Be sure to implement state best management practices (BMPs) for forestry, particularly with regard to streamside management zones (SMZs) and stream crossings.
 - Be especially mindful to use wider SMZs along steeper slopes, i.e., use the width recommended in the BMP manual for the amount of slope.
 - Be especially mindful to observe BMPs for application of fertilizers, herbicides, & pesticides in conjunction with water bodies, aquatic habitat, and SMZs.
2. Avoid or minimize travel over glade areas and do not locate log decks on glade areas.
3. For information on Montane Longleaf Pine, refer to companion informational document for Native Longleaf Pine Systems.

Sources of further information

- Published state BMP manuals for forestry can be found on the websites of state forestry agencies.
- Information about state programs for forestry BMPs can be found on the websites of:
 - The National Association of State Foresters, <https://www.stateforesters.org/bmps/>
 - The Southern Group of State Foresters, <https://www.southernforests.org/water>
- For other sources of information for Montane Longleaf Pine, refer to companion informational document for Native Longleaf Pine Systems.

Resolute wood suppliers should contact your Resolute forester for further evaluation if operating in an area you have questions about.

Note: Information from the “Summary of the SACBA” and “Identified Threats to the SACBA” sections, and the map of the SACBA, were taken from a document published by FSC-US in preparation for regional meetings held during the summer of 2018.

This document was developed by Resolute FP US Inc. and was **last updated 2019-10-30**. It is anticipated that updates to this document will be made as further information on the SACBA becomes available. Additional hard copies or PDF in electronic format may be obtained by sending an email request to kevin.gallagher@resolutefp.com.

Resolute FP US Inc.
Mesophytic Cove sites (MCS)

Information for Wood Suppliers, Loggers, and Forest Landowners

Background

The Forest Stewardship Council® (FSC) National Risk Assessment for the Conterminous United States of America (FSC-NRA-USA V1-0) has identified Mesophytic Cove Sites (MCS) as an area of “specified risk” for certain High Conservation Values (HCVs). An HCV is a biological, ecological, social, or cultural value of outstanding significance or critical importance. Mesophytic cove sites are considered an HCV because they are a rare ecosystem that is at risk at a national or regional scale.

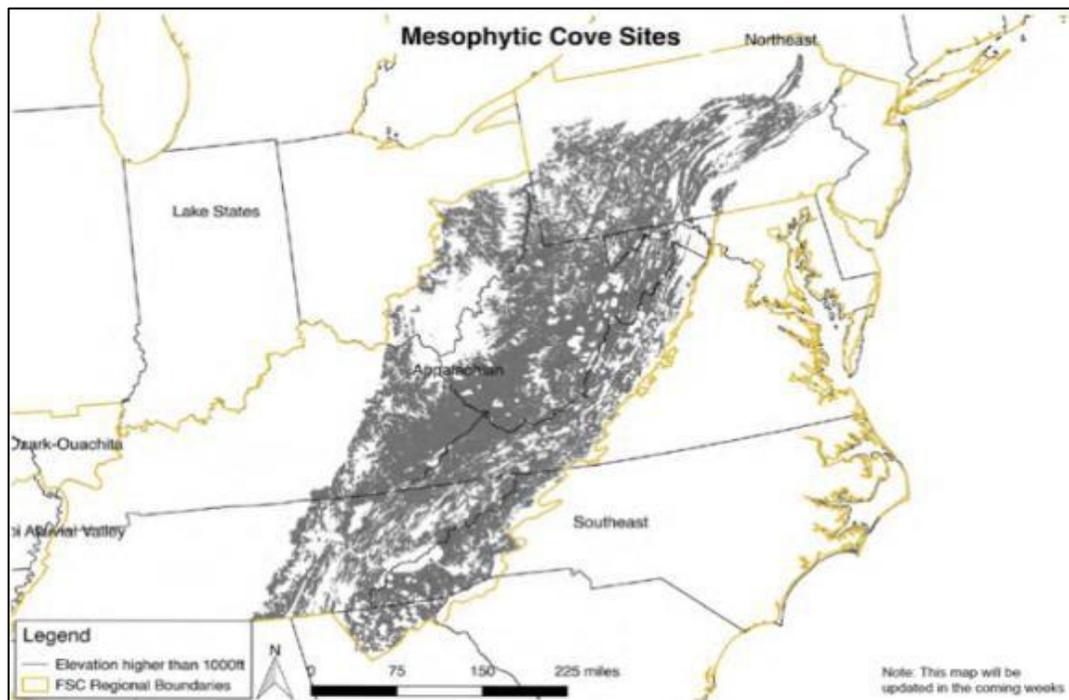
Forest management and harvesting activities may continue to be conducted within the area of specified risk as long as certain items of concern are addressed. The purpose of this document is to provide information to wood suppliers, loggers, and forest landowners so that they can be informed of the values of concern, what the threats to them are, and information they may consider in order to mitigate or address the threats in implementation of their forest management or harvesting operations (**focus on info in red outline on reverse**).

Summary of Mesophytic Cove Sites

Mesophytic cove sites are highly diverse, closed-canopy hardwood forests occurring on sheltered sites at low- to moderate-elevation (1,000-3,600 ft.), and sometimes higher. They tend to occur in large patches on concave slopes that accumulate nutrients and moisture. They are characterized by high species diversity and a complex forest structure. The ground level flora in particular has high species richness, often with abundant spring ephemerals. Rich cove forests have very fertile soils with a diverse herb layer containing few shrubs. Acidic cove forests are less fertile than rich coves, but otherwise similar.

