

Changes Made to the FM Forest Plan, ROD and FEIS in Response to the Objection Resolution Instructions	
RF Instructions	Edits Made in Response to RF Instructions
BIOLOGICAL OPINION	
<p>Include in the revised plan and final ROD the non-discretionary Reasonable and Prudent Measures and Terms and Conditions of the Biological Opinion, received on December 2, 2016.</p>	<p>P.266, FM Forest Plan, Appendix J Reasonable and Prudent Measures was added. This section includes the two reasonable and prudent measures required by the USFWS.</p> <p>Pp .31-32, ROD, Endangered Species Act was reworted. The Endangered Species Act of 1973 (ESA) requires federal agencies to implement proactive programs to conserve listed species and avoid implementing actions that could jeopardize the continued existence of a species. ESA Section 7(a)(1) states, Federal agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act. The Francis Marion Revised Forest Plan is the agency’s strategy to meet our obligations under ESA Section 7(a)(1).</p> <p>ESA section 7 (a)(2) requires federal agencies, through consultation with the U.S. Fish and Wildlife Service (USFWS), to ensure that their activities are not likely to jeopardize the continued existence of listed species or adversely modify designated critical habitats. The Forest Service received a non-jeopardy Biological Opinion with incidental take authorization from USFWS on December 2, 2016 fulfilling our consultation requirement.</p> <p>The Biological Opinion contained two Reasonable and Prudent Measures and several associated Terms and Conditions. These are mandatory nondiscretionary items</p>

that must be implemented. I am incorporating the Reasonable and Prudent Measures and Terms and Conditions into the revised plan through this ROD and they are included as Appendix J. These Reasonable and Prudent Measures and Terms and Conditions are equivalent to forest plan standards and must be implemented.

In January 2013, the Forest notified the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA) and the U.S. Fish and Wildlife Service (FWS) of the forest plan revision process and requested lists of federally listed threatened and endangered species, species proposed for Federal listing, and candidate species to be considered for further evaluation throughout the forest plan revision process. In 2015, the Forest met with the FWS to finalize the list of threatened and endangered species that would be addressed in the biological assessment (BA). See the BA (FEIS, Appendix G) in the planning record for the complete consultation history.

In accordance with Section 7(c) of the Act, the BA was prepared to assess the effects of implementing the Francis Marion National Forest Revised Land Management Plan on ten federally-listed threatened, endangered, proposed species or designated critical habitat known or likely to occur on the Francis Marion National Forest in Charleston and Berkeley County, South Carolina.

The BA found implementation of the revised land management plan **may affect, and is likely to adversely affect individuals of** American chaffseed (*Schwalbea*

americana), Canby's dropwort (*Oxypolix canbyi*), frosted flatwoods salamander (*Ambystoma cingulatum*), pondberry (*Lindera melissifolia*) and red cockaded woodpeckers (*Picoides borealis*). The potential adverse effects to individuals of federally listed species would result in short-term harm incidental to ecological restoration activities such as prescribed fire, reducing hardwood and pine mid-stories and thinning and restoring longleaf pine to improve habitat conditions. While individuals may be impacted, the plan would provide an overall net benefit. Because the forest plan does not commit to any action, projects would be subject to further consultation.

P.144, FM Forest Plan, MQ 15, the following language was added to the Adaptive Management Strategy:

Alert: RCW population declines to 450 active clusters,

Response: The FS would initiate actions to turn around declines.

Alert: RCW population declines to 400 active clusters,

Response The Forest Service would reinitiate formal consultation with USFWS and stop all actions that could adversely affect RCW.

P. 108, FM Forest Plan, OBJ-T&E-2, the following language was added to the end of the paragraph on management strategies.

If the population declines to 450 active clusters, the FS would initiate actions to turn around declines. If the population declined further to 400 active clusters, this level would trigger reinitiation of formal consultation

	<p>with USFWS and stop all actions that could adversely affect RCW. (See Appendix J and MQ 15).</p>
<p>RED-COCKADED WOODPECKER</p>	
<p>Replace the existing Endangered Species Act (ESA) section in the draft ROD in its entirety with the following in the final ROD</p> <p>Endangered Species Act: The Endangered Species Act of 1973 (ESA) requires federal agencies to implement proactive programs to conserve listed species and avoid implementing actions that could jeopardize the continued existence of a species. ESA Section 7(a)(1) states, Federal agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act. The Francis Marion Revised Forest Plan is the agency’s strategy to meet our obligations under ESA Section 7(a)(1).</p> <p>ESA section 7 (a)(2) requires federal agencies, through consultation with the U.S. Fish and Wildlife Service (USFWS), to ensure that their activities are not likely to jeopardize the continued existence of listed species or adversely modify designated critical habitats. The Forest Service received a non-jeopardy Biological Opinion with incidental take authorization from USFWS on December 2, 2016 fulfilling our consultation requirement.</p> <p>The Biological Opinion contained two Reasonable and Prudent Measures and several associated Terms and Conditions. These are mandatory nondiscretionary items that must be implemented. I am incorporating the Reasonable and Prudent Measures and</p>	<p>Pp. 31-32, ROD, ESA section was edited to include the language in the RF Instructions on the Red-cockaded woodpecker. See above.</p>

Terms and Conditions into the revised plan through this ROD and they are included as Appendix J. These Reasonable and Prudent Measures and Terms and Conditions are equivalent to forest plan standards and must be implemented.

In January 2013, the Forest notified the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA) and the U.S. Fish and Wildlife Service (FWS) of the forest plan revision process and requested lists of federally listed threatened and endangered species, species proposed for Federal listing, and candidate species to be considered for further evaluation throughout the forest plan revision process. In 2015, the Forest met with the FWS to finalize the list of threatened and endangered species that would be addressed in the biological assessment (BA). See the BA (FEIS, Appendix G) in the planning record for the complete consultation history.

In accordance with Section 7(c) of the Act, the BA was prepared to assess the effects of implementing the Francis Marion National Forest Revised Land Management Plan on ten federally-listed threatened, endangered, proposed species or designated critical habitat known or likely to occur on the Francis Marion National Forest in Charleston and Berkeley County, South Carolina.

The BA found implementation of the revised land management plan **may affect, and is likely to adversely affect individuals of** American chaffseed (*Schwalbea americana*), Canby's dropwort (*Oxypolix canbyi*), frosted flatwoods salamander (*Ambystoma cingulatum*), pondberry (*Lindera melissifolia*) and red cockaded woodpeckers (*Picoides borealis*). The potential adverse effects to individuals of federally listed species would result in short-term harm incidental to ecological restoration activities such as prescribed fire, reducing hardwood and pine

<p>mid-stories and thinning and restoring longleaf pine to improve habitat conditions. While individuals may be impacted, the plan would provide an overall net benefit. Because the forest plan does not commit to any action, projects would be subject to further consultation.</p> <p>The BA also determined that implementation of the revised plan will primarily result in discountable, insignificant, or completely beneficial effects to frosted flatwoods salamander designated critical habitat.</p> <p>The BA determined that implementation of the revised plan may affect, but is not likely to adversely affect wood stork (<i>Mycteria americana</i>), which is not known to nest to on the Forest.</p> <p>The BA found implementation of the revised land management plan activities will have no effect on shortnose (<i>Acipenser brevirostrum</i>) and Atlantic sturgeons (<i>Acipenser oxyrinchus</i>), Bachman’s warbler (<i>Verimvora bachmanii</i>) and West Indian manatee (<i>Trichechus manatus</i>).</p> <p>The revised plan includes desired conditions, standards and guidelines, objectives and provides broad management direction. These forest plan components comply with the requirements of ESA and the associated recovery plan for each federally listed species. For these reasons, I find this decision to be in compliance with the requirements of ESA.</p>	
<p>Modify G35 to state “G35. Guidelines and recovery objectives in the most up-to-date recovery plan should be implemented for all federally-listed species, when available and feasible. If site specific conditions preclude implementing recovery tasks, consult with the USFWS field office using the appropriate consultation tool. Collaborate with U.S. Fish and Wildlife Service in the conservation of at-risk species.”</p>	<p>P.131, FM Revised Plan, G35 was reworded. Original wording G35. Guidelines and recovery objectives in the most up-to-date recovery plan should be considered for all federally-listed species, when available. Collaborate with U.S. Fish and Wildlife Service in the conservation of at-risk species.</p> <p>Revised wording G35. Guidelines and recovery objectives in the most up-to-date recovery plan should be implemented for all</p>

	<p>federally-listed species, when available and feasible. If site specific conditions preclude implementing recovery tasks, consult with the USFWS field office using the appropriate consultation tool. Collaborate with USFWS in the conservation of at-risk species.</p> <p>To ensure consistency with acronyms in the glossary all references to the U.S. Fish and Wildlife Service were changed to USFWS.</p>
<ul style="list-style-type: none"> Amend DC-MA2-1, DC-T&E-2, OBJ-T&E-2, and G35 as follows; changes are in bold. <p>For DC-MA-2-1, pages 39 and 40 of the revised plan, change the first sentence in the second paragraph to <i>Within Red-cockaded Woodpecker Clusters: Guidelines for the management of cavity trees and clusters from the most recent species recovery plan are implemented (See OBJ-T&E-2 and G35 for exceptions).</i> Currently this sentence is <i>Within Red-cockaded Woodpecker Clusters: Guidelines for the management of cavity trees and clusters from the most recent species recovery plan are considered.</i></p> <p>For DC-T&E-2, page 42 of the revised plan, change the last sentence to “Project development is based on implementing guidelines in the most recent Recovery Plan in the management of cavities, clusters, and foraging habitat.” Currently this sentence is “Guidelines in the most recent Recovery Plan in the management of cavities, clusters, foraging habitat, and monitoring <i>are considered during project development.</i>”</p> <p>For OBJ-T&E-2, page 107 of the revised plan, change the second paragraph to “Management Strategy: The forest</p>	<p>P.41, FM Forest Plan, DC-MA-2-1, <i>Within Red-cockaded Woodpecker Clusters:</i> 2nd sentence- “considered” changed to “implemented” and inserted “(See OBJ-T&E-2 and G35, G36 and G38 for exceptions).” A reference to G36 and G38 was added since those guidelines listed some exceptions for RCW habitat management.</p> <p>P. 43, FM Forest Plan, DC-T&E-2 Red-Cockaded Woodpecker, last sentence was deleted “Guidelines in the most recent Recovery Plan in the management of cavities, clusters, foraging habitat, and monitoring are considered during project development.” And replaced with “Project development is based on implementing guidelines in the most recent Recovery Plan in the management of cavities, clusters, and foraging habitat.”</p> <p>P. 108, FM Forest Plan, OBJ-T&E-2. Red-Cockaded Woodpecker, Management Strategies, the last sentence</p>

supports a recovered population for the red-cockaded woodpecker in upland longleaf and wet pine savanna ecosystems within Management Area 1 and contributes towards range-wide recovery efforts. **Every project with the potential to affect RCW, will implement the Reasonable and Prudent Measures and Terms and Conditions in the biological opinion, and guidelines in the most recent species recovery plan. If site specific conditions do not allow for the implementation of the Reasonable and Prudent Measures and Terms and Conditions or conditions dictate a different management strategy, project-level formal consultation will be reinitiated with USFWS. A project specific decision will not be signed until the Forest Service has received a project specific non-jeopardy biological opinion.**” Currently the second paragraph ends with the sentence *“Every project with the potential to affect RCW will consider the terms and conditions of the biological opinion and guidelines in the most recent species recovery plan.”*

For G35, page 131 of the revised plan, change this guideline to **“G35. Guidelines and recovery objectives in the most up-to-date recovery plan should be implemented for all federally-listed species, when available and feasible. If site specific conditions preclude implementing recovery tasks, consult with the USFWS field office using the appropriate consultation tool. Collaborate with U.S. Fish and Wildlife Service in the conservation of at-risk species.”** Currently this guideline is **“G35. Guidelines and recovery objectives in the most up-to-date recovery plan should be considered for all federally-listed species, when available. Collaborate with U.S. Fish and Wildlife Service in the conservation of at-risk species.”**

“Every project with the potential to affect RCW, will consider the terms and conditions of the biological opinion, and guidelines in the most recent species recovery plan.”

Was deleted and replaced with

“Every project with the potential to affect RCW, will implement the Reasonable and Prudent Measures and Terms and Conditions in the biological opinion, and guidelines in the most recent species recovery plan. If site specific conditions do not allow for the implementation of the Reasonable and Prudent Measures and Terms and Conditions or conditions dictate a different management strategy, project-level formal consultation will be reinitiated with USFWS. A project specific decision will not be signed until the Forest Service has received a project specific non-jeopardy biological opinion.”

P.131, FM Forest Plan, G35 was reworded.

Original wording G35. Guidelines and recovery objectives in the most up-to-date recovery plan should be considered for all federally-listed species, when available. Collaborate with U.S. Fish and Wildlife Service in the conservation of at-risk species.

Revised wording G35. Guidelines and recovery objectives in the most up-to-date recovery plan should be implemented for all federally-listed species, when available and feasible. If site specific conditions preclude implementing recovery tasks, consult with the USFWS field office using the appropriate consultation tool. Collaborate with USFWS in the conservation of at-risk species.”

	<p>To ensure consistency with acronyms in the glossary all references to the U.S. Fish and Wildlife Service were changed to USFWS.</p>
<ul style="list-style-type: none"> • Add a guideline to the revised plan similar to G36 in the draft plan, which was “Ensure forest management activities are consistent with the most up-to-date recovery plan for the red-cockaded woodpecker at the time of the activities. In some instances there may be a need to deviate from The Red-cockaded Woodpecker Recovery Plan to provide long term benefits for the red-cockaded woodpecker (RCW) and its habitat (e.g., longleaf pine restoration or timber harvest which could reduce foraging below the Managed Stability Standard in the Red-cockaded Woodpecker Recovery Plan). Consult with USDI Fish and Wildlife Service.” 	<p>P.132, FM Forest Plan, G42 was added G42. Ensure forest management activities are consistent with the most up-to-date recovery plan for the red-cockaded woodpecker at the time of the activities. In some instances there may be a need to deviate from The Red-cockaded Woodpecker Recovery Plan to provide long term benefits for the red-cockaded woodpecker (RCW) and its habitat (e.g., longleaf pine restoration or timber harvest which could reduce foraging below the Managed Stability Standard in the Red-cockaded Woodpecker Recovery Plan). Consult with USFWS.</p>
<p>PLAN COMPONENT SPECIFICITY</p>	
<ul style="list-style-type: none"> • Add a desired condition that there is improved connectivity between Carolina gopher frog meta-populations. 	<p>P.46, FM Forest Plan, DC-SCC-2 Wildlife Species Sensitive to Road Use Associates, no changes. This DC addresses limiting impacts from road use. P.48, FM Forest Plan, DC-SCC-Upland Pine Woodlands Associate, the following sentence was added to the end of the paragraph. “Herbaceous groundcover in upland pine woodlands in the Wando Resource Integration Zone provides migration routes for at risk amphibians, such as Carolina gopher frog and frosted flatwoods salamander.” P. 49, FM Forest Plan, DC-SCC-8 Forested Wetlands Associates and P. 108, OBJ-SCC-1 Carolina Gopher Frog, Added sentence “Management activities connect breeding wetlands in the Wando Resource Integration Zone” to the end of the desired condition and objective.</p>

<ul style="list-style-type: none"> • Add forest plan components to protect these species from logging activities. • Add forest plan components that provide protection from ground-disturbing activities during migration seasons in areas where connectivity is important. 	<p>P.125, FM Forest Plan, No changes. This standard to Swallow-tailed Kite is already included.</p> <p>S31. Conduct no logging within 300 feet of known active American swallow-tailed kite nests from April 1 through June 30 or until fledging is completed. When nests are found in active sales, logging will be coordinated with timber purchasers to protect the kite nesting site. Inactive nest-site trees may be harvested.</p> <p>Pp. 131-132, FM Forest Plan, No changes. The concerns related to impacts to Carolina Gopher Frog is covered by guidelines to protect Frosted Flatwoods Salamander Designated Critical Habitat on pp. 131 to 132 of the FM forest plan. Specifically G33, G44 and G45. G44 and G45 were added to the FM forest plan in response to direction on Frosted Flatwoods Salamander.</p> <p>G44. Ground-disturbing activities (e.g. drum chopping) during vegetation management should be minimized within the Frosted Flatwoods Salamander Designated Critical Habitat.</p> <p>G45. Within Frosted Flatwoods Salamander Designated Critical Habitat, the preferred time for prescribed burning is when the salamanders are least active on the ground (typically between April and October).</p>
<p>Amend DC-REC-6 to address aquatic invasive species by adding the language shown in bold below.</p> <p>Dispersed Recreation - Fishing Opportunities Visitors are able to fish in hundreds of miles of blackwater streams, as well as several lakes and ponds. Lakes and manmade ponds are stocked and managed for sustainable recreational fishing opportunities. Primary desired species include bluegill, redear sunfish,</p>	<p>Pp. 58 to 59, FM Forest Plan, DC-REC-6. Dispersed Recreation- Fishing Opportunities, the sentences “Aquatic nuisance species are controlled and managed according to Forest Service regional guidance and South Carolina state direction. Vegetation around ponds is sufficient to function as a sediment and pollutant filter to water bodies.” Was replaced with “The introduction and spread of aquatic nuisance species are controlled and managed through effective monitoring,</p>

<p>largemouth bass and channel catfish.) Bass-to-bluegill ratios are monitored and maintained at desirable levels. The introduction and spread of aquatic nuisance species are controlled and managed through effective monitoring, responsive treatment, and public education. These efforts are informed by and in accordance with the most current and appropriate Forest Service guidance and South Carolina Department of Natural Resources Aquatic Nuisance Species Program. Vegetation around pools is managed to be ecologically and functionally sufficient to filter adverse levels of sediment and pollution from entering water bodies. Water quality parameters (water temperature, dissolved oxygen, turbidity, hardness, alkalinity and pH) are monitored and used as a basis to improve conditions within ponds for sustainable fisheries.</p> <ul style="list-style-type: none"> • Also add this same language (in bold above) to DC-THR-1. Non-Native Invasive Species Management. 	<p>responsive treatment, and public education. These efforts are informed by and in accordance with the most current and appropriate Forest Service guidance and South Carolina Department of Natural Resources Aquatic Nuisance Species Program. Vegetation around pools is managed to be ecologically and functionally sufficient to filter adverse levels of sediment and pollution from entering water bodies.”</p> <p>In the last sentence of the paragraph of the desired condition, “turbidity” was inserted.</p> <p>This rewrite is addressed by RF instructions on DC-THR-1. Non-Native Invasive Species Management.</p>
<ul style="list-style-type: none"> • In DC-WAT-2, revise to provide clarity for what constitutes "sufficient hardwood reproduction". 	<p>Sufficient hardwood reproduction is addressed in the desired conditions for DC-ECO-7 to 8. This desired condition was rewritten to clarify that the intent is restoration of hydrologic function and not to address hardwood reproduction.</p> <p>P.51, FM Forest Plan, DC-WAT-2 Restoration of Hydrologic Function, minor wording changes were made</p> <p>In the 2nd sentence, (DC-ECO-8) was inserted, the phrase “and mid- to late-seral native vegetation” was deleted and replaced with “except during drought conditions.”</p> <p>In the 3rd sentence, “(DC-ECO-7) dominated by mid- to late-seral hardwood tree species” was inserted and the phrase “and supply mid- to late-seral hardwood tree species and sufficient hardwood reproduction to assure sustainability of the mature hardwood forest” was deleted.</p>

<ul style="list-style-type: none"> For DC-T&E-2, page 42 of the revised plan, change the last sentence to “Project development is based on implementing guidelines in the most recent Recovery Plan in the management of cavities, clusters, and foraging habitat.” Currently this sentence is “Guidelines in the most recent Recovery Plan in the management of cavities, clusters, foraging habitat, and monitoring <i>are considered during project development.</i>” 	<p>P. 45, FM Forest Plan, DC-T&E-2 Red-Cockaded Woodpecker, the last sentence was deleted: “Guidelines in the most recent Recovery Plan in the management of cavities, clusters, foraging habitat, and monitoring are considered during project development.” And was replaced with “Project development is based on implementing guidelines in the most recent Recovery Plan in the management of cavities, clusters, and foraging habitat.”</p>
<ul style="list-style-type: none"> Add a guideline to help ensure that in MA-1, open loblolly pine woodlands providing high-functioning nesting and foraging habitat for red-cockaded woodpeckers and other plant and animal species are maintained. Loblolly pine forest types are converted to longleaf pine over time. 	<p>P.131, FM Forest Plan, G43 was added. G43. In MA1, open loblolly pine woodlands providing high-functioning nesting and foraging habitat for red-cockaded woodpeckers and other plant and animal species are maintained. Loblolly pine forest types are converted to longleaf pine over time.</p>
<ul style="list-style-type: none"> Reword S38 as follows: Active RCW cavity trees will only be cut for insuring public/employee safety. Written authorization from USFWS is required after project-level consultation. Prior to cutting an active RCW cavity tree, it must be replaced with an artificial cavity. Reword G36 as follows: G36. Do not allow any mechanical activities within active red-cockaded woodpecker clusters during the nesting season (April 1– July 31). Exceptions may be made at the project level with written authorization from the U.S. Fish and Wildlife Service, after project-level consultation. 	<p>P.127, FM Forest Plan, G38 was rewritten. The first sentence was rewritten into two sentences so now “Cutting of active RCW cavity tree is prohibited unless formally authorized by FWS” is replaced with “Cutting of active RCW cavity trees is prohibited unless removal is needed for public or employee safety. Written authorization by the USFWS is required after project consultation.” A third sentence was added “Prior to cutting an active RCW tree, it must be replaced with an artificial cavity”.</p> <p>P.131, FM Forest Plan, G36 was reworded to read as a guideline and to address RF instructions.</p> <p>Original wording G36. Do not allow any mechanical activities within active red-cockaded woodpecker clusters during the nesting season (April 1– July 31). Exceptions may be made at the project level with authorization from the U.S. Fish and Wildlife Service.</p>

<ul style="list-style-type: none"> Reword S32 as follows: Ensure each RCW in an active cluster has a suitable cavity, but maintain a minimum of 4 suitable cavities at all times. 	<p>Revised wording G36. Mechanical activities within active red-cockaded woodpecker clusters are not allowed during the nesting season (April 1– July 31). Exceptions may be made at the project level with written authorization from the USFWS after project consultation.</p> <p>To ensure consistency with acronyms in the glossary and within the forest plan, “U.S. Fish and Wildlife Service” was replaced with “USFWS”.</p> <p>P.125, FM forest plan, S32 was reworded</p> <p>Original wording S32. Retain at least 4 suitable cavities within each active RCW cluster on the forest.</p> <p>Revised wording S32. Ensure each RCW in an active cluster has a suitable cavity, but maintain a minimum of 4 suitable cavities at all times.</p>
<ul style="list-style-type: none"> For OBJ-T&E-2, page 107 of the revised plan, change the second paragraph to “<i>Management Strategy:</i> The forest supports a recovered population for the red-cockaded woodpecker in upland longleaf and wet pine savanna ecosystems within Management Area 1 and contributes towards range-wide recovery efforts. Every project with the potential to affect RCW, will implement the Reasonable and Prudent Measures and Terms and Conditions in the biological opinion, and guidelines in the most recent species recovery plan. If site specific conditions do not allow for the implementation of the Reasonable and Prudent Measures and Terms and Conditions or conditions dictate a different management strategy, project-level formal consultation will be reinitiated with USFWS. 	<p>P. 108, FM Forest Plan, OBJ-T&E-2 Red-Cockaded Woodpecker, the 2nd paragraph on management strategy was rewritten.</p> <p>The last sentence was deleted “Every project with the potential to affect RCW, will consider the terms and conditions of the biological opinion, and guidelines in the most recent species recovery plan”</p> <p>and was replaced with</p> <p>“Every project with the potential to affect RCW, will implement the Reasonable and Prudent Measures and Terms and Conditions in the biological opinion, and guidelines in the most recent species recovery plan. If site specific conditions do not allow for the implementation of the Reasonable and Prudent Measures</p>

<p>A project specific decision will not be signed until the Forest Service has received a project specific non-jeopardy biological opinion. Currently the second paragraph ends with the sentence <i>“Every project with the potential to affect RCW will consider the terms and conditions of the biological opinion and guidelines in the most recent species recovery plan.”</i></p>	<p>and Terms and Conditions or conditions dictate a different management strategy, project-level formal consultation will be reinitiated with USFWS. A project specific decision will not be signed until the Forest Service has received a project specific non-jeopardy biological opinion.”</p>
<ul style="list-style-type: none"> • Add definitions for “low” and “moderate” road densities in the Desired Conditions for DC-ECO-4 	<p>P.25, FM Forest Plan, DC-ECO-2, Landscape Structure and Connectivity - The sentence “Open road densities are low to moderate (less than 1 mile/mile²) over time” was added as the last sentence on landscape structure and connectivity.</p> <p>P.27, FM Forest Plan, DC-ECO-3, Landscape Structure and Connectivity - The last sentence of the third paragraph “Open road densities are moderate over time” was deleted and replaced with “Open road densities are low to moderate (less than 1 mile/mile²) over time”.</p> <p>P.29, FM Forest Plan,, DC-ECO-4, Landscape Structure and Connectivity - The sentence “Open road densities are low to moderate (less than 1 mile/mile²) over time” was added as the last sentence on landscape structure and connectivity.</p> <p>P.29, FM Forest Plan,, DC-ECO-4, Stressors - The sentence was rewritten. “Open road and” was deleted and “(less than 1 mile/mile²)” was inserted at the end of the sentence.</p> <p>P.30, FM Forest Plan, DC-ECO-5, Landscape Structure and Connectivity - The sentence “Open road densities are low to moderate (less than 1 mile/mile²) over time” was added as the last sentence on landscape structure and connectivity.</p> <p>P.30 of the FM forest plan, DC-ECO-5, Stressors - The sentence “Open road densities are low to moderate” was deleted.</p>

P.32, FM Forest Plan,, DC-ECO-6, Landscape Structure and Connectivity - The sentence “Open road densities are low to moderate (less than 1 mile/mile²) over time” was added as the last sentence on landscape structure and connectivity.

P.32, FM Forest Plan, DC-ECO-6, Stressors - The sentence “Open road densities are low to moderate” was deleted.

P.34, FM Forest Plan, DC-ECO-7, Landscape Structure and Connectivity - The sentence “Open road densities are low to moderate (less than 1 mile/mile²) over time” was added as the last sentence on landscape structure and connectivity.

P.34, FM Forest Plan, DC-ECO-7, Stressors - The last sentence was rewritten. The language “and road densities are low to moderate” was deleted.

Pp.35-36, FM Forest Plan, DC-ECO-8, Landscape Structure and Connectivity - The sentence “Open road densities are low to moderate (less than 1 mile/mile²) over time” was added as the last sentence on landscape structure and connectivity.

P.36, FM Forest Plan, DC-ECO-8, Stressors - The last sentence was deleted “Open road densities are low to moderate in these ecosystems”.

P.38-39, FM Forest Plan, DC-ECO-9, Landscape Structure and Connectivity - The sentence “Open road densities are low to moderate (less than 1 mile/mile²) over time” was added as the last sentence on landscape structure and connectivity.

P.36, FM Forest Plan, DC-ECO-9, Stressors - The last sentence was deleted “Open road densities are low to moderate”.

	<p>P.48, FM Forest Plan, DC-SCC-5, Landscape Structure and Connectivity, the 2nd paragraph in that section - “(less than 1 mile/mile²) over time” was added to the last sentence.</p>
<ul style="list-style-type: none"> Change language in the revised plan to ensure the terms “salt-water intrusion” and “salt-water influx” are used appropriately. Add definitions of “salt-water intrusion” and “salt-water influx” to the Definitions (Appendix G) 	<p>P.35, FM Forest Plan, DC-ECO-8, Ecological Process, the 4th sentence was rewritten from “In areas not too strongly affected by salt intrusion, drowning by rising sea level or fire, the communities may exist as old-growth, multi-aged forests. To “In areas not too strongly affected by salt-water intrusion or salt-water influx, drowning by rising sea level or fire, the communities may exist as old-growth, multi-aged forests”</p> <p>P.36, FM Forest Plan, DC-ECO-9, FM Forest Plan, Ecological Process, in the 2nd sentence “saltwater” was deleted and replaced with “seawater”</p> <p>P.37, FM Forest Plan, DC-ECO-9, Stressors in the 2nd sentence “salt water intrusion” was deleted and replaced with “salt-water influx as well as intrusion”. The 3rd sentence was rewritten from “Both salt marsh and maritime forests are expected to be influenced by sea-level rise in the future” to “While salt marshes and maritime forests are expected to be influenced by sea-level rise in the future, living coastal lines allow for migration of these ecosystems in response to changes in salinity levels.”</p> <p>P.54, FM Forest Plan, DC-THR-3. Response to Rising Sea level and Salt water Intrusion heading was rewritten to “Response to Rising Sea Level and Salt-water Intrusion and Influx”. In the 2nd sentence “other intrusions of seawater” was deleted and replaced with “salt-water influxes and intrusions”.</p> <p>Pp. 252-253 of FM Forest Plan, Appendix G- Glossary, the following definitions were added: salt-water influx - The movement of saline water into freshwater surface waters (rivers, streams, lakes, ponds and</p>

<ul style="list-style-type: none"> • Add language addressing salt-water intrusion to the applicable columns for MQ25 in Table 5-1, Monitoring questions and indicators for the Francis Marion monitoring plan (pg. 147, revised plan). 	<p>wetlands) resulting in salinity levels higher than current conditions.</p> <p>salt-water intrusion – The movement of saline water into freshwater aquifers resulting in salinity levels higher than current conditions.</p> <p>P. 149, FM Forest Plan, Table 5-1, MQ25, the following changes were made:</p> <p>In the “Indicators” column</p> <p>(I-1) “and depressional wetlands” was inserted in the list.</p> <p>(I-3) “in surface water (rivers and streams) or groundwater (aquifers)” was inserted .</p> <p>In the “Source Partners” column</p> <p>(I-2) “SCHEC” was added as a source of information</p> <p>In the “Adaptive Management Strategy” column</p> <p>(I-3) Alert “(especially during low flow)” was deleted. A second alert related to indicator (I-3) was added:</p> <p>(I-3) Alert: Changes in salinity of drinking water from either surface water (rivers and streams) or groundwater (aquifers) withdrawals,</p> <p>Response: Examine land-cover impacts based on increased salinity levels,</p>
<ul style="list-style-type: none"> • Revise DC-ECO-1 to better describe how the Forest Plan will provide for this network of old growth areas. 	<p>P.22, FM Forest Plan, DC-ECO-1 Old Growth Conditions, the second paragraph was deleted and replaced</p> <p>“During project-level planning, old growth conditions are maintained and restored to meet the Region 8 old growth guidance. Existing and future old growth conditions occur as large, medium and small patches across the landscape Reference old growth characteristics will develop in designated areas across the Francis Marion, such as wilderness, riparian management zones and pocosins, depressional wetland and</p>

Carolina bay groups; and almost all upland longleaf pine woodland and wet pine savanna and flatwoods ecosystems within Management Area 1. In the long term these areas will have abundant older age classes and exhibit old growth characteristics as displayed in the Region 8 old growth guidance. Canopy gaps may occur frequently at a small scale in hardwood ecosystems, or at a larger scale in pine ecosystems that result from landscape-level fire or hurricanes”

was deleted and replaced with

“A network of small and medium sized old growth areas will be found across the Francis Marion National Forest. Areas identified as existing old growth during project-level planning, and areas within old growth compatible designations (where old growth conditions will be found over time) contribute to the old growth network.