While the sheltered, mesic sites that support Cove Forests are not particularly rare, examples that retain structural components like the dense canopy and high species diversity (both in the overstory and understory) are very rare. These characteristics may take 200 years to develop. These sites will not have evidence of having been previously clear-cut or farmed (followed by regrowth of the forest). Typically, they will include basswood, buckeye, cucumber, walnut, and magnolias in the mid-story and yellow-poplar, beech, sugar maple, northern red oak, white oak, ash, and hickories in the overstory.

Map of Specified Risk Area for Mesophytic Cove Sites



Identified threats to the Mesophytic Cove Sites

The most significant current threats to this forest type are invasive species and conversion to other uses. Threats also include **incompatible forest management that results in alterations to the structure and composition of the forest or conversion to other forest types (white pine)**, climate change, chronic deer herbivory, harvesting of herbs, and pollution. Cove forest sites can be managed in a compatible way using methods that do not disturb soil productivity, hydrology, or the understory, that maintain the diversity of the overstory without losing oak or moving toward monocultures of maple or poplar, that limit openings, and that don't result in 'high-grading' the forest (removing all trees of high commercial value and leaving the remainder). Incompatible forest management occurs when these guidelines are not followed and remains a threat to these systems in the Appalachian region.

While less severe disturbances, such as logging and fire, may not reduce herbaceous species richness or diversity to the same extent as more severe disturbances like mining and agriculture, they can still affect herbaceous species composition or abundance and therefore the quality and functioning of the system. Overall, the magnitude of impact on the herbaceous species from activities that occur within these sites is directly proportional to the severity of disturbance.

Information that may be considered for forest management activities in areas of specified risk

1. Be sure to implement state best management practices (BMPs) for forestry.
2. Be alert for areas characterized by "old growth" (200 +/- year-old trees, closed canopy, diverse overstory & understory, diverse herb layer & few shrubs in the understory); fertile & moist soils; concave slopes; and no evidence of prior timber harvesting or farming.
 - Consider preserving such areas or utilizing selective harvest such that overstory and understory characteristics are maintained.
3. Be aware of common invasive species in the area of operation and avoid silvicultural practices that may introduce or facilitate the spread of these species.
4. Consider development of hunting management plans that would prevent over-abundant deer populations from causing irreversible ecological damage.

Sources of further information

- Published state BMP manuals for forestry can be found on the websites of state forestry agencies.
- Information about state programs for forestry BMPs can be found on the websites of:
 - The National Association of State Foresters, <https://www.stateforesters.org/bmps/>
 - The Southern Group of State Foresters, <https://www.southernforests.org/water>
- World Wildlife Fund webpage on this topic, <https://www.worldwildlife.org/ecoregions/na0402>
- The publication "Invasive Plant Responses to Silvicultural Practices in the South" (2016, University of Georgia document BW-2016-03). This publication and other information on invasive species is available on the following websites:
 - Center for Invasive Species & Ecosystem Health, <https://www.invasive.org/>
 - The University of GA affiliate site, <https://www.bugwood.org/>

Resolute wood suppliers should contact your Resolute forester for further evaluation if operating in an area you have questions about.

Note: Information from the "Summary of the MCS" and "Identified Threats to the MCS" sections, and the map of the MCS, were taken from a document published by FSC-US in preparation for regional meetings held during the summer of 2018.

This document was developed by Resolute FP US Inc. and was **last updated 2019-10-30**. It is anticipated that updates to this document will be made as further information on MCS becomes available. Additional hard copies or PDF in electronic format may be obtained by sending an email request to kevin.gallagher@resolutefp.com.

Resolute FP US Inc.
Cheoah Bald Salamander (CBS)