Reference old growth conditions occur as high quality plant and animal communities on ecologically-appropriate sites consistent with the Guidance for Conserving and Restoring Old-Growth Forest Communities in the Southern Region. Old growth patches are of different sizes and include eight ecosystems and nine old growth community types exhibiting characteristic composition, structure, ecological processes, and landscape structure and connectivity.

Future fire-adapted old growth conditions and associated community types are promoted within Management Area 1, primarily as upland longleaf woodlands and seasonally wet pine savannas within ½ mile foraging partitions for red-cockaded woodpecker, but also as depressional wetlands and Carolina bays, particularly those dominated by pond cypress. The structure of these old growth communities within Management Area 1 is open woodland or savanna. Within longleaf pine woodland and savanna old growth communities, the minimum

basal area is 10 ft²/acre - with longleaf pine diameter at breast height (DBH) >=16 inches on upland sites, and >=20 inches DBH in wet pine savannas and flatwoods, and the minimum age class of the oldest age class of trees is one hundred and ten years. Scattered large flat-topped longleaf trees providing old growth conditions are present in the canopy of all pine ecosystems. The minimum age class of trees within old growth communities associated with depressional wetlands and Carolinas bays dominated by pond cypress is 120 years.

Future forested wetland old growth ecosystems and associated community types are relatively abundant within designated wilderness areas and riparian management zones forestwide. The minimum age class of the oldest existing age class of trees ranges from 200 years for bald cypress to 100 years for bottomland hardwood species. The minimum basal area in associated old growth stands is typically 40 ft²/acre and DBH of largest trees is typically >=16 inches but may exceed 30 inches.

Old growth conditions for oak and mesic hardwood forests and maritime forests are promoted on unsuitable lands (not in wildlife openings) and as rare communities. The minimum age class of trees of the oldest age class of trees is 120 years in mesic hardwood forests, the minimum basal area is 40 ft²/acre, and the DBH of largest trees is typically >=24 inches.”

P. 141, FM Forest Plan, Table 5-1, MQ8, the following changes were made:

- Include in the Monitoring Program a provision to monitor the progress of providing for a network of old growth areas across the landscape.

In the Monitoring question column

MQ8 was reworded from “MQ 8: To what extent is landscape structural diversity including old growth conditions within the natural range of variation (NRV)

	<p>departure?” To “MQ 8: To what extent is landscape structural diversity meeting desired conditions for structural diversity?”</p> <p>In the Desired Conditions and Objectives column,</p> <p>The reference to “DC-ECO-1” was deleted and replaced with “DC-ECO-2, DC-ECO-3, DC-ECO-4, DC-ECO-5, DC-ECO-6, DC-ECO-7, DC-ECO-8, DC-ECO-9, Sections on Landscape Structure and Connectivity”</p> <p>P. 142, FM Forest Plan, Table 5-1, MQ8a was added</p> <p>In the Monitoring Question column</p> <p>MQ 8a. What is the status and condition of old growth communities across the landscape?</p> <p>In the Indicators column</p> <p>(I-1) Trends in the abundance, distribution, and condition of old growth communities.</p> <p>(I-2) Acres of existing old growth identified during project-level planning</p> <p>In the Desired Conditions and Objectives column,</p> <p>DC-ECO-1 OBJ-ECO-1</p> <p>In the Sources/Partners column</p> <p>Partners include the following: Defenders of Wildlife SCTNC USFWS SCDNR</p>
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	<p>(I-1) Forest GIS digital data layers on ecosystem extent, ecosystem condition, and key characteristics; (I-2) FSVEG database on stand conditions; Project-level decision documents.</p> <p>In the Frequency column</p> <p>Trends in Old Growth Conditions is collected every 5 years. Reported at the 6 year monitoring reporting period.</p> <p>In the Adaptive Management Strategy column</p> <p>Alert: Amount of Old Growth Conditions declines from previous reporting period.</p> <p>Response: Determine the reason for the reduction and assess the reasons why Old Growth conditions are declining, and develop an action plan to address issues and identify solutions.</p>
<ul style="list-style-type: none"> • Add a definition of environmental flow to the glossary. • Add the following language to S20: Maintain environmental flows and levels to ensure ecological integrity. 	<p>P.213, FM Forest Plan, Glossary, the following definition was added: environmental flows - The hydrologic regime required to protect, maintain, or enhance the ecological structure and function of an aquatic resource or a defined set of ecological or environmental benefits. Environmental flow refers to the rate of flow, volume, or water level regime that should be maintained in a stream, lake, pond, spring, wetland, or groundwater system to protect, restore, maintain, or enhance the ecological integrity of the system and its components.</p> <p>P.123, FM Forest Plan, S20 was edited. The sentence “Maintain environmental flows and levels to ensure ecological integrity” was added as the last sentence in S20.</p>

<ul style="list-style-type: none"> Reword Standard 37 to reflect the intent that stands meeting the criteria for old growth (as identified during project level planning) will be managed to maintain or enhance that stand’s old growth characteristics. 	<p>P.125, FM Forest Plan, S37 was rewritten to match the wording of S37 in the FEIS:</p> <p>Original wording S37 Stands meeting the criteria for old growth as defined in the Region 8 old growth Guidance will be identified during project level analyses. Consider the contribution of existing old growth communities to the future network of small and medium-sized areas of old growth conditions including the full diversity of ecosystems across the landscape.</p> <p>Revised wording S37. Maintain stands meeting criteria for old growth during project planning using the criteria in the Region 8 Old Growth Guidance. Consider the contribution of old growth communities to the future network of small and medium-sized areas of old growth conditions including the full diversity of ecosystems across the landscape.</p>
<p>AT-RISK SPECIES</p>	
<ul style="list-style-type: none"> Reword S22 to consistently use language appropriate to a Standard. Add lakes and open water wetlands as features to which a fixed-width RMZ would apply in S22. 	<p>P.123, FM Forest Plan, S22 was rewritten:</p> <p>Original wording S22. Riparian management zones (RMZs) will be identified and designated during the appropriate stages of project planning for all perennial and intermittent streams, ponds, lakes, and springs. RMZs should be 50 feet on each side of intermittent streams and 100 feet on each side of perennial streams. The following direction applies to RMZs:</p> <p>Revised wording S22. Identify and designate riparian management zones (RMZs) during the appropriate stages of project planning for all perennial and intermittent waterbodies (streams, ponds, lakes, springs, and open water wetlands). Maintain RMZs of at least 50 feet on each side of intermittent waterbodies and 100 feet on each side of perennial waterbodies. The following direction applies to RMZs:</p>

- Add definition of “open water wetlands” to Definitions (Appendix G) and change language so that fixed RMZ widths apply to intermittent and perennial waterbodies (not just to intermittent and perennial streams).
- Provide rationale that supports the statement that “increased sediment [$<5\%$] in streams should not inhibit the movement of aquatic organisms and impair aquatic habitat” (pg. 97, FEIS).
- Clarify the plan components regarding large woody debris in riparian management zones and streams and ensure they are consistent.

P.232, FM Forest Plan, Glossary the following definition was added:

“open water wetland - Deeper, normally perennial pools within wetlands and shallow portions of lakes and rivers. Typically home to submerged macrophytes.”

P. 100, FEIS, Chapter 3, Section 3.2.5 Watershed and Water Resources in the last paragraph, 2nd sentence inserted (Hansen 2016, Barnes et al 1997 and Meyer et al 1999) at the end of the sentence: “Therefore, the increased sediment in streams should not inhibit the movement of aquatic organisms and impair aquatic habitat.”

P. 365, FEIS, References added the following citation.

Hansen, W.F. 2016. Email Communication.

P. 358, FEIS, References added the following citation.

Barnes, K.H., J.L. Meyer and B.J. Freeman. 1997. Sedimentation and Georgia’s Fishes: An Analysis of Existing Information and Future Research. Pp. 139-143 in *Proceedings of the 1997 Georgia Water Resources Conference* held March 20-22, 1997 at University of Georgia. Kathryn J. Hatcher, Editor, Institute of Ecology, The University of Georgia, Athens, GA.

P. 371, FEIS, References added the following citation.

Meyer, J., A. Sutherland, K. Barnes, D. Walters and B. Freeman. 1999. A Scientific Basis for Erosion and Sedimentation Standards in the Blue Ridge Physiographic Province. Pp. 321 324 in *Proceedings of the 1999 Georgia Water Resources Conference* held March 30-31, 1998 at University of Georgia. Kathryn J. Hatcher, Editor, Institute of Ecology, The University of Georgia, Athens, GA.

P. 122, FM Forest Plan, S14 was reworded

Original wording S14. Remove large wood added by harvest activities to streams unless it is compatible with native vegetation and aquatic habitat objectives and approved by a biologist. This is an exception to state BMPs.

Revised wording S14. Enforce timber sale contract clauses to remove logging debris added by harvest activities to streamcourses unless it is compatible with native vegetation and aquatic habitat objectives and approved by a biologist. This is an exception to state BMPs.

P. 123, FM Forest Plan, S21 was reworded

Original wording S21. The removal of large woody debris (pieces greater than 4 feet long and 4 inches in diameter) is allowed only if it otherwise poses a risk to water quality, degrades habitat for aquatic or riparian wildlife species, impedes water recreation (e.g. rafting) or poses a threat to private property or Forest Service infrastructure (e.g. bridges). The need for removal must be determined on a case-by-case basis.

Revised wording S21. Do not remove instream large wood (>10 cm diameter and >1m length) unless it poses a risk to water quality, degrades habitat for aquatic or riparian wildlife species, impedes water recreation (e.g. rafting) or poses a threat to human health and safety, private property or Forest Service infrastructure (e.g. bridges). The need for removal must be determined on a case-by-case basis.

P. 129, FM Forest Plan, G28 was moved from Section 4.2.2.6 to Section 4.2.2.4, rewritten and renumbered to G27.

Original wording G28. Dead and downed logs or other woody debris should be retained in riparian management zones unless its removal is deemed necessary for the protection of human life and property.

Revised wording G27. The removal of large woody debris (>10 cm diameter and >1m length) in the RMZ is allowed only if it otherwise poses a risk to water quality, degrades habitat for aquatic or riparian wildlife species, impedes water recreation (e.g. rafting) or poses a threat to human health and safety, private

	<p>property or Forest Service infrastructure (e.g. bridges). The need for removal must be determined on a case-by-case basis.</p>
<p>Add the following language (in bold) to DC-T&E-1: Frosted Flatwoods Salamander - Maintain and restore ecological conditions as described in DC-ECO-2 through 4 for the federally threatened frosted flatwoods salamander within 1,175 acres of designated critical habitat on the forest (See Figure 2-17 below). Within the Wando Resource Integration Zone, project development is based on implementing guidelines in the most recent Recovery Plan (TBD) Within this zone seasonally flooded isolated wetlands provide high quality breeding habitat, while surrounding fire-maintained longleaf-pine dominated woodlands and savannas provide migration routes between breeding habitats. Restore continuous native herbaceous ground-cover and soil and hydrologic characteristics which support the natural function and connectivity of these groundwater-dependent ecosystems. Information is obtained through the forest-wide monitoring program used to establish baselines for habitat trends and conditions (MQ 6-7), measure the quality of salamander habitat, and will assess the stability of populations (MQ 14) to ensure successful reproduction and recruitment of the frosted flatwoods salamander.</p> <p>Add the following language (in bold) to OBJ-T&E-1. Management Strategies: It is anticipated that the US Fish and Wildlife Service (FWS) will release a recovery plan for frosted flatwoods salamander. When a recovery plan is released the Francis Marion will evaluate the need to add or modify plan components to meet recovery goals and coordinate with partners to expand the population.</p>	<p>P. 43, FM Forest Plan, DC_T&E-1 was reworded</p> <p>Original wording DC-T&E-1. Frosted Flatwoods Salamander Maintain and restore ecological conditions for the federally threatened frosted flatwoods salamander within designated critical habitat on the forest (See Figure 2-17 below), which includes 1,175 acres on national forest land within the Wando Resource Integration Zone). Within this zone seasonally flooded isolated wetlands provide high quality breeding habitat, while surrounding fire-maintained longleaf-pine dominated woodlands and savannas provide migration routes. Restore continuous native herbaceous ground-cover and soil and hydrologic characteristics which support the natural function of these groundwater-dependent ecosystems. Information is obtained to ensure successful reproduction and recruitment of the frosted flatwoods salamander.</p> <p>Revised wording DC-T&E-1. Frosted Flatwoods Salamander Maintain and restore ecological conditions as described in DC-ECO-2 through 4 for the federally threatened frosted flatwoods salamander within 1,175 acres of designated critical habitat on the forest (See Figure 2-17 below). Guidelines in the most recent Recovery Plan (not released yet) are considered during project development within the Wando Resource Integration Zone. Within this zone seasonally flooded isolated wetlands provide high quality breeding habitat, while surrounding fire-maintained longleaf-pine dominated woodlands and savannas provide migration routes between breeding habitats. Restore continuous native herbaceous ground-cover and soil and hydrologic characteristics which support the natural function and</p>

<p>Add Guideline to address the appropriate seasons for prescribed fire in Frosted Flatwoods Salamander Critical Habitat.</p> <p>Add a guideline for minimizing ground-disturbing activities during vegetation management within the Frosted Flatwoods Salamander Critical Habitat.</p>	<p>connectivity of these groundwater-dependent ecosystems. Information is obtained through the forest-wide monitoring program used to establish baselines for habitat trends and conditions (MQ 6-7), measure the quality of salamander habitat, and will assess the stability of populations (MQ 14) to ensure successful reproduction and recruitment of the frosted flatwoods salamander.</p> <p>P. 131, FM Forest Plan, G44 was added G44. Ground-disturbing activities (e.g. drum chopping) during vegetation management should be minimized within the Frosted Flatwoods Salamander Designated Critical Habitat.</p> <p>P. 132, FM Forest Plan, G44 was added G45. Within Frosted Flatwoods Salamander Designated Critical Habitat, the preferred time for prescribed burning is when the salamanders are least active on the ground (typically between April and October).</p>
<ul style="list-style-type: none"> • Add an appropriate plan component (standard or guideline) to address the need to identify and mark individuals or occupied habitat in locations of federally-listed plant species prior to the onset of ground disturbing activities where the activity may have negative impacts, so that the plants or habitat can be avoided. • Expand the management strategy in OBJ-T&E-3 to include the need for management activities to reduce woody shrubs in habitat occupied by pondberry to improve habitat. 	<p>P. 125, FM Forest Plan, S42 was added S42. Identify and mark at risk plants in locations of federally list plant species in order to avoid negative impacts to plants from management activities.</p> <p>P. 108, FM Forest Plan, OBJ-T&E-3. Threatened and Endangered Species, Management Strategies. The following sentence was added to the end of the management strategy “Management activities should reduce woody shrubs in pondberry locations to improve habitat.”</p>
<ul style="list-style-type: none"> • Address the intent of the Forest to reduce feral hog populations on NFS and to limit their detrimental effects on ecosystems by strengthening commitment to the coordinated strategy referenced in the draft ROD. 	<p>P. 108, FM Forest Plan, DC-THR-1. Non-Native Invasive Species Management was reworded.</p>

Specifically, change DC-THR-1, Non-Native Invasive Species Management, page 52 to the following:

Non-native invasive species are reduced on the landscape. Populations of non-native invasive species, such as feral hogs, are reduced through partnerships with appropriate state, local and private organizations. Through collaboration with partners on education, timely treatment and control, equipment cleaning and early detection and rapid response, the spread and introduction of non-native invasive species is minimized. Proactive management activities and monitoring reduce the number of non-native species and improve the integrity of ecosystems and forest health. Guidance from the regional noxious and invasive strategy is incorporated into project planning and implementation.

In partnership with the U.S. Department of Agriculture Animal and Plant Health Inspection Service, Clemson University Department of Plant Industry, South Carolina Cogongrass and Wild Hog Task Forces, the South Carolina Department of Natural Resources Aquatic Nuisance Species Program, and the South Carolina Exotic Pest Plant Council, the forest will reduce resource damage due to non-native invasive species through a combination of education, research, and management, not only on national forest lands but with cooperating landowners. Educational materials are provided to the publics which encourage the use of weed-free feed for horses, boat cleaning at landings, and the use of local firewood (cut within 50 miles of where it will be burned). The Forest Service works with state and industry partners on the development of weed-free certifications for soil, gravel, mulch and feed to reduce the introduction of non-native invasive species on national forest lands.

Original Wording DC-THR-1. Non-Native Invasive Species Management

Non-native invasive species occupy less than 1 percent of the landscape. Through collaboration with partners on education, native understory restoration, timely treatment and control, equipment cleaning and early detection and rapid response, the spread and introduction of non-native invasive species is prevented. See Figure 2-24. Proactive management activities and monitoring reduce the number of non-native species and improve the integrity of ecosystems and forest health. Guidance in the regional noxious and invasive weed strategy is considered during planning and implementation of projects.

Prevention and education efforts, coordinated with the U.S. Department of Agriculture Animal and Plant Health Inspection Service, Clemson University Department of Plant Industry, South Carolina Cogongrass and Wild Hog Task Forces, the South Carolina Department of Natural Resources Aquatic Nuisance Species Program, the and the South Carolina Exotic Pest Plant Council, to coordinate educational, research, and management efforts to reduce the problems associated with non-native invasive species on forests, wildlife habitats, and ecosystems. Educational materials are provided to the publics which encourage the use of weed-free feed for horses, boating cleaning at landings, and the use of local firewood (cut within 50 miles of where it will be burned). The Forest Service works with state and industry partners on the development of weed-free certifications for soil, gravel, mulch and feed that will limit the introduction of non-native invasive species on national forest lands.

Revised wording DC-THR-1. Non-Native Invasive Species Management

Non-native invasive species are reduced on the landscape. Populations of non-native invasive species, such as feral hogs,

	<p>are reduced through partnerships with appropriate state, local and private organizations. Through collaboration with partners on education, timely treatment and control, equipment cleaning and early detection and rapid response, the spread and introduction of non-native invasive species is minimized. Proactive management activities and monitoring reduce the number of non-native species and improve the integrity of ecosystems and forest health. Guidance from the regional noxious and invasive strategy is incorporated into project planning and implementation.</p> <p>In partnership with the U.S. Department of Agriculture Animal and Plant Health Inspection Service, Clemson University Department of Plant Industry, South Carolina Cogongrass (See Figure 2-24) and Wild Hog Task Forces, the South Carolina Department of Natural Resources Aquatic Nuisance Species Program, and the South Carolina Exotic Pest Plant Council, the forest will reduce resource damage due to non-native invasive species through a combination of education, research, and management, not only on national forest lands but with cooperating landowners. Educational materials are provided to the public which encourage the use of weed-free feed for horses, boat cleaning at landings, and the use of local firewood (cut within 50 miles of where it will be burned). The Forest Service works with state and industry partners on the development of weed-free certifications for soil, gravel, mulch and feed to reduce the introduction of non-native invasive species on national forest lands.</p>
<ul style="list-style-type: none"> • Clarify the determination (and supporting information) of ecological integrity and species diversity requirements in the ROD. • Provide an additional document to specifically explain steps, rationale and calculations for ecological 	<p>P. 7, ROD, Rationale for Decision, Section 1 inserted the following sentence at the beginning of the 1st paragraph after the heading:</p>

sustainability evaluations, including NRV and departure ratings, species linkages, and criteria to groups.

- Include ESE table in project record

“Plan components emphasize the maintenance and restoration of ecological conditions needed to support viable populations of at-risk terrestrial plant and animal species.”

P. 7, ROD, Rationale for Decision, Section 1c. 2nd Paragraph after heading, after 1st sentence inserted the following:

“Plan components emphasize contributions to federal recovery efforts for the red-cockaded woodpecker, the frosted flatwoods salamander, American chaffseed, Pondberry, and Canby’s dropwort.”

P. 6, ROD, Rationale for Decision, Section 1a. Paragraph 6, after 1st sentence inserted the following:

“Plan components emphasize restoration of fire-adapted longleaf pine woodland and savanna ecosystems on 91,000 acres within Management Area 1.”

[Appendix D edits](#)

P. 166, FM Forest Plan, Appendix D, Table D-2. Species groups and associated ecosystems on the Francis Marion National Forest. Deleted the acreage column.

P. 167-173, FM Forest Plan, Appendix D, Table D-2. Species groups and associated ecosystems on the Francis Marion National Forest. Species listing by Species group was corrected.

Added the following species to these species groups

Pine Upland/Wetland Ecotone Associates

- Florida Thorough-wort

Calcareous Mesic Hardwood Associates

- Black-stem spleenwort
- Chapman’s Redtop

Mesic and Wet Pine Savanna Associates

- Ravenel’s Eryngium
- Small’s Bog Button

	<p>Deleted the following species from these species groups</p> <p>Pond Cypress Savanna Associates</p> <ul style="list-style-type: none"> • Coastal-plain thorough-wort <p>Upland Pine Woodland Associates</p> <ul style="list-style-type: none"> • p <p>P. 175, FM Forest Plan, Appendix D, Table D-4 Crosswalk of at-risk species and forest plan components was deleted and was replaced by FEIS Appendix E Table E-46.</p> <p>See FM FEIS, APPENDIX E edits listed at the end of this document</p>
<ul style="list-style-type: none"> • Clarify that protected public and private lands (including lands under conservation easements) inform land adjustment decisions under Forest-wide desired condition DC-COM-1. • Clarify coordination efforts with Berkeley County to implement green infrastructure and the Blueway Plan are important to the desired condition of Wando, Wambaw and Santee RIZs. 	<p>P. 65, FM Forest Plan, DC-COM-1, 2nd Paragraph, the following sentence was inserted after the 1st sentence. “Protected public and private lands inform land adjustment decisions.”</p> <p>P. 65, FM Forest Plan, DC-RIZ-Wando-1. Desired Conditions for Ecological Sustainability in the Wando RIZ, the following paragraph was added. “Respond to Human Population Growth and Development. State and private landowners’ open spaces or natural areas link with the Francis Marion to connect ecosystems across property lines. The Francis Marion collaborates with the town of Wando and with Berkeley County to implement Smart Growth and sustainable development principles and Berkeley County’s Green Infrastructure and Blueway plan. Unincorporated communities are acknowledged as a valuable part of the larger social landscape.”</p> <p>P. 91, FM Forest Plan, DC-RIZ-Wambaw-1. Desired Conditions for Ecological Sustainability in the Wando RIZ, the following paragraph was added.</p>

	<p>“Respond to Human Population Growth and Development. State and private landowners’ open spaces or natural areas link with the Francis Marion to connect ecosystems across property lines. The Francis Marion collaborates with the community of Honey Hill and with Berkeley County to implement Smart Growth and sustainable development principles and Berkeley County’s Green Infrastructure and Blueway plan. Unincorporated communities are acknowledged as a valuable part of the larger social landscape.”</p> <p>P. 101, FM Forest Plan, DC-RIZ-Santee-1. Desired Conditions for Ecological Sustainability in the Wando RIZ, the following paragraph was added.</p> <p>“Respond to Human Population Growth and Development. State and private landowners’ open spaces or natural areas link with the Francis Marion to connect ecosystems across property lines. The Francis Marion collaborates with the communities of Witherbee and Cordesville and with Berkeley County to implement Smart Growth and sustainable development principles and Berkeley County’s Green Infrastructure and Blueway plans. Unincorporated communities are acknowledged as a valuable part of the larger social landscape.”</p>
<ul style="list-style-type: none"> • As is identified in the “Ten Percent Old Growth Objective and Standard to Protect Old Growth” issue, Standard 37 in the revised plan will be reworded. • In the FEIS on pages 208 and 209, update the reference to Standard 37 to match the new language for S37 that will be in the revised plan. • Review the description of the “effects” on pages 208 and 209 of the FEIS to ensure changes to S37 are reflected. • Review documents in the project record to ensure descriptions of what was identified as “future old growth” on page 207 of the FEIS and what was used to calculate the acres of future old growth match. 	<p>P.125, FM Forest Plan, S37 was reworded in the FM forest plan to match S37 in the FEIS, so no changes are needed to the effects analysis on old growth in Chapter 3 of the FEIS.</p> <p>Original wording “S37 Stands meeting the criteria for old growth as defined in the Region 8 old growth Guidance will be identified during project level analyses. Consider the contribution of existing old growth communities to the future network of small and medium-sized areas of old growth conditions including the full diversity of ecosystems across the landscape.”</p>

	<p>Revised wording S37. Maintain stands meeting criteria for old growth during project planning using the criteria in the Region 8 Old Growth Guidance. Consider the contribution of old growth communities to the future network of small and medium-sized areas of old growth conditions including the full diversity of ecosystems across the landscape.</p>
<p>TIMBER MANAGEMENT AND NFMA</p>	
<ul style="list-style-type: none"> • Include in the Record of Decision a description of the management intent for the lands in the suited timber base that are being managed for at-risk species. 	<p>P.8 ROD, Rationale for My Decision, 1c) Provide for plant and animal diversity, including” at-risk” terrestrial and aquatic species added the following paragraph to the end of this section.</p> <p>“After carefully considering the needs of rare plants and animals, red-cockaded woodpecker foraging habitat, designated critical habitat for frosted flatwoods salamander and rare plant communities are included in the suitable land base for timber production. Regularly scheduled timber harvests are essential to maintain the open conditions preferred by these species. The production of timber is not the primary driver of project-level activities; timber along with prescribed burning and other management tool are used to achieve and maintain habitat conditions for at-risk plant and animal communities while restoring highly diverse ecosystems that provide for ecological integrity.”</p>
<ul style="list-style-type: none"> • Change Standard S22 to define and include open water wetlands. Adjust any changes to the suited acres and timber volume determinations that are applicable, along with any applicable changes to the Aquatics sections. 	<p>P.123, FM Forest Plan, S22 was rewritten.</p> <p>Original wording S22. Riparian management zones (RMZs) will be identified and designated during the appropriate stages of project planning for all perennial and intermittent streams, ponds, lakes, and springs. RMZs should be 50 feet on each side of intermittent streams and 100 feet on each side of perennial streams. The following direction applies to RMZs:</p> <p>Revised wording S22. Identify and designate riparian management zones (RMZs) during the appropriate stages of</p>

- Include in the ROD a discussion of the agency's intent in implementing the forest plan's timber suitability direction.

project planning for all perennial and intermittent waterbodies (streams, ponds, lakes, springs, and open water wetlands). Maintain RMZs of at least 50 feet on each side of intermittent waterbodies and 100 feet on each side of perennial waterbodies. The following direction applies to RMZs:

P.232, FM Forest Plan, the following definition was added: “**open water wetland** - Deeper, normally perennial pools within wetlands and shallow portions of lakes and rivers. Typically home to submerged macrophytes.”

P.137. FM Forest Plan, Chapter 4, Table 4.3 Timber Suitability for the Francis Marion National Forest; P.157, FM Forest Plan, Appendix B, Table B-1; and P.9, FM FEIS Appendices, Appendix B, Table B-1. Lands suitable for timber production were edited. In the description of Riparian Management Zones, the word “streams” was deleted and replaced with “waterbodies.”

See section below Changes in the Unsuitable for Timber Production Land Base

P.8 ROD, Rationale for My Decision, 1c) Provide for plant and animal diversity, including” at-risk” terrestrial and aquatic species added the following paragraph to the end of this section.

“After carefully considering the needs of rare plants and animals, red-cockaded woodpecker foraging habitat, designated critical habitat for frosted flatwoods salamander and rare plant communities are included in the suitable land base for timber production. Regularly scheduled timber harvests are essential to maintain the open conditions preferred by these species. The production of timber is not the primary driver of project-level activities; timber along with prescribed burning and other

	management tool are used to achieve and maintain habitat conditions for at-risk plant and animal communities while restoring highly diverse ecosystems that provide for ecological integrity.”
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Changes in the Unsuitable for Timber Production Land Base to Reflect RMZs around Open Water Wetlands

Prepared by: Mary Morrison
12/16/2016

Based on the RF instructions to address the objection resolution, an additional analysis of RMZs around open water wetlands was completed by a GIS specialist. See below for the analysis process. He used the acreage of unbuffered ponds/lakes (from SC Lidar Consortium) clipped to FS ownership, minus the areas that are already in the unsuitable layer, resulting in 108 acres of open water wetlands not buffered. The acreage of the above after it's buffered by 100 feet and the unsuitable layer is again subtracted, is 432 acres.