Information for Wood Suppliers, Loggers, and Forest Landowners

Background

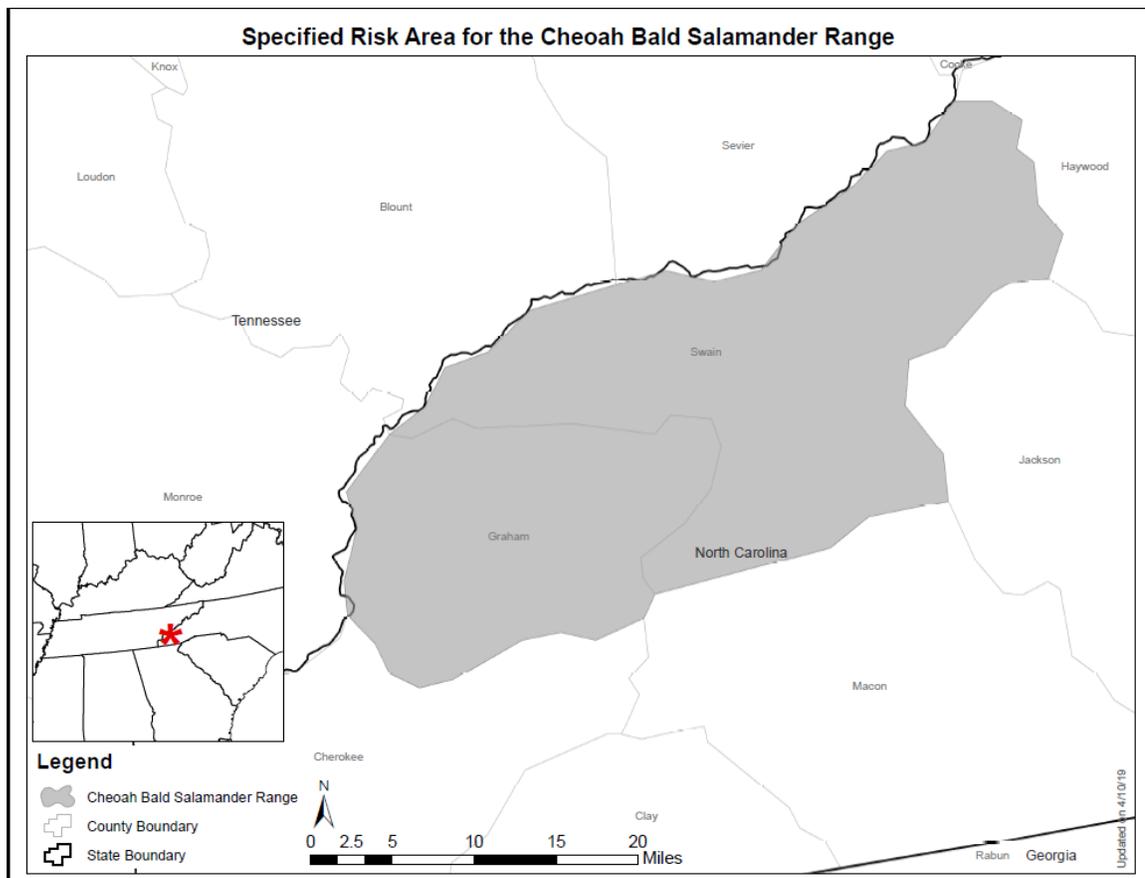
The Forest Stewardship Council® (FSC) National Risk Assessment for the Conterminous United States of America (FSC-NRA-USA V1-0) has identified the Cheoah Bald Salamander (CBS) as a species of “specified risk” for certain High Conservation Values (HCVs). An HCV is a biological, ecological, social, or cultural value of outstanding significance or critical importance. The CBS is considered an HCV because it is a rare species population with very limited distribution.

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Summary of the Cheoah Bald Salamander

The CBS’s range is not yet well defined but is believed to be limited a portion of the Appalachian Mountains at the very western extent of North Carolina within the elevational range of 975-1,524 meters (3,200-5,000 feet), associated with the Cheoah Bald. The salamander’s primary habitat is the mesic forests and the species may be common in areas with suitable habitat. It appears that much of the species’ range may occur within the Nantahala National Forest and it is identified as a Federal Species of Concern. The FSC-NRA-USA identifies such areas within Graham and Swain Counties as areas of concern. For more information, contact the North Carolina Natural Heritage Program or the Nantahala National Forest.

Specified risk area comprises Graham and Swain Counties in southwestern NC



Identified Threats to the Cheoah Bald Salamander

These salamanders depend on forest & woodland habitats and it is believed that clearcut harvests can threaten local populations. Though some populations have been found in second growth forests, literature suggests it takes decades for the species to re-populate following timber harvests. Therefore, these kinds of forest disruption could have a significant effect on the species as a whole.

Information to consider when conducting forest management activities in areas of specified risk

1. Be sure to implement state best management practices (BMPs) for forestry.
2. Be mindful of amphibian habitat when operating in forests above 3,200 feet elevation.
 - As much as possible, leave the litter layer and cover objects such as fallen logs or rocks undisturbed.
 - Consider intentionally managing for biomass retention on the site, in the form of fine and coarse woody debris.
 - Avoid clearcuts where such habitat is prevalent.

Sources of further information

- Published state BMP manuals for forestry can be found on the websites of state forestry agencies.
- Information about state programs for forestry BMPs can be found on the websites of:
 - The National Association of State Foresters: <https://www.stateforesters.org/bmps/>
 - The Southern Group of State Foresters: <https://www.southernforests.org/water>
- Information about the identification of the species and its distribution and habitat can be found at the following websites:
 - <http://herpsofnc.org/cheoah-bald-and-red-legged-salamanders/>
 - NatureServe: <https://www.natureserve.org/>
- A 2012 publication titled “Forest Biomass Retention and Harvesting Guidelines for the Southeast” by the Forest Guild Southeast Biomass Working Group can be found at this website, https://foreststewardsguild.org/wp-content/uploads/2019/05/FG_Biomass_Guidelines_SE.pdf

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Resolute FP US Inc.
Patch-nosed Salamander (PNS)

Information for Wood Suppliers, Loggers, and Forest Landowners

Background

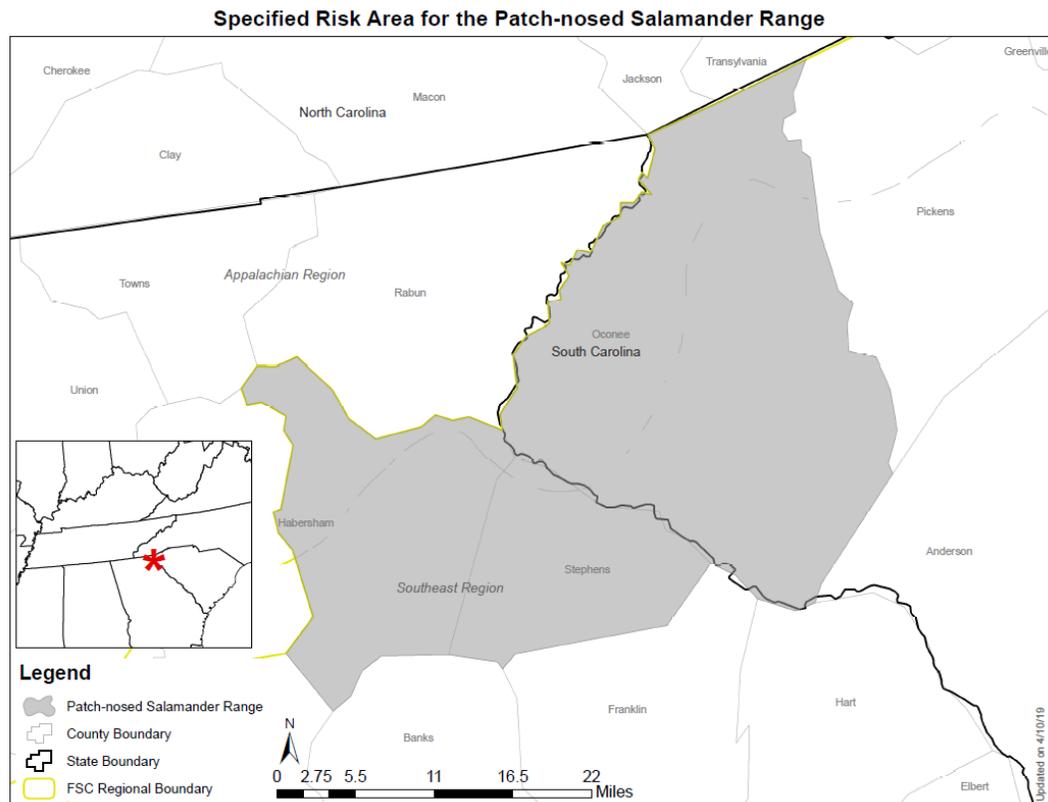
The Forest Stewardship Council® (FSC) National Risk Assessment for the Conterminous United States of America (FSC-NRA-USA V1-0) has identified the Patch-nosed Salamander (PNS) as a species of “specified risk” for certain High Conservation Values (HCVs). An HCV is a biological, ecological, social, or cultural value of outstanding significance or critical importance. The PNS is considered an HCV because it is a rare species population with very limited distribution.

Forest management and harvesting activities may continue to be conducted within the area of specified risk as long as certain items of concern are addressed. The purpose of this document is to provide information to wood suppliers, loggers, and forest landowners so that they can be informed of the values of concern, what the threats to them are, and information they may consider in order to mitigate or address the threats in implementation of their forest management or harvesting operations (**focus on info in red outline on reverse**).

Summary of the Patch-Nosed Salamander

The PNS is the smallest known salamander in North America – typically around 5 cm in length, half of which is the tail. The known range includes a limited number of small, first order streams located at the foot of the Blue Ridge escarpment in Stephens and Habersham counties (near Lake Tugaloo) of Georgia, within the Chattahoochee National Forest. There is one additional population known in Oconee County, South Carolina. Identified individuals of this species have all been found in leaf litter or under rocks in the above water streambeds or banks of first-order streams. It is not yet known whether adjacent hardwood forests also provide habitat. This species is not listed at either the federal or state level.

Specified risk area comprises Stephens & Habersham Cos. In northeastern GA
and Oconee Co. in northwestern SC



Identified Threats to the Patch-nosed Salamander

Little is known about this species and specific threats have not yet been documented. **The species depends on riparian habitat, so any factor that would disrupt water flow, canopy cover, or the leaf-litter layer would likely impact the species.** All of these can potentially be affected by forest management.

Information to consider when conducting forest management activities in areas of specified risk

1. Be sure to implement state best management practices (BMPs) for forestry, particularly with regard to streamside management zones (SMZs) and stream crossings.
2. Be mindful of amphibian habitat, especially in riparian areas and including dry streambeds above flowing water.
 - As much as possible, leave the litter layer and cover objects such as fallen logs or rocks undisturbed.
 - Consider intentionally managing for biomass retention on the site, in the form of fine and coarse woody debris.
 - Avoid clearcuts where such habitat is prevalent.

Sources of further information

- Published state BMP manuals for forestry can be found on the websites of state forestry agencies.
- Information about state programs for forestry BMPs can be found on the websites of:
 - The National Association of State Foresters: <https://www.stateforesters.org/bmps/>
 - The Southern Group of State Foresters: <https://www.southernforests.org/water>
- Information about the identification of the species and its distribution and habitat can be found at the following websites:
 - https://amphibiaweb.org/cgi/amphib_query?where-genus=Urspelerpes&where-species=brucei
 - NatureServe: <https://www.natureserve.org/>
 - Herpetological Conservation & Biology 2018 publication on life history: http://www.herpconbio.org/Volume_13/Issue_3/Camp_etal_2018.pdf
 - USFS fact sheet: https://www.fws.gov/charleston/pdf/ARS%20fact%20sheets%20for%20web/patch%20nosed%20alamander%20fact%20sheet_SC_2016.pdf
- A 2012 publication titled “Forest Biomass Retention and Harvesting Guidelines for the Southeast” by the Forest Guild Southeast Biomass Working Group can be found at this website, https://foreststewardsguild.org/wp-content/uploads/2019/05/FG_Biomass_Guidelines_SE.pdf

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This document was developed by Resolute FP US Inc. and was **last updated 2019-10-30**. It is anticipated that updates to this document will be made as further information on the PNS becomes available. Additional hard copies or PDF in electronic format may be obtained by sending an email request to kevin.gallagher@resolutefp.com.