Analysis name: Riparian Management Zones (RMZs) – With Lakes and Ponds

Analysis start date: 12/12/2016

Analysis end date: 12/13/2016

Analyst: Andy Maceyka

Analysis Steps:

1. Clipped SC LIDAR Consortium waterbody layer to the FS ownership layer to get LakePond_ByFSOwnership.
2. Erased LakePond_ByFSOwnership by Unsuitable_Alt2 layer to get LakePond_ByFSOwnership_erase. Calculated acres.
3. Buffered LakePond_ByFSOwnership_erase by 100 ft to get LakePond_ByFSOwnership_erase_buffer100ft.
4. Erased LakePond_ByFSOwnership_erase_buffer100ft by Unsuitable_Alt2 to get LakePond_ByFSOwnership_erase_buffer100ft_erase. Calculated acres.
5. Added these areas to the Unsuitable_Alt2 layer to get Unsuitable_wLakePond.
6. The project folder can be found here:

T:\FS\NFS\FrancisMarion\Project\FSSO\FrancisMarionForestPlanRevision\GIS\EIS\Analysis\Timber\RiparianZones_20141017_JPurnell\MapPackage\20161212. .

Various tables on the number acres suitable for timber production were modified in response to adding riparian management zones around “open water wetlands” and the resulting increase of 432 acres that are “unsuitable for timber production.” See table on next page and below for a summary of the changes. This modification applied to the Timber Suitability Tables in the Plan and FEIS. Specific changes include:

Forest Plan Chapter 4, Table 4.3 Timber Suitability for the Francis Marion National Forest (p. 137) and Appendix B, Table B-1. Lands suitable and unsuitable for timber production (p. 157) were modified to reflect the increase in the acres of the unsuitable for timber production land base. In the Forest Plan Chapter 4 and Appendix B, the original number of acres in the RMZ was 20,969 and the revised number of acres in the RMZ is now 21,401. Riparian Management Zones were rewritten to refer to perennial and intermittent waterbodies.

Classification	Original Acres	Revised Acres
Riparian management zones (w/in 100’ of perennial waterbodies or within 50’ of intermittent waterbodies)	20,969	21,401
Lands Suitable for Timber Production	194,023	193,483
Lands Not Suitable for Timber Production	65,602	66,142

FEIS, Chapter 2 Table 2-3. Acres suitable for timber production estimated 10-year volumes sold for the different plan alternatives (p.44); Table 3-57 Acres suitable for timber production and estimated 10-year volumes sold for the different plan alternatives (p.238) and FEIS Appendix B, Table B-1. Lands suitable for timber production (acre) were edited to reflect an increase of 432 500 acres in the number of acres unsuitable for timber production in Alternatives 2 and 3 and decrease in the suitable timber land base. No changes were made in the acreage for Alternative 1.

The difference of 432 acres reduces the suitable land base by 1/359th or 0.3%. This change in the number of acres unsuitable for timber production is minimal and within the margin of error. The change in acres for timber production is not enough to change the projected timber sale quantity and sustained yield limit due to rounding and the scale of the change. See Appendix B, Table B-2 Planned timber sale program; decadal volume outputs for 1st and 2nd decade in the revised forest plan. No changes in the FEIS analysis were made in response to this change in the suitable timber production land base.

Classification	Alternative 1		Alternative 2		Alternative 3	
	Original Acres	Revised Acres	Original Acres	Revised Acres	Original Acres	Revised Acres
Riparian management zones (w/in 100’ of perennial streams or within 50’ of intermittent streams in Alts 2-3)	15,212	N/A	20,969	21,401	19,975	20,407

Lands Suitable for Timber Production	184,343	N/A	194,023	193,483	177,307	176,875
Lands Not Suitable for Timber Production	75,282	N/A	65,602	66,142	82,318	82,750

Classification	Acres
Total National Forest System Lands	259,625
Nonforest lands	
Water and marsh	925
Brush	6,757
Wildlife openings	555
Rights-of-way	126
Administrative sites	20
Developed recreation sites	80
Borrow pits	6
Cemeteries	6
Lands Withdrawn From Timber Production	
Wilderness areas	13,649
Guilliard Lake Research Natural Area	23
Lands That May be Suitable for Timber Production	237,478
Lands where timber production is not compatible with achieving desired conditions and objectives (lands not appropriate for timber production.)	43,995
Santee Experimental Forest	5,966
Recommended Wilderness	

Pond pine forest types	6,132
Riparian management zones (w/in 100' of perennial streams or within 50' of intermittent streams)	21,401
Inventoried roadless area	1,394
Red-cockaded woodpecker clusters	6,481
Genetic resource management area (seed orchard)	673
Special uses	18
Cedar Hill Island	802
Guilliard Lake Scenic Area	1,054
Battery Warren Historic Area	74
Lands Suitable for Timber Production	193,483
Lands Not Suitable for Timber Production	66,142

Other Edits to FM forest plan

Cover page was updated to reflect change in date and document number.

Table of Contents update to reflect changes.

Hyperlinks repaired.

The following terms were made consistent throughout the forest plan to match the acronyms in the glossary:

- FWS and U. S. FWS were changed to USFWS.
- dbh was changed to DBH.
- DHEC was changed to SCDHEC
- DNR was changed to SCDNR

Basal area was referred to inconsistently including “square feet per acre basal area”; “square feet of basal area”; “feet² of basal area” and “ft.² of basal area”. References to basal area were changed to “ft² of basal area/acre” to endure consistency.

P.7, FM Forest Plan, Section 1.6.2 Social Benefits, 2nd paragraph, 1st sentence “managed by” was inserted before U.S. Fish and Wildlife Service and “USFWS” was inserted afterwards.

P.11, FM Forest Plan, Overview, 1st paragraph, last sentence “and how this direction is organized in the forest plan” was inserted at the end of the sentence.

P. 13, FM Forest Plan, Chapter 2, Table 2-1, 2nd Column. (acres round to nearest hundred unless noted) was inserted after Administrative boundary and acres were rounded.

P. 16, FM Forest Plan, Chapter 2, Table 2-2, 2nd and 3rd Columns, acres were rounded to nearest hundred acres.

P.21, FM Forest Plan, Chapter 2, 4th paragraph the reference to “DC-ECO-9” was deleted and replaced with “DC-ECO-10 Rivers and Streams”.

P.31, FM Forest Plan, Chapter 2, DC-ECO-6, 2nd paragraph, 1st sentence 5,809 was changed to 5,800 to reflect rounding to nearest hundred acres.

P.38, FM Forest Plan, Chapter 2, 1st paragraph, 1st sentence “salt marshes, maritime forests, depressional wetlands, Carolina bays” inserted and “and depressional wetlands and Carolina bays” was deleted from the end of the sentence.

P. 40, FM Forest Plan, Chapter 2, Table 2-3, 2nd and 3rd Columns, acres were rounded to nearest hundred acres.

P. 73, FM Forest Plan, Chapter 2, DC-RIZ-Coastal-1

- **Rapid Response to Climate Change and Sea-Level Rise.** Inserted “cultural” before sites.
- **Response to Human Population Growth and Development.** 2nd sentence inserted “the towns of” before Awendaw; “and” before McClellanville and “with” before Charleston County.

P. 109, FM Forest Plan, Chapter 3, OBJ-ECO-6. 3rd paragraph, 4th bullet. Deleted “Only 12% or our maritime forests are in late succession, compared to 51% predicted in LANDFIRE PNV models, and none of our maritime forests meet age criteria for old growth.”

P. 112, FM Forest Plan, Chapter 3, OBJ-WAT-2. 1st paragraph, 1st sentence. Inserted “at least” before 5.

Pp. 127 to 129, FM Forest Plan, Chapter 4, 4.2.1 Standards- Standards S42 to S56 were renumbered to S43 to S57 to reflect the addition of standard S42.

P. 132, FM Forest Plan, Chapter 4, 4.2.2 Guidelines, 4.2.2.5 Guidelines for Channeled Ephemeral Stream Zones. G27 was renumbered to G28 to reflect that G28 was moved to the section on Riparian Management Zones.

P. 132, FM Forest Plan, Chapter 4, 4.2.2 Guidelines, 4.2.2.6 Guidelines for Wildlife Habitat Management. 1st paragraph, 1st sentence. Reference to G28 was deleted and replaced with a reference to G29.

P. 133, FM Forest Plan, Chapter 4, 4.2.2 Guidelines, 4.2.2.7 Guidelines for At-risk Species and Ecological Sustainability. 1st paragraph, 1st sentence. Reference to G41 was deleted and replaced with a reference to G45 to reflect the additional guidelines added in response to the RF instructions.

P. 134, FM Forest Plan, Chapter 4, 4.2.2 Guidelines, Guidelines 42 to G45 were renumbered to G46 to G49 to reflect the numbering change when 4 new guidelines were added to the At-risk species guidelines.

Pp. 157 to 158, FM Forest Plan, Appendix A, Table A-1. Labels for the desired conditions DC-ECO-1 to DC-ECO-9 were corrected to DC-ECO-2 to DC-ECO-10.

P. 160, FM Forest Plan, Appendix B, Suitability for Timber Production. 4th paragraph, 1st sentence was reworded. “virtually all of the” was deleted and replaced with “most”

Pp. 182-183, FM Forest Plan, Appendix E, Maps. Map for the Francis Marion National Game Preserve was added and labeled as Figure E-5. Figure E-5 Map of eligible wild and scenic rivers on the Francis Marion National Forest was renumbered to Figure E-6.

P. 188, Appendix G: Acronyms and Definitions, 2nd Column, “FC- Forestry Commission” was inserted.

P. 191, Appendix G: Acronyms and Definitions, 1st Column, “SC- South Carolina” was inserted.

Other FEIS Edits

Cover page was updated to reflect change in date and document number

Hyperlinks for websites were restored throughout.

P.17, FEIS, 1.6 Public Involvement. The paragraph “Based on comments from Forest Service personnel, public, other agencies and non-governmental organizations, the planning interdisciplinary team developed a list of issues to address in this document.” Was moved to the beginning of 1.7 Issues.

P.17, FEIS, 1.6 Public Involvement and Appendix A. The following three paragraphs were inserted at the end of Section 1.6 in Chapter 1 and at the end of Appendix A in the FEIS.

“This FEIS was also subject to a pre-decisional objection process pursuant to 36 Code of Federal Regulation (CFR) § Part 219 Subpart B. A 60-day objection period on the draft Record of Decision (ROD), revised forest plan, and final environmental impact statement ran concurrently with an objection period for the Francis Marion’s list of species of conservation concern (SCC). This objection period was initiated on August 26, 2016 with the publication of the Notice of Objection Filing Period in *The State* newspaper. One objection was received during the objection filing period. The objector brought up issues concerning forest plan components and related analysis in the

FEIS, as well as concerns about the process and documentation related to the selection of the Francis Marion's SCC. These two topics are addressed by different reviewing officers and separate meetings were held with the objector to discuss their objection issues.

On December 1, 2016, the reviewing officer for Region 8 and his staff met with the objector and agreed to changes in forest plan components, the draft ROD and the FEIS that primarily addressed issues with plan component specificity, old growth, riparian management zones, management requirements for the Red-cockaded woodpecker, habitat conditions for other at-risk species and clarified the process used for ecological sustainability (including species grouping and key characteristics of their habitat conditions). These changes are detailed in a document titled *–Summary of Changes to the Revised Plan and FEIS* and is available on the Forest's website at <http://www.fs.usda.gov/detail/scnfs/landmanagement/planning/?cid=stelprdb5393142>. “

On December 2, 2016, the reviewing officer for the Washington Office and his staff met with the objector and agreed to review 25 species for further consideration as species of conservation concern, which will take place early in calendar year 2017. This review may result in changes to the list of the Francis Marion's Species of Conservation Concern, and in turn, any applicable forest plan components and FEIS analysis related to any species added to the Francis Marion's Species of Conservation Concern list. If substantial changes are needed, then a forest plan amendment and updated analysis in the FEIS may be required.

P. 86, FEIS, Deleted the word “endangered” before wood storks and inserted “threatened”.

P.148, FEIS, 3.3.2.2, consultation w/FWS on the forest plan does NOT (need to insert the word “not”) evaluate site-specific activities.

p. 137, FEIS, 3.3 Biological Environment, 3.3.1 Ecosystems, Table 3-20, Connectivity, Paved Open Road Density. Delete the following: (less than 1 mile square mile).

p. 218, FEIS, 3.3.4, Forest Health and Protection, Affected Environment, Old Growth, Future Old Growth. Delete 4. Depressional Wetlands and Carolina Bays, Pocosins, and Narrow Forested Swamps and Blackwater Stream Floodplain Forests within Management Area 1 only (Management Area 26 in Alternative 1).

p. 218, FEIS, 3.3.4, Forest Health and Protection, Affected Environment, Old Growth, OBJ-ECO-1. Old Growth Conditions. Reworded OBJ-ECO-1 to match rewrites in the FM Forest Plan. It now reads

OBJ-ECO-1. Old Growth Conditions

Over the next 10 years, contribute to a network of small (between 1 and 99 acres) and medium (between 100 and 2,499 acres) – sized areas providing future old growth conditions during project or activity planning.

Management Strategy: Old growth reference conditions for longleaf pine ecosystems are maintained or restored within 0.5 mile foraging partitions for the endangered red-cockaded woodpecker in Management Area 1 (53% of the total ecosystem extent), wilderness and riparian management zones and other unsuitable lands and rare communities.

P. 218. FEIS, 3.3.4, Forest Health and Protection, Affected Environment, Old Growth, S37. No Changes. Standard in FM Forest Plan was reworded.

P. 230. FEIS, 3.3.4, Forest Health and Protection, DC-THR-1 was reworded to match FM forest plan.

P. 239. FEIS, 3.4.1, Forest Products and Timber Harvest, 1st paragraph, last sentence “2” was changed to “few” and “28” was changed to “18”.

P. 11. FEIS, Appendix B, Step 2, 4th paragraph, 1st sentence, “virtually all” was deleted and replaced with “most”

P.232, p.233, p.234, FEIS, Appendix G Biological Assessment and Biological Evaluations. Biological Evaluation, Reword S41 so that it is consistent with Forest Plan language.

Pp. 237-238, FEIS, Appendix G Biological Assessment and Biological Evaluations. Biological Evaluation, Delete the following references not used: USDA – 2008; USDA – 2009

U.S. Department of Agriculture – Forest Service Francis Marion & Sumter National Forest. 2008. American Chaffseed Monitoring Trends Francis Marion National Forest. Unpublished. Columbia, SC.

U.S. Department of Agriculture – Forest Service Francis Marion & Sumter National Forest. 2009. Summary of Pondberry Monitoring Data – Francis Marion National Forest. Unpublished. Columbia, SC.