Resolute FP US Inc.
Native Longleaf Pine Systems (NLPS)

Information for Wood Suppliers, Loggers, and Forest Landowners

Background

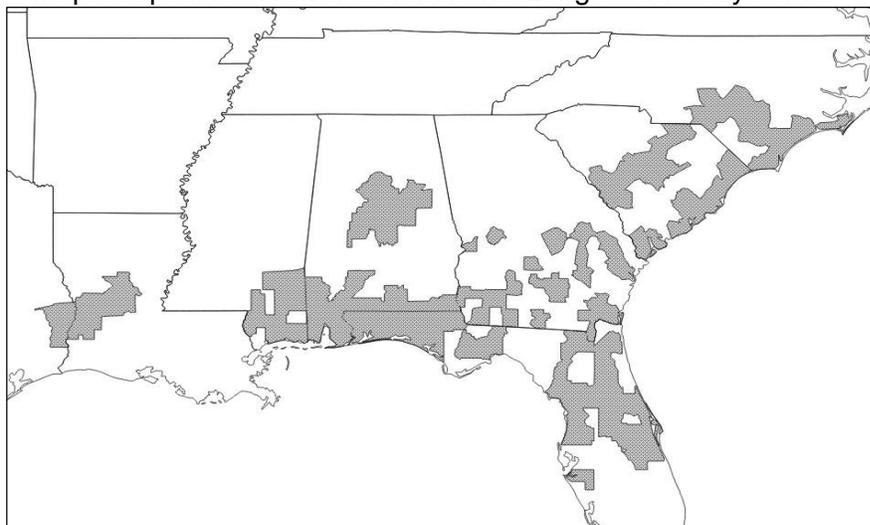
The Forest Stewardship Council® (FSC) National Risk Assessment for the Conterminous United States of America (FSC-NRA-USA V1-0) has identified the Native Longleaf Pine Systems (NLPS) as an area of “specified risk” for certain High Conservation Values (HCVs). An HCV is a biological, ecological, social, or cultural value of outstanding significance or critical importance. NLPS are considered an HCV because of their rarity - NLPS were once one of the most widespread forest types in the U.S. but were reduced to less than 5% of their original range, becoming one of the rarest forest systems in the world.

Forest management and harvesting activities may continue to be conducted within the area of specified risk as long as certain items of concern are addressed. The purpose of this document is to provide information to wood suppliers, loggers, and forest landowners so that they can be informed of the values of concern, what the threats to them are, and information they may consider in order to mitigate or address the threats in implementation of their forest management or harvesting operations (**focus on info in red outline on reverse**).

Summary of Native Longleaf Pine Systems

The historical reduction in NLPS was driven by suppression of fire and conversion to other forest types. These forest systems are associated with high animal and plant diversity, including many rare, threatened, and endangered species. These fire-dependent systems include longleaf pine as the dominant tree, a conspicuous lack of mid-story trees and shrubs, and a well-developed, diverse ground layer (dominated by bunch grasses and other flowering plants). At a landscape scale, naturally occurring longleaf systems typically exist as an uneven-aged mosaic of even-aged patches, which vary in size, shape, structure, composition, and density, depending upon the local conditions. This variability helps to drive the high biodiversity associated with them, with most of that biodiversity in the ground layer. Fire is the most important driver in the system, maintaining both the structural characteristics and the species diversity, particularly in the ground layer. Longleaf Pine systems can be subcategorized into four basic groups: Montane, Sandhill, Rolling Hill, and Flatwoods & Savanna. These systems are associated with particularly high animal and plant diversity, including nearly 900 endemic plant species and rare wildlife such as the Red-cockaded Woodpecker, Bachman’s Sparrow, Henslow’s Sparrow, Eastern Harvest Mouse, Gopher Tortoise, Wolf spider, Eastern Indigo Snake, and Flatwoods Salamander. “Native” in this instance refers to existing longleaf pine that is on a site that has historically been maintained as longleaf pine. Longleaf pine stands that have been restored in areas that have not been historically maintained in longleaf pine do not apply under this definition. “Native” does not imply a particular regeneration method; these stands may be either planted or naturally regenerated.

Map of Specified Risk Area for Native Longleaf Pine Systems



Identified threats to Native Longleaf Pine Systems

Threats to NLPS include altered stand structure (due to lack of fire), **conversion to other forest types**, conversion to other land uses (development and agriculture), habitat disturbance (including **management techniques that inhibit native understory communities which may include herbicide application**), fragmentation, and **modification of hydrological features (including by both past and current silvicultural practices)**. Because native longleaf cannot compete with other species for short-term returns on investment, it is still being converted to other forest types. While these other forest types may provide an acceptable habitat for some species, their establishment is threatening existing longleaf pine areas. As the bulk of the biodiversity exists in the understory of a longleaf pine system, restoration or maintenance of species composition is an essential component of longleaf pine conservation. While herbicides can be an essential tool in restoration of longleaf pine, there is mixed evidence regarding the impact of herbicides on understory vegetation – different chemicals and application methods may have differing effects. The hydrology of a site is important both for establishment of longleaf pine systems as well as for the natural function of the wetlands (ephemeral and permanent) that typically occur within them. Threats are different in different places, with lack of fire being the overall greatest concern, followed by conversion to other land uses (development), and incompatible forest management practices (predominantly conversion to other forest types). The interactions between these three threats compound the problems. It is possible to harvest in and sustainably manage longleaf pine systems and therefore timber management by itself is not considered a threat.