P. 237, FEIS, Appendix G Biological Assessment and Biological Evaluations. Biological Evaluation. Signature date changed July 21, 2016 to December 17, 2016

FEIS and FEIS Appendix E, Edits made in response to the RF instructions on clarifying the Ecological Sustainability Evaluation Process

Species Group Edits

p.189, FEIS, Table 3-38 and Appendix E, Table E-10, p.99. Add *Asplenium resiliens* to list of Calcareous Mesic Hardwood Associates, Black-stem spleenwort, 1 known occurrence on the forest.

p.182, FEIS, Table 3-32, and Appendix E, Table E7. Add *Eryngium aquaticum* (Ravenel’s Eryngo, 2 known occurrences) and *Lachnocaulon minus* (Small’s Bog Button, 1 known occurrence) to list of Mesic and Wet Pine Savanna Species

p.185, FEIS, Tables 3-34 and p.179, Table 3-29, and Appendix E, Table E-6 and E-8. Remove *Eupatorium recurvans* (from pond cypress savanna associates) and add *Eupatorium anomalum* (Florida thoroughwort, 1 occurrence) to Pine Upland/Wetland Ecotone Associates

p.187, FEIS, Table 3-36, Move *Tridens chapmanii* (Chapman’s redtop) from upland pine woodland associates to Calcareous Mesic Hardwood Associates (p.189, Table 3-38) and Appendix E, pp.98-99.

p. 90, Appendix E, Delete last sentence, “Rationale and sources used in making choices were recorded in the ecological sustainability tool (ESE). [This is on p 4 of attached Appendix E]

p.96. Appendix E. Change At-Risk Species and Species Group Heading To Ecological Conditions for At-Risk Species

p. 96. Appendix E. Add the following sentence to the first paragraph on p.95. Sixty-seven species of Conservation were designated by the Regional Forester on August 11, 2016.

p. 97-100. Appendix E, Delete the last sentence in the last paragraph. Add the following paragraphs to this section:

Public involvement on the development of the ecosystems and at-risk species included:

- Scoping on the assessment as part of the proposed action, (The assessment is posted on-line at <http://www.fs.usda.gov/detail/scnfs/landmanagement/planning/?cid=stelprd3797222>)
- Findings from the assessment were presented at the Ecological Sustainability forum held August 6, 2013. (Meeting notes are posted on-line at <http://www.fs.usda.gov/detail/scnfs/landmanagement/planning/?cid=stelprdb5436948>)
- At-risk species meetings held April 15-17, 2014 meeting notes are posted on-line at <http://www.fs.usda.gov/detail/scnfs/landmanagement/planning/?cid=stelprd3797222>)

A complete list of at-risk species, their relationship to ecological conditions, key characteristics, and forest plan components – including coarse filter and fine filter components, is displayed in Table E-46. The best available science was used in the development of ecological conditions for at-risk species, including species groups (Tables E-5 through E-15), associated ecosystems and habitat acres (Table E-4), key characteristics associated with both at-risk species and associated ecosystems (Tables E-20 through E-36), and associated forest plan and management strategies. Information on ecological conditions for rare plants and associated ecosystems were developed both internally by Forest Botanist/Ecologist Robin Mackie, Interdisciplinary Team Members, Subject Matter Experts during the Collaborative Specialist Meetings (including subject matter experts from NatureServe, TNC, ARC, fed/state government, academia and other partners) held in 2014, USFS Regional Office Subject Matter Experts and reviewed during the Reference Sites for Ecological Systems field trip held November 7-9, 2012.

The forest also considered plant survey and monitoring efforts of Glitzenstein and Streng (2010,2012a), Everett (2012), Gaddy, Lee, and Nelson (2012, 2014), McMillan, Porcher, and McMillan (2001), Gramling (2003, 2010), Natureserve (2012,2015), Porcher (1995,2005), the Carolina Vegetation Survey (<http://cvs.bio.unc.edu/>), plant habitats in Weakley – Flora of the Carolinas, Virginia, and Georgia (2015).

For identifying ecological conditions for amphibians and reptiles, the Forest relied on the internal expertise of former Forest Wildlife Biologist Mark Danaher, district biological technician Danny Carlson, Interdisciplinary Team Members, Subject Matter Experts during the Collaborative Specialist Meetings (including subject matter experts from NatureServe, TNC, ARC, fed/state government, academia and other partners) held in 2014, USFS Regional Office Subject Matter Experts. The forest also considered and included numerous literature citations in the process record, as well as the expertise of the Amphibian and Reptile Conservancy (Means, 205,2006; Martin et.al., 2016;).

References for ecological conditions for aquatic species include former fisheries biologist (Jeannie Riley), acting fisheries biologist (Thomas Scott), and current forest fisheries biologist (James Whalen), Interdisciplinary Team Members, Subject Matter Experts during the Collaborative Specialist Meetings (including subject matter experts from NatureServe, ARC, fed/state government, academia and

other partners) held in 2014, USFS Regional Office Subject Matter Experts. The forest also considered numerous references cited in the assessment (including Hansbarger and Dean, 1994; Kohlsaet et.al., 2005).

Best available science for insects considered North American and South Carolina Butterfly Count information and trends, dating back to 1993 (LeGrand and Chapman, 2015; Sutton et.al., 2015), and for bats, birds (La Sorte et.al., 2007), considered the South Carolina Comprehensive Wildlife Strategies (Kohlsaet et.al., 2005; SCDNR, 2015), numerous literature references cited in the FEIS and assessment, as well as by Danaher (2014). Species were reviewed by Interdisciplinary Team Members, Subject Matter Experts during the Collaborative Specialist Meetings held April 15-17, 2014 in Columbia, SC and USFS Regional Office Subject Matter Experts.

Information on the distribution of known species occurrences was confirmed through a review of digital data maintained by the Forest and by South Carolina Heritage Program. The Forest and species and conservation experts recognize that some uncertainty will always exist in predictions of future trends for rare species, their distribution, rarity, management responses, and threats and stresses. New information regarding the list of species of conservation concern will be evaluated periodically consistent with FSH 1909.12, Chapter 20, 21.22b.

Existing ecological conditions, including the status of key characteristics, compared to the expected historic or natural range of variation for each ecosystem, was disclosed in the assessment (FPA2.1_TerrestrialAquaticEcosystem_Watersheds), as is the status of federally-listed species and potential species of conservation concern, and associated species groups and ecological conditions (FPA5.1.5.25.3_AtRiskSpecies; FPS5.4_ThreatenedEndangered_ProposedWildlifeSpecies).

The following is an excerpt from the ecosystem section of the assessment:

In 2009, the U.S. Forest Service entered into a National Memorandum of Understanding with Natureserve to cooperate in the development and application of ecological classification and mapping standards, and in biodiversity conservation information. Several state classifications of natural vegetation are available and were consulted in development of a revised ecosystem framework and at risk species groups including those for South Carolina (Nelson, 1986), North Carolina (1990), and Georgia (Edwards et.al., 2013). The Natureserve Ecological System framework (2012) is a mid-scale ecosystem classification which is based on the International Vegetation Classification System, and forms the basis of LANDFIRE (Landscape Fire and Resource Management Planning Tools) and Southeast Gap Analysis Project, collaborative vegetation mapping tools. Natureserve's ecosystem classification is informed by previous vegetation classification efforts, and incorporates physiognomy, biogeography, and hydrology into one classification, representing the next step in ecological classification.

And later:

The National framework of ecological units developed by the Forest Service of the U.S. Department of Agriculture in 1993 (Cleland et.al., 1997), specifies the consideration of landform, soils or geology, and potential natural vegetation in the classification of ecological units and ecological potential at various scales.

.. Given the new information and technology available since 1996, a revised ecological classification units for the Francis Marion National Forest, at both the landtype association level (LTA), and the landtype (LT) level were developed in 2013 (Simon and Hayden, 2013). This information will be referred to throughout the analysis.

At the finer scale of Landtype and Landtype Phase, Simon and Hayden (2013) modeled ecological systems and acreage, using the Natureserve Ecosystem framework. The following shows the acreage of each ecosystem predicted based on a 1st Draft of Ecological Modeling efforts and based on sampling of vegetation at over 1000 locations (Simon and Hayden, 2013). Detailed descriptions of each of the ecological systems are available on request (Natureserve, 2012), and will be referred to throughout this document. Descriptions of structure and disturbance regimes for ecological systems are addressed in the relevant biophysical setting descriptions from LANDFIRE (www.landfire.gov/).

Existing condition – by ecosystem, for each key characteristic/ecosystem combination, was initially determined and disclosed in the assessment, using the mapped ecological unit layer in GIS, and overlaying existing information - including forest type groups, existing fire regimes, and landscape structural diversity – to compare existing condition to that which would be expected based on the natural and historic range of variation (NRV) for each ecosystem. (Note: 2012 planning regulations refer to natural range of variation hence the change the NRV from HRV). Existing conditions for each forest ecosystem and key characteristic combination - was disclosed in the assessment, then developed for each Alternative at 10- and 50- year intervals and disclosed in the DEIS and FEIS.

The 10- and 50- year predictions for ecological conditions for at-risk species in Alternative 1, consider the distribution at-risk species, in comparison to the fire-adapted ecosystem acreage and distribution within Management Area 26, the management area designated to longleaf restoration with 2-3 year fire return intervals in the 1996 Revised Land Management Plan. In Alternative 1, at the finer scale many of the more newly designated at-risk species would not receive the protection of the suite of desired conditions, objectives, standards and guidelines in the 2016 Revised Land Management Plan.

The 10- and 50- year predictions for ecological conditions for at-risk species in Alternative 2, considered the distribution of at-risk species, in comparison to the fire-adapted ecosystem acreage within Management Area 1, the management area designated to longleaf and fire-adapted ecosystem restoration within Alternative 2 of the 2016 Revised Land Management Plan. The suite of desired conditions, objectives, standards and guidelines in the 2016 Revised Land Management Plan would also apply. At 10- years, limits for timber management were based on our objectives, and set by our capacity to restore ecosystems through the use of timber management, therefore ecological sustainability scores for longleaf ecosystems increased after 50- years, compared to 10- years.

The 10- and 50- year predictions for ecological conditions supporting at risk species in Alternative 3, considered the distribution of at-risk species, in comparison to the fire-adapted ecosystem acreage within Management Area 1, the management area designated to longleaf and fire-adapted ecosystem restoration within Alternative 3 of the 2016 Revised Land Management Plan. Management Area 1 is smaller in Alternative 3 compared to Alternative 2. At 10-years, the forest is limited in both capacity and time to restore longleaf ecosystems - set by objectives, therefore ecological sustainability scores for fire-adapted ecosystems increased after 50- years,

compared to 10- years. In Alternative 3, as in Alternative 2, the suite of desired conditions, objectives, standards and guidelines in the 2016 Revised Land Management Plan apply.

Final conclusions regarding ecological conditions supporting at-risk species viability/recovery, considered the Overall Ecological Sustainability Ratings (Table E-45), which represent a composite or overall condition score for each ecosystem/key characteristic combination and is calculated by multiplying individual key characteristic indicator values by indicator weights and then averaging the score.

The following table was added to the end of Appendix E in the FEIS and replaces the forest plan component table that was in Appendix D of the FM forest plan..

Table E-46. At-Risk Species and associated ecological conditions, key characteristics, and forest plan components, Francis Marion National Forest

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
<i>Ambystoma cingulatum</i>	Wet Pine Savanna and Flatwoods	Composition -% of Ecosystem Dominated by characteristic Native Forest Types	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration	DC-T&E-2 Frosted Flatwoods Salamander	OBJ-T&E-1. Frosted Flatwoods Salamander	S30, S36, S41; G8, G9, G32, G33, G35, G40, G41, G45, G46
	Pond Cypress Savannas	Structure - % Ecosystem Extent in Woodland, Savanna, Grassland,	DC-ECO-4 Depressional Wetlands and Carolina Bays	OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-2. Wildlife Species Sensitive to Road Use Associates	OBJ-SCC-3. At-Risk Species	Appendix J.1.
	Sensitive to Road Use	Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.)		OBJ-ECO-4. Pond Cypress Savannas and Carolina bays	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates		
		Structure - % Structural Departure from NRV			DC-SCC-6. Pond Cypress Savanna Associates		
		Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile2)					
		Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile2)					

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles ²) Stressor - % of Ecosystem Extent Impacted by Non-Native Invasive Species Process or Function - % of Ecosystem Acres Burned at Desired Return Interval Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval					
<i>Lithobates capito</i>	Wet Pine Savanna and Flatwoods Pond Cypress Savannas Sensitive to Road Use Stumps and Root Mounds	Same as above.	DC-ECO-3 Wet Pine Savanna and Flatwoods DC-ECO-4 Depressional Wetlands and Carolina Bays	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems OBJ-ECO-4. Pond Cypress Savannas and Carolina bays	DC-SCC-1. Wildlife Stump and Root Mound Associates DC-SCC-2. Wildlife Species Sensitive to Road Use Associates DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates DC-SCC-6. Pond Cypress Savanna Associates	OBJ-SCC-1. Carolina Gopher Frog OBJ-SCC-3. At-Risk Species	S30, S41; G8, G9, G32

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
<i>Pseudobranchius striatus</i>	Depressional Wetlands and Carolina Bays Wet Pine Savanna and Flatwoods	Same as above.	DC-ECO-3 Wet Pine Savanna and Flatwoods DC-ECO-4 Depressional Wetlands and Carolina Bays	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems OBJ-ECO-4. Pond Cypress Savannas and Carolina bays	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates DC-SCC-6. Pond Cypress Savanna Associates	OBJ-SCC-3. At-Risk Species	S41; G8, G9
<i>Aimophila aestivalis</i>	Upland Pine Woodlands	Same as above.	DC-ECO-2 Upland Longleaf and Loblolly Pine Woodlands	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-7. Upland Pine Woodlands Associates	OBJ-SCC-3. At-Risk Species	S36, S41; G40, G41
<i>Elanoides forficatus</i>	Forested Wetlands Pocosins	Same as above.	DC-ECO-5 Pocosins DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-5. Pocosins	DC-SCC-8. Forested Wetlands Associates	OBJ-SCC-2. Swallow-tailed Kite OBJ-SCC-3. At-Risk Species	S22, S31, S41; G8, G9, G34

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
			DC-ECO-8 Broad Forested Swamps and Large River Floodplain Forests				
<i>Haliaeetus leucocephalus</i>	Forested Wetlands	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile2) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile2) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles2) Stressor - % of Ecosystem Extent Impacted by Non-Native Invasive Species	DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests DC-ECO-8 Broad Forested Swamps and Large River Floodplain Forests		DC-SCC-8. Forested Wetlands Associates	OBJ-SCC-3. At-Risk Species	S22, S25, S41
<i>Mycteria americana</i>	Forested Wetlands	Same as above.	ECO-7 Narrow Forested Swamps and Blackwater Stream		DC-SCC-8. Forested Wetlands Associates	OBJ-SCC-3. At-Risk Species	S22, S41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
			Floodplain Forests DC-ECO-8 Broad Forested Swamps and Large River Floodplain Forests				
<i>Picoides borealis</i>	Upland Pine Woodlands Wet Pine Savannas and Flatwoods	Ecosystem Dominated by characteristic Native Forest Types Structure - % Ecosystem Extent in Woodland, Savanna, Grassland, Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile2) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile2) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/mile2) Stressor - % of Ecosystem Extent Impacted by Non-Native Invasive Species	DC-ECO-2 Upland Longleaf and Loblolly Pine Woodlands DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems OBJ-SCC-3. At-Risk Species	DC-T&E-3 Red-Cockaded Woodpecker DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates DC-SCC-7. Upland Pine Woodlands Associates	OBJ-T&E-2. Red-Cockaded Woodpecker OBJ-SCC-3. At-Risk Species	S27, S32, S33, S34, S36, S37, S38, S41; G35, G36, G40, G42, G44 Appendix J.2.

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Process or Function - % of Ecosystem Acres Burned at Desired Return Interval Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval					
<i>Acipenser brevirostrum</i>	Rivers and Streams	Course Woody Debris Abundance - % Riparian Forested Hydrologic Function - Major Hydrologic Electric Dam Proximity/Influence Hydrologic Function - Riparian Road Density Hydrologic Function - Road Crossing Rating Hydrologic Function - Severity of Hydrologic Control Structures Non-Native Invasive Species - Presence/Absence of Non-Native Invasive Species in the Watershed Water Quality - Sediment Risk Rating Water Quality - Point Source Rating	DC-ECO-10 Rivers and Streams	OBJ-SCC-3. At-Risk Species	DC-SCC-10. River and Stream Associates		S13-S22; G19-G26; G28, G35

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Water Quality - Non-Point Source Rating Water Temperature Regime - Riparian Land Use Rating					
<i>Acipenser oxyrinchus</i>	Rivers and Streams	Same as above	DC-ECO-10 Rivers and Streams		DC-SCC-10. River and Stream Associates		S13-S22; G19-G26; G28, G35
<i>Anguilla rostrata</i>	Rivers and Streams	Same as above	DC-ECO-10 Rivers and Streams		DC-SCC-10. River and Stream Associates		S13-S22; G19-G26; G28, G35
<i>Amblyscirtes alternata</i>	Narrow Forested Swamps and Blackwater Stream Floodplain Forests Pocosins Upland Pine Woodlands	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % Ecosystem Extent in Woodland, Savanna, Grassland, Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile ²) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile ²) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles ²)	DC-ECO-5 Pocosins DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration		OBJ-SCC-3. At-Risk Species	S36, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Stressor - % of Ecosystem Extent Impacted by Non-Native Invasive Species Process or Function - % of Ecosystem Acres Burned at Desired Return Interval Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval					
<i>Danaus plexippus</i>	Narrow Forested Swamps and Blackwater Stream Floodplain Forests Pocosins Upland Pine Woodlands	Same as above	DC-ECO-2 Upland Longleaf and Loblolly Pine Woodlands DC-ECO-5 Pocosins DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-3. Pine Upland/Wetland Ecotones Associates DC-SCC-7. Upland Pine Woodland Associates	OBJ-SCC-3. At-Risk Species	S35, S36, S41; G40, G41
<i>Euphyes berryi</i>	Narrow Forested Swamps and Blackwater Stream Floodplain Forests Pocosins	Same as above	DC-ECO-5 Pocosins DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration	DC-SCC-3. Pine Upland/Wetland Ecotones Associates	OBJ-SCC-3. At-Risk Species	S35, S36; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
<i>Zale perculata</i>	Forested Wetlands	<p>Composition - % of Ecosystem Dominated by characteristic Native Forest Types</p> <p>Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.)</p> <p>Structure - % Structural Departure from NRV</p> <p>Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile²)</p> <p>Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile²)</p> <p>Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/mile²)</p> <p>Stressor - % of Ecosystem Extent Impacted by Non-Native Invasive Species</p>	<p>DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests</p> <p>DC-ECO-8 Broad Forested Swamps and Large River Floodplain Forests</p>		DC-SCC-8. Forested Wetlands Associates	OBJ-SCC-3. At-Risk Species	S35; G35
<i>Corynorhinus rafinesquii</i>	<p>Forested Wetlands</p> <p>Pine Upland/Wetland Ecotones</p> <p>Snags and Large Diameter Trees</p> <p>Forest Openings</p>	<p>Composition - % of Ecosystem Dominated by characteristic Native Forest Types</p> <p>Structure - % Ecosystem Extent in Woodland, Savanna, Grassland,</p>	<p>DC-ECO-5 Pocosins</p> <p>DC-ECO 7 Narrow Forested Swamps and Blackwater Stream Forests</p> <p>DC-ECO 8 Broad Forested Swamps</p>	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration	<p>DC-SCC-3. Pine Upland/Wetland Ecotones Associates</p> <p>DC-SCC-8. Forested Wetlands Associates</p>	OBJ-SCC-3. At-Risk Species	S28; G31

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
	Rivers and Streams	<p>Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.)</p> <p>Structure - % Structural Departure from NRV</p> <p>Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile2)</p> <p>Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile2)</p> <p>Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/mile2)</p> <p>Stressor - % of Ecosystem Extent Impacted by Non-Native Invasive Species</p> <p>Process or Function - % of Ecosystem Acres Burned at Desired Return Interval</p> <p>Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval</p>	and Large River Floodplain Forests		<p>DC-SCC-9. Wildlife Snag and Large Diameter Hollow Tree Associates</p> <p>SCC-11. Forest Opening Associates</p>		
<i>Myotis austroriparius</i>	<p>Forested Wetlands</p> <p>Pine Upland/Wetland Ecotones</p>	Same as above.	<p>DC-ECO-5 Pocosins</p> <p>DC-ECO 7 Narrow Forested Swamps</p>	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration	DC-SCC-3. Pine Upland/Wetland Ecotones Associates	OBJ-SCC-3. At-Risk Species	S28, S37; G31

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
	Snags and Large Diameter Trees Forest Openings		and Blackwater Stream Forests DC-ECO 8 Broad Forested Swamps and Large River Floodplain Forests	OBJ-SCC-3. At-Risk Species	DC-SCC-8. Forested Wetlands Associates DC-SCC-9. Wildlife Snag and Large Diameter Hollow Tree Associates SCC-11. Forest Opening Associates		
<i>Trichechus manatus</i>	Rivers and Streams	Course Woody Debris Abundance - % Riparian Forested Hydrologic Function - Major Hydrologic Electric Dam Proximity/Influence Hydrologic Function - Riparian Road Density Hydrologic Function - Road Crossing Rating Hydrologic Function - Severity of Hydrologic Control Structures Non-Native Invasive Species - Presence/Absence of Non-Native Invasive Species in the Watershed Water Quality - Sediment Risk Rating			DC-SCC-10. River and Stream Associates		G35

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Water Quality - Point Source Rating Water Quality - Non-Point Source Rating Water Temperature Regime - Riparian Land Use Rating					
<i>Clemmys guttata</i>	Forested Wetlands Pond Cypress Savannas Rivers and Streams Sensitive to Road Use	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % Ecosystem Extent in Woodland, Savanna, Grassland, Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile ²) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile ²) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles ²) Stressor - % of Ecosystem Extent Impacted by Non-	DC-ECO-4 Depressional Wetlands and Carolina Bays DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Forests DC-ECO-8 Broad Forested Swamps and Large River Floodplain Forests	OBJ-SCC-3. At-Risk Species	DC-SCC-2. Wildlife Species Sensitive to Road Use Associates DC-SCC-6. Pond Cypress Savannas Associates DC-SCC-8. Forested Wetlands Associates	OBJ-SCC-3. At-Risk Species	S35; G32, G35

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Native Invasive Species Process or Function - % of Ecosystem Acres Burned at Desired Return Interval Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval Course Woody Debris Abundance - % Riparian Forested Hydrologic Function - Major Hydrologic Electric Dam Proximity/Influence Hydrologic Function - Riparian Road Density Hydrologic Function - Road Crossing Rating Hydrologic Function - Severity of Hydrologic Control Structures Non-Native Invasive Species - Presence/Absence of Non-Native Invasive Species in the Watershed Water Quality - Sediment Risk Rating Water Quality - Point Source Rating					

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Water Quality - Non-Point Source Rating Water Temperature Regime - Riparian Land Use Rating					
<i>Crotalus adamanteus</i>	Narrow Forested Swamps and Blackwater Stream Forests Pocosins Upland Pine Woodlands Wet Pine Savannas and Flatwoods Stump and Root Mounds Sensitive to Road Use	Same as above.	DC-ECO-2 Upland Longleaf and Loblolly Pine Woodlands DC-ECO-3 Wet Pine Savanna and Flatwoods DC-ECO-4 Pocosins	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-SCC-3. At-Risk Species	DC-SCC-1. Wildlife Stump and Root Mound Associates DC-SCC-2. Wildlife Species Sensitive to Road Use Associates DC-SCC-3. Pine Upland/Wetland Ecotones Associates DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates	OBJ-SCC-3. At-Risk Species	S37; G31, G32, G35
<i>Heterodon simus</i>	Upland Pine Woodlands Sensitive to Road Use	Same as above	DC-ECO-2 Upland Longleaf and Loblolly Pine Woodlands	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration	DC-SCC-2. Wildlife Species Sensitive to Road Use Associates DC-SCC-7. Upland Pine Woodland Associates	OBJ-SCC-3. At-Risk Species	G32