Information that may be considered for forest management activities in areas of specified risk

1. Be sure to implement state best management practices (BMPs) for forestry.
2. Consider keeping existing natural longleaf pine in that forest type, rather than converting to other forest types or other land uses.
 - Explore various landowner incentive programs that are available (see websites listed below).
3. Implement forest management practices that favor the maintenance or eventual restoration or development of natural longleaf pine systems within the specified risk area, with special attention to:
 - Development of appropriate understory.
 - Appropriate use of fire.
 - Appropriate and discretionary use of herbicides.

Sources of further information

- Published state BMP manuals for forestry can be found on the websites of state forestry agencies.
- Information about state programs for forestry BMPs can be found on the websites of:
 - The National Association of State Foresters, <https://www.stateforesters.org/bmps/>
 - The Southern Group of State Foresters, <https://www.southernforests.org/water>
- The Longleaf Alliance website, <https://longleafalliance.org/>
- Alabama Wildlife Federation – Longleaf Pine Ecosystem Restoration Project website, <https://www.alabamawildlife.org/longleaf/>
- America’s Longleaf Restoration Initiative website, <http://www.americaslongleaf.org/>
- USDA NRCS – Longleaf Pine Initiative, https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/initiatives/?cid=nrcsdev11_023913

Resolute wood suppliers should contact your Resolute forester for further evaluation if operating in an area you have questions about.

Note: Information from the “Summary of the NLPS” and “Identified Threats to the NLPS” sections, and the map of the NLPS, were taken from a document published by FSC-US in preparation for regional meetings held during the summer of 2018.

This document was developed by Resolute FP US Inc. and was **last updated 2019-10-30**. It is anticipated that updates to this document will be made as further information on NLPS becomes available. Additional hard copies or PDF in electronic format may be obtained by sending an email request to kevin.gallagher@resolutefp.com.

Resolute FP US Inc.
Late Successional Bottomland Hardwoods (LSBH)
Information for Wood Suppliers, Loggers, and Forest Landowners

Background

The Forest Stewardship Council® (FSC) National Risk Assessment for the Conterminous United States of America (FSC-NRA-USA V1-0) has identified Late Successional Bottomland Hardwoods (LSBH) as an area of “specified risk” for certain High Conservation Values (HCVs). An HCV is a biological, ecological, social, or cultural value of outstanding significance or critical importance. LSBH is considered an HCV because of its rarity - much of the original bottomland hardwood in the US was cleared for agriculture, particularly in the Mississippi valley, and much of the remainder was mismanaged – leaving very few intact examples.

Forest management and harvesting activities may continue to be conducted within the area of specified risk as long as certain items of concern are addressed. The purpose of this document is to provide information to wood suppliers, loggers, and forest landowners so that they can be informed of the values of concern, what the threats to them are, and information they may consider in order to mitigate or address the threats in implementation of their forest management or harvesting operations (**focus on info in red outline on reverse**).

Summary of Late Successional Bottomland Hardwoods

Bottomland Hardwoods are periodically inundated, floodplain forests, where the entire ecosystem is driven by hydrology. Even small changes to the hydrology can result in very significant effects on the system. These forests include a number of different species associations that vary depending upon the extent of flooding, soil characteristics, decomposition rates, soil and water pH, nutrient availability and turnover rates, flood depth and water velocity, light intensity, and disturbance. Late successional stands are not defined by the species, as much as by the structural composition (e.g., more stratification) and existence of large wood debris, including standing hollow trees – these changes occur at about 80 years in most Bottomland Hardwood types and perhaps a little later in cypress swamps. While old Bottomland Hardwood stands are not particularly rare, the late successional stands, with characteristics as previously described, are quite rare, due to a history of selective clear-cutting and high-grading. The extremely diverse stand conditions of these forests and the biodiversity they support make them particularly important. Woody species diversity can be comparable to the most diverse upland forests in the U.S. They tend to have structurally complex vegetation and a deep litter layer. The dense vegetation and the landscape connectivity they provide make them important travel corridors for wildlife. Bottomland hardwoods in the Coastal Plain and Mississippi Alluvial Valley have some similarities, but also differ in some significant ways. In the Coastal Plain areas, bottomland hardwoods tend to occur in more narrow bands that follow a river or stream, whereas in the Mississippi Alluvial Valley, they extend much greater distances from the river/stream, resulting in much larger areas of the forest type. For the purposes of this assessment, ‘late successional’ refers to bottomland hardwoods that are at least 80 years old and have the complex structural characteristics associated with late successional stands, but are not necessarily Old Growth (as defined in the FSC US Forest Management Standard).



Identified threats to Late Successional Bottomland Hardwoods

Significant threats include development, hydrologic changes (droughts, water withdraws, ditching), **incompatible forest management (results in changes to canopy age and structure, hydrology, and available dead and down woody debris)**, pollution, fragmentation, climate change, **invasive species (including spread that is exacerbated by logging activities)**, and **economic drivers that alter forest management goals (i.e., economic drivers result in pressure for inappropriate harvests)**. Changes to the vegetative cover in these systems can significantly affect hydrologic flow, and therefore the entire system. Forest management occurring within bottomland hardwoods is not necessarily in itself a threat, but how the management is applied in the context of the local landscape is important. Size and location of openings, which species are retained, harvest method (equipment and techniques), past disturbance of hydrology and availability of red maple/sweet gum seed in the surrounding landscape may have an impact on successful development of stands with the desired species composition and habitat elements. Silviculture decisions should emphasize the geomorphic setting and hydrologic conditions of the site, while restoring or maintaining the species and structural diversity.

Threats can differ between the Coastal Plains of the Southeast Region and Mississippi Alluvial Valley Region:

<u>Mississippi Alluvial Valley</u>	<u>Coastal Plains of the Southeast</u>
The demand for forest products can promote silviculture that does not achieve forest conditions desired for biodiversity and ecological function.	Without dependable, seasonable dry periods, these forests are more often treated under challenging (wet) conditions, resulting in more frequent use of clearcut silviculture and significant changes to the vegetative cover . In this region, the systems are still not fully understood, with gaps in knowledge regarding best situation-specific silvicultural techniques and interactions between forest management threats and other threats.

Information that may be considered for forest management activities in areas of specified risk

1. Be sure to implement state best management practices (BMPs) for forestry.
2. Avoid “high-grading,” especially in stands 80+ years old.
3. Be alert for “late successional” bottomland hardwood stands – stands that are 80+ years with well-defined **complex**/multiple layers (overstory, mid-story, & understory) and that contain large woody debris (including standing hollow trees) and a deep litter layer.
 - Consider preserving such areas or utilizing selective harvest such that overstory, mid-story, and understory characteristics, along with dead and down woody debris, are maintained.

Sources of further information

- Published state BMP manuals for forestry can be found on the websites of state forestry agencies.
- Information about state programs for forestry BMPs can be found on the websites of:
 - The National Association of State Foresters, <https://www.stateforesters.org/bmps/>
 - The Southern Group of State Foresters, <https://www.southernforests.org/water>
- Mississippi State Univ. Extension website for managing bottomland hardwoods, general info and various publications are available: <https://www.naturalresources.msstate.edu/wildlife/bottomland-hardwoods.asp>
- A 2001 publication titled “A Guide to Bottomland Hardwood Restoration” can be found at this website: <https://pubs.usgs.gov/itr/2000/0011/report.pdf>
- A publication updated in 2019 by Univ. of FL Extension titled “The Importance of Bottomland Hardwood Forests for Wildlife can be found at this website: <http://edis.ifas.ufl.edu/pdf/FILES/UW/UW31600.pdf>
- The U.S. Forest Service Southern Research Station “Center for Forest Wetlands Research” website: <https://www.srs.fs.usda.gov/charleston/>

Resolute wood suppliers should contact your Resolute forester for further evaluation if operating in an area you have questions about.

Note: Information from the “Summary of the LSBH” and “Identified Threats to the LSBH” sections, and the map of LSBH, were taken from a document published by FSC-US in preparation for regional meetings held during the summer of 2018.

This document was developed by Resolute FP US Inc. and was **last updated 2019-10-30**. It is anticipated that updates to this document will be made as further information on LSBHs becomes available. Additional hard copies or PDF in electronic format may be obtained by sending an email request to kevin.gallagher@resolutefp.com.

Resolute FP US Inc.
Florida Panhandle Critical Biodiversity Area (FPCBA)
Information for Wood Suppliers, Loggers, and Forest Landowners

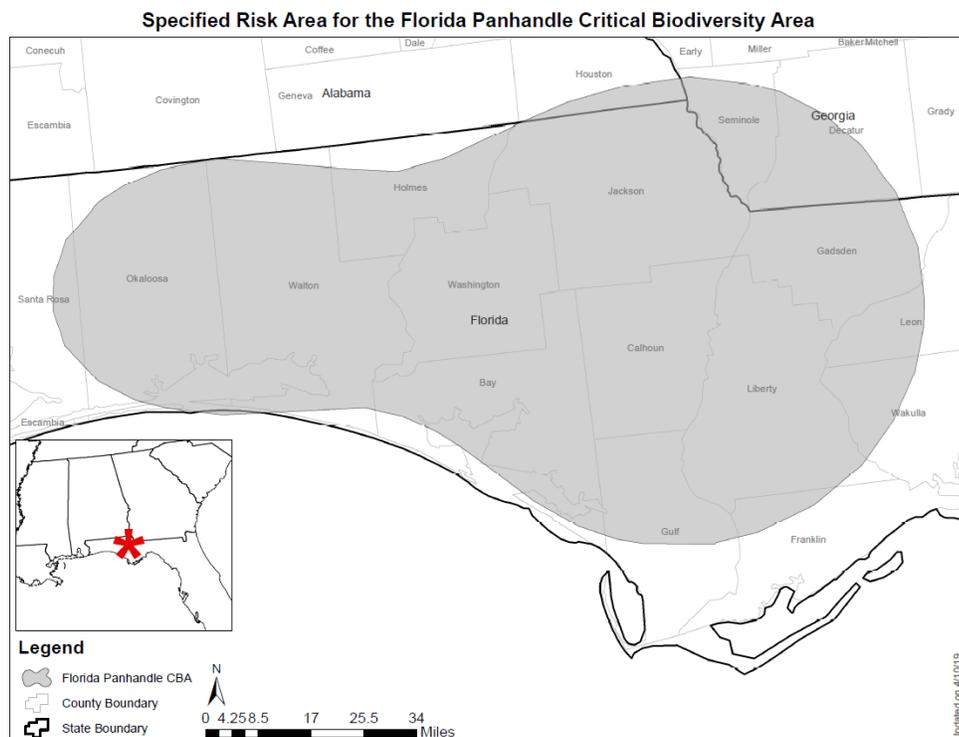
Background

The Forest Stewardship Council® (FSC) National Risk Assessment for the Conterminous United States of America (FSC-NRA-USA V1-0) has identified the Florida Panhandle Critical Biodiversity Area (FPCBA) as an area of “specified risk” for certain High Conservation Values (HCVs). An HCV is a biological, ecological, social, or cultural value of outstanding significance or critical importance. The FPCBA is considered an HCV because it contains a high overall species richness, diversity, or uniqueness within a defined area compared to other sites within the same biogeographic area.

Forest management and harvesting activities may continue to be conducted within the area of specified risk as long as certain items of concern are addressed. The purpose of this document is to provide information to wood suppliers, loggers, and forest landowners so that they can be informed of the values of concern, what the threats to them are, and information they may consider in order to mitigate or address the threats in implementation of their forest management or harvesting operations (**focus on info in red outline on reverse**).

Summary of the Florida Panhandle CBA

The Florida Panhandle is reported to be one of the 5 richest biodiversity hotspots in North America. Of particular importance is the richness of frogs, snakes, turtles, and mussels. This concentration of biodiversity is driven by the river systems (particularly the Apalachicola River), longleaf pine savanna habitat, and unique steephead ravines. Biodiversity richness is centered on the area where the Chattahoochee River meets the Flint River and form the Apalachicola River. Species of particular interest include the Okaloosa darter (*Etheostoma okaloosae*) which is endemic to the Florida Panhandle, and the Red-cockaded Woodpecker (*Picoides borealis*) which is associated with the longleaf pine. Historically longleaf pine savanna supported incredibly high species richness and were historically maintained by fire. The biodiversity values are driven in part by the resulting understory plant community. Eglin Air Force Base within this CBA includes one of the largest remaining longleaf pine forests under single ownership. Steephead Ravines along the Apalachicola River system contain a wide diversity of species including rare, threatened, and endangered species, due largely to the variety of site conditions and microclimates. They also harbor the southernmost range of many northern species.



Identified threats to the Florida Panhandle CBA

<p><u>Apalachicola Bay/River System</u> Threats to this aquatic system are varied and include persistent drought resulting in reduced flow level, loss of floodplain and wetland habitat due to reduced flow levels, point and non-point source pollution (including sediments from forestry operations due to insufficient ground cover and inadequate buffers), unrestrained growth and development. The Apalachicola River and Bay Surface Water Improvement and Management Plan identifies implementation of silvicultural Best Management Practices (BMPs) as a significant component of one of its priority projects.</p>	<p><u>Longleaf Pine Savanna</u> Biodiversity values can be adversely affected by forest management activities via conversion of longleaf to other pine types, and the use of management techniques, including herbicide application, that have the potential to inhibit native understory communities. As the bulk of the biodiversity exists in the understory of a longleaf pine system, restoration or maintenance of understory species composition is an essential component of longleaf pine conservation. Other threats include fire-suppression, urban development, fragmentation, non-native species, and climate change. It is possible to harvest in and sustainably manage longleaf pine systems and therefore timber management by itself is not considered a threat. Both Sandhill and Natural pineland habitats are documented within the CBA.</p>	<p><u>Steephead Ravines</u> Reported threats include altered hydrologic regimes, conversion to other land uses, & fire suppression. Forestry practices were identified as a low source of stress to the habitat in the Florida Wildlife Action Plan.</p>
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Information that may be considered for forest management activities in areas of specified risk

1. Be sure to implement state best management practices (BMPs) for forestry, particularly with regard to a) streamside management zones (SMZs) and stream crossings and b) operating on steep slopes in general.
 - Be especially mindful to use wider SMZs along steeper slopes, i.e., use the width recommended in the BMP manual for the amount of slope.
 - Be especially mindful to observe BMPs for application of fertilizers, herbicides, & pesticides in conjunction with water bodies, aquatic habitat, and SMZs.
2. Utilize management practices that preserve and/or encourage natural ground cover growth within and adjacent to SMZs.
3. Avoid or minimize operating within or traveling across steephead ravines.
4. For information on Longleaf Pine Savannas, refer to companion informational document for Native Longleaf Pine Systems.

Sources of further information

- Published state BMP manuals for forestry can be found on the websites of state forestry agencies.
- Information about state programs for forestry BMPs can be found on the websites of:
 - The National Association of State Foresters, <https://www.stateforesters.org/bmps/>
 - The Southern Group of State Foresters, <https://www.southernforests.org/water>
- For other sources of information for Montane Longleaf Pine, refer to companion informational document for Native Longleaf Pine Systems.

Resolute wood suppliers should contact your Resolute forester for further evaluation if operating in an area you have questions about.

Note: Information from the “Summary of the FPCBA” and “Identified Threats to the FPCBA” sections, and the map of the FPCBA, were taken from a document published by FSC-US in preparation for regional meetings held during the summer of 2018.

This document was developed by Resolute FP US Inc. and was **last updated 2019-10-30**. It is anticipated that updates to this document will be made as further information on the FPCBA becomes available. Additional hard copies or PDF in electronic format may be obtained by sending an email request to kevin.gallagher@resolutefp.com.