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
<i>Agalinis aphylla</i>	Wet Pine Savannas and Flatwoods	Same as above	DC-ECO3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-SCC-3. At-Risk Species	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates DC-RIZ-S Santee Rare Plants	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Andropogon gyrans var. stenophyllus</i>	Pond Cypress Savannas Wet Pine Savannas and Flatwoods	Same as above	DC-ECO3 Wet Pine Savanna and Flatwoods DC-ECO-4 Depressional Wetlands and Carolina Bays		DC 6. Pond Cypress Savannas Associates DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates DC-RiZ-Wambaw-S-9 rare plant communities	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Andropogon mohrii</i>	Upland/Wetland Ecotones	Same as above	DC-ECO-4 Pocosins DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Forests	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-SCC-3. At-Risk Species	DC-SCC-3. Pine Upland/Wetland Ecotones Associates DC-SCC- DC-RiZ-Wambaw-S-9 rare plant communities	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Anthraenantia rufa</i>	Wet Pine Savannas and Flatwoods	Same as above	DC-ECO3 Wet Pine Savanna and Flatwoods		DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
<i>Asclepias pedicillata</i>	Pine/Wetland Ecotones	Same as above		OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-SCC-3. At-Risk Species	DC-SCC-3. Pine Upland/Wetland Ecotones Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Asplenium resiliens</i>	Calcareous Mesic Hardwoods	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile ²) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile ²) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles ²) Stressor - % of Ecosystem Extent Impacted by Non-Native Invasive Species	DC-ECO-6 Oak and Mesic Hardwood Forest	OBJ-ECO-6. Oak Forests and Mesic Hardwoods	DC-SCC-4. Calcareous Mesic Hardwood Forest Associates DC-Z-Wambaw-S-5 Rare Plant Communities	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
<i>Burmannia biflora</i>	Pond Cypress Savannas	<p>Composition -% of Ecosystem Dominated by characteristic Native Forest Types</p> <p>Structure - % Ecosystem Extent in Woodland, Savanna, Grassland,</p> <p>Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.)</p> <p>Structure - % Structural Departure from NRV</p> <p>Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile²)</p> <p>Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile²)</p> <p>Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles²)</p> <p>Stressor - % of Ecosystem Extent Impacted by Non-Native Invasive Species</p> <p>Process or Function - % of Ecosystem Acres Burned at Desired Return Interval</p> <p>Process or Function - % of Ecosystem Acres Burned at</p>	DC-ECO-4 Depressional Wetlands and Carolina Bays	<p>OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration</p> <p>OBJ-ECO-4. Pond Cypress Savannas and Carolina Bays</p>	<p>DC-SCC-6. Pond Cypress Savannas Associates</p> <p>RIZ-Wambaw-S-9 Rare Plant Communities</p>	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Desired Growing Season Return Interval					
<i>Calopogon barbatus</i>	Mesic to Wet Pine Savannas and Flatwoods	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates	OBJ-SCC-3. At-Risk Species	S26, S29, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Calopogon multiflorus</i>	Mesic to Wet Pine Savannas and Flatwoods	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates	OBJ-SCC-3. At-Risk Species	S26, S29, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Carex basiantha</i>	Calcareous Mesic Hardwoods	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV	DC-ECO-6 Oak and Mesic Hardwood Forest		DC-SCC-4. Calcareous Mesic Forests Associates DC-RIZ-Santee-S-2 Rare Plant Communities DC-RIZ-Santee-S-3 Rare Plant Communities	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile ²) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile ²) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/mile ²)					
<i>Carex crus-corvi</i>	Forested Wetlands	Same as above.	DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests DC-ECO 8 Broad Forested Swamps and Large River Floodplain Forests		DC-Z-Wambaw-S-9 Rare Plant Communities DC-RIZ-Wambaw-S-3 Eligible Wild and Scenic River	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Carex elliotii</i>	Pine Upland/Wetland Ecotone	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % Ecosystem Extent in Woodland, Savanna, Grassland, Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV	DC-ECO-4 Pocosins DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration Flatwoods Ecosystems	DC-SCC-3. Pine Upland/Wetland Ecotones Associates DC-Z-Wambaw-S-9 Rare Plant communities	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile ²) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile ²) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles ²) Stressor - % of Ecosystem Extent Impacted by Non-Native Invasive Species Process or Function - % of Ecosystem Acres Burned at Desired Return Interval Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval					
<i>Carex granularis</i>	Calcareous Mesic Hardwoods	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV	DC-ECO-6 Oak and Mesic Hardwood Forest		DC-SCC-4. Calcareous Mesic Forests Associates DC-RIZ-Santee-S-3. Rare Communities	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile2) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile2) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/mile2)					
<i>Carex stricta</i>	Mesic to Wet Pine Savannas and Flatwoods	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % Ecosystem Extent in Woodland, Savanna, Grassland, Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile2) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile2) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/mile2)	DC-ECO-2 Upland Longleaf and Loblolly Pine Woodlands	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates DC-Z-Wambaw-S-9 Rare Plant communities	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Stressor - % of Ecosystem Extent Impacted by Non-Native Invasive Species Process or Function - % of Ecosystem Acres Burned at Desired Return Interval Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval					
<i>Carya myristiciformis</i>	Calcareous Mesic Hardwoods	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile ²) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile ²) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles ²)	DC-ECO -6 Oak and Mesic Forest and		DC-SCC-4. Calcareous Mesic Forests Associates DC-RIZ-Santee-S-2; DC-RIZ-Santee-S-3	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
<i>Chasmanthium nitidum</i>	Mesic to Wet Pine Savannas and Flatwoods	<p>Composition -% of Ecosystem Dominated by characteristic Native Forest Types</p> <p>Structure - % Ecosystem Extent in Woodland, Savanna, Grassland,</p> <p>Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.)</p> <p>Structure - % Structural Departure from NRV</p> <p>Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile2)</p> <p>Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile2)</p> <p>Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles2)</p> <p>Process or Function - % of Ecosystem Acres Burned at Desired Return Interval</p> <p>Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval</p>	DC-ECO-3 Wet Pine Savanna and Flatwoods		<p>DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates</p> <p>DC-Z-Wambaw-S-9 Rare Plant communities</p>	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Cladium mariscoides</i>	Mesic to Wet Pine Savannas and Flatwoods	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem	DC-SCC-5. Mesic to Wet Pine Savanna and	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
				Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	Flatwoods Associates DC-RIZ-Wambaw-S-9 Rare Plant Communities		
<i>Coreopsis integrifolia</i>	Pine Upland/Wetland Ecotones	Same as above	DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests		DC-SCC-3. Pine Upland/Wetland Ecotones Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Eryngium aquaticum var. ravenelii</i>	Marl Mesic to Wet Pine Savannas and Flatwoods	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates DC-RIZ-Wambaw-S-9 Rare Plant Communities	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Eupatorium anomalum</i>	Pine Upland/Wetland Ecotones	Same as above	DC-ECO-5 Pocosins DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests		DC-SCC-3. Pine Upland/Wetland Ecotones Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Helenium pinnatifidum</i>	Pond Cypress Savannas	Same as above	DC-ECO-4 Depressional Wetlands and Carolina Bays	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem	DC-SCC-6. Pond Cypress Savannas Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
				Maintenance or Restoration OBJ-ECO-4. Pond Cypress Savannas and Carolina Bays	DC-Z-Wando-S-2 Rare Plant communities RIZ-Wambaw-S-9 Rare Plant Communities		
<i>Lachnocaulon minus</i>	Mesic to Wet Pine Savannas and Flatwoods	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Lindera melissifolia</i>	Depressional Wetlands and Carolina Bays	Same as above	DC-ECO-4 Depressional Wetlands and Carolina Bays	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration	DC-T&E-5 Pondberry DC-SCC-6. Pond Cypress Savannas Associates DC-Z-Wando-S-2 Rare Plant communities DC-Z-Wambaw-S-9 Rare Plant communities	OBJ-T&E-3. Threatened and Endangered Plant Species OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G35, G40, G41, G43
<i>Listera australis</i>	Calcareous Mesic Hardwood Forests	Composition -% of Ecosystem Dominated by characteristic Native Forest Types	DC- ECO- 6 Oak and Mesic Hardwood Forest		DC-SCC-4. Calcareous Mesic Forests Associates	OBJ-SCC-3. At-Risk Species	S26, S29, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile2) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile2) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/mile2)			DC-RIZ-Santee-S-3. Rare Communities		
<i>Lobelia boykinii</i>	Pond Cypress Savannas	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % Ecosystem Extent in Woodland, Savanna, Grassland, Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile2)	DC-ECO-4 Depressional Wetlands and Carolina Bays	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-4. Pond Cypress Savannas and Carolina Bays	DC-SCC-6. Pond Cypress Savannas Associates DC-Z-Wambaw-S-9 Rare Plant communities	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile ²) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/mile ²) Process or Function - % of Ecosystem Acres Burned at Desired Return Interval Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval					
<i>Ludwigia lanceolata</i>	Mesic to Wet Pine Savannas	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Lysimachia hybrida</i>	Mesic to Wet Pine Savannas	Same as above	DC-ECO-2 Upland Longleaf and Loblolly Pine Woodlands	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
<i>Lysimachia loomisii</i>	Pine Upland/Wetland Ecotone	Same as above	DC-ECO-5 Pocosins DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests		DC-SCC-3. Pine Upland/Wetland Ecotones Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Macbridea caroliniana</i>	Forested Wetlands	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile2) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile2) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles2)	DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests DC-ECO 8 Broad Forested Swamps and Large River Floodplain Forests		DC-SCC-8. Forested Wetland Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Matelea flavidula</i>	Calcareous Mesic Hardwood Forests	Same as above	DC- ECO-6 Oak and Mesic Hardwood Forest	OBJ-ECO-6. Oak Forests and Mesic Hardwoods	DC-SCC-4. Calcareous Mesic Forests Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
					DC-RIZ-Wambaw-S-9 Rare Plant Communities		
<i>Myriophyllum laxum</i>	Depressional Wetlands and Carolina Bays	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % Ecosystem Extent in Woodland, Savanna, Grassland, Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile ²) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile ²) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles ²) Process or Function - % of Ecosystem Acres Burned at Desired Return Interval Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval	DC-ECO-4 Depressional Wetlands and Carolina Bays	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-4. Pond Cypress Savannas and Carolina Bays	DC-SCC-6. Pond Cypress Savannas Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
<i>Oxypolis canbyi</i>	Pond Cypress Savannas	Same as above	DC-ECO-4 Depressional Wetlands and Carolina Bays	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-4. Pond Cypress Savannas and Carolina Bays	DC-T&E-6 Canby's Dropwort DC-SCC-6. Pond Cypress Savannas Associates	OBJ-T&E-3. Threatened and Endangered Plant Species OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G35, G40, G41, G43
<i>Platanthera integra</i>	Wet to Mesic Pine Savannas and Flatwoods	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-4. Depressional Wetlands and Carolina Bays	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates	OBJ-SCC-3. At-Risk Species	S26, S29, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Ponthieva racemosa</i>	Calcareous Mesic Hardwood Forests	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile2) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile2)	DC- ECO-6 Oak and Mesic Hardwood Forest	OBJ-ECO-6. Oak Forests and Mesic Hardwoods	DC-SCC-4. Calcareous Mesic Forests Associates DC-Z-Santee-S-3 Rare Plant Communities DC-Z-Wambaw-S-9 Rare Plant communities	OBJ-SCC-3. At-Risk Species	S26, S29, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles2)					
<i>Pteroglossapsis ecristata</i>	Upland Pine Woodlands	Composition - % of Ecosystem Dominated by characteristic Native Forest Types Structure - % Ecosystem Extent in Woodland, Savanna, Grassland, Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile2) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile2) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles2) Process or Function - % of Ecosystem Acres Burned at Desired Return Interval Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval	DC-ECO-2 Upland Longleaf and Loblolly Pine Woodlands	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-7. Upland Pine Woodland Associates DC-Z-Wambaw-S-9 Rare Plant Communities	OBJ-SCC-3. At-Risk Species	S26, S29, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
<i>Quercus similis</i>	Forested Wetlands	<p>Composition -% of Ecosystem Dominated by characteristic Native Forest Types</p> <p>Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.)</p> <p>Structure - % Structural Departure from NRV</p> <p>Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile²)</p> <p>Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile²)</p> <p>Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/mile²)</p>	<p>DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests</p> <p>DC-ECO 8 Broad Forested Swamps and Large River Floodplain Forests</p>		DC-SCC-8. Forested Wetland Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Rhynchospora breviseta</i>	Wet to Mesic Pine Savannas and Flatwoods	<p>Composition -% of Ecosystem Dominated by characteristic Native Forest Types</p> <p>Structure - % Ecosystem Extent in Woodland, Savanna, Grassland,</p> <p>Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.)</p> <p>Structure - % Structural Departure from NRV</p>	DC-ECO-3 Wet Pine Savanna and Flatwoods	<p>OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration</p> <p>OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems</p>	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile ²) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile ²) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles ²) Process or Function - % of Ecosystem Acres Burned at Desired Return Interval Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval					
<i>Rhynchospora globularis var. pinetorum</i>	Mesic to Wet Pine Savannas and Flatwoods	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates RIZ-Wambaw-S-9 Rare Plant Communities	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Rhynchospora harperi</i>	Pond Cypress Savannas	Same as above	DC-ECO-4 Depressional Wetlands and Carolina Bays	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration	DC-SCC-6. Pond Cypress Savannas Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
				OBJ-ECO-4. Pond Cypress Savannas and Carolina Bays			
<i>Rhynchospora oligantha</i>	Mesic to Wet Pine Savannas and Flatwoods	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates RIZ-Wambaw-S-9 Rare Plant Communities	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Rhynchospora pleiantha</i>	Pond Cypress Savannas	Same as above	DC-ECO-4 Depressional Wetlands and Carolina Bays	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-4. Depressional Wetlands and Carolina Bays	DC-SCC-6. Pond Cypress Savannas Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Rhynchospora scirpoides</i>	Pond Cypress Savannas	Same as above	DC-ECO-4 Depressional Wetlands and Carolina Bays	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-4. Depressional Wetlands and Carolina Bays	DC-SCC-6. Pond Cypress Savannas Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Rhynchospora stenophylla</i>	Pine Upland/Wetland Ecotones	Same as above	DC-ECO-4 Pocosin DC-ECO-7 Narrow Forested Swamps and Blackwater Stream	OBJ-ECO-5. Pocosins	DC-SCC-3. Pine Upland/Wetland Ecotones Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
			Floodplain Forests		DC-RIZ-Wambaw-S-9 Rare Plant Communities		
<i>Ruellia strepens</i>	Forested Wetlands	<p>Composition -% of Ecosystem Dominated by characteristic Native Forest Types</p> <p>Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.)</p> <p>Structure - % Structural Departure from NRV</p> <p>Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile²)</p> <p>Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile²)</p> <p>Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles²)</p>	DC-ECO-7 Narrow Forested Swamps and Blackwater Stream Floodplain Forests DC-ECO 8 Broad Forested Swamps and Large River Floodplain Forests		DC-SCC-8. Forested Wetlands Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Schwalbea americana</i>	Upland Longleaf Pine Woodlands	<p>Composition -% of Ecosystem Dominated by characteristic Native Forest Types</p> <p>Structure - % Ecosystem Extent in Woodland, Savanna, Grassland,</p> <p>Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.)</p>	DC-ECO-2 Upland Longleaf and Loblolly Pine Woodlands	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-T&E-4 American Chaffseed DC-SCC-7. Upland Pine Woodlands Associates	OBJ-T&E-3. Threatened and Endangered Plant Species OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G35, G40, G41, G43

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile ²) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile ²) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/mile ²) Process or Function - % of Ecosystem Acres Burned at Desired Return Interval Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval					
<i>Spiranthes laciniata</i>	Pond Cypress Savannas	Same as above	DC-ECO-4 Depressional Wetlands and Carolina Bays	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-4. Pond Cypress Savannas and Carolina Bays	DC-SCC-6. Pond Cypress Savannas Associates DC-Z-Wambaw-S-9 Rare Plant communities	OBJ-SCC-3. At-Risk Species	S26, S29, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Sporobolus curtisii</i>	Mesic to Wet Pine Savannas	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
				OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-RIZ-Santee-S-3. Rare Communities		
<i>Sporobolus pinetorum</i>	Mesic to Wet Pine Savannas	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates DC-RIZ-Wambaw-S-9 Rare Plant Communities	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Tridens chapmanii</i>	Calcareous Mesic Hardwood Forests	Composition -% of Ecosystem Dominated by characteristic Native Forest Types Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.) Structure - % Structural Departure from NRV Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile2) Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile2) Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles2)	DC-ECO-6- Oak and Mesic Hardwood Forest	OBJ-ECO-6. Oak Forests and Mesic Hardwoods	DC-SCC-4. Calcareous Mesic Forests Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
<i>Triphora trianthophora</i>	Calcareous Mesic Hardwood Forests	Same as above	DC-ECO-6- Oak and Mesic Hardwood Forest	OBJ-ECO-6. Oak, Mesic Hardwood, and Maritime Forests	DC-SCC-4. Calcareous Mesic Forests Associates DC-Z-Santee-S-3;	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Utricularia macrorhiza</i>	Pond Cypress Savannas	<p>Composition -% of Ecosystem Dominated by characteristic Native Forest Types</p> <p>Structure - % Ecosystem Extent in Woodland, Savanna, Grassland,</p> <p>Structure - % of Ecosystem meeting age criteria for old growth (>=100yrs.)</p> <p>Structure - % Structural Departure from NRV</p> <p>Connectivity - ORV Trail Density w/in 0.5 miles (miles/mile²)</p> <p>Connectivity - Paved Open Road Density w/in 0.5 miles (miles/mile²)</p> <p>Connectivity - Unpaved Open Road Density w/in 0.5 miles (miles/miles²)</p> <p>Process or Function - % of Ecosystem Acres Burned at Desired Return Interval</p>	DC-ECO-4 Depressional Wetlands and Carolina Bays	<p>OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration</p> <p>OBJ-ECO-4. Pond Cypress Savannas and Carolina Bays</p>	DC-SCC-6. Pond Cypress Savannas Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
		Process or Function - % of Ecosystem Acres Burned at Desired Growing Season Return Interval					
<i>Xyris brevifolia</i>	Mesic to Wet Pine Savannas	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration	DC-SCC-5. Mesic to Wet Pine Savanna and Flatwoods Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Xyris difformis</i> <i>var. floridana</i>	Pond Cypress Savannas	Same as above	DC-ECO-4 Depressional Wetlands and Carolina Bays	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-4. Pond Cypress Savannas and Carolina Bays	DC-SCC-6. Pond Cypress Savannas Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Xyris flabelliformis</i>	Mesic to Wet Pine Savannas	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet Pine Savanna and Flatwoods Ecosystems	DC-SCC-5 Mesic to Wet Pine Savannas and Flatwoods Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41
<i>Xyris stricta</i>	Mesic to Wet Pine Savannas	Same as above	DC-ECO-3 Wet Pine Savanna and Flatwoods	OBJ-ECO-2 Frequent Prescribed Fire for Ecosystem Maintenance or Restoration OBJ-ECO-3. Upland Longleaf and Wet	DC-SCC-5 Mesic to Wet Pine Savannas and Flatwoods Associates	OBJ-SCC-3. At-Risk Species	S26, S34, S35, S36, S37, S39, S40, S41; G40, G41

Scientific Name	Ecological Conditions	Key Characteristics and Indicators	Coarse-filter Components		Fine-filter Components		
			Desired Conditions	Objectives & Mgmt. Strategies	Desired Conditions	Objectives & Mgmt. Strategies	Standards & Guidelines
				Pine Savanna and Flatwoods Ecosystems			

Additional References Cited in this Analysis are listed in the FEIS, pp.343-367, or disclosed in association with the Proposed Action (Assessment), or Danaher (2014), unless otherwise noted below.

Carolina Vegetation Survey Rare Plant Records. 2012.

Gramling, Joel M. and Andrea E. Gramling. 2010. A survey of *Litsea aestivalis* (Pondspice) in the Francis Marion National Forest.

Haber, J. and P. Nelson. 2015. Planning for Connectivity. Defenders of Wildlife, Center for Large Landscape Conservation, Wildlands Network, and Yellowstone to Yukon Conservation Initiative.

LeGrand, Harry, and Mike Chapman. 2015. Francis Marion National Forest Butterfly Counts, South Atlantic. South Atlantic North American Butterfly Association.

Martin, Mike, Jeff Holmes, Wade Kalinowsky, and Jackie Homes Burns. 2016. Amphibians and Reptiles on the Francis Marion National Forest – Status, Distribution, Population Connectivity, and Habitat Associations. Amphibian and Reptile Conservancy.

Means, D.B. 2005. The value of dead tree bases and stumpholes as habitat for wildlife (Chapter 9), IN WE Meshaka and KJ Babbitt eds., Amphibians and reptiles: status and conservation in Florida. Malabar, FL, Krieger Publishing Company, p.74-78.

Means, D.B. 2006. Vertebrate faunal diversity of longleaf pine ecosystems (Chapter 6), IN S Jose, EJ Jokela, and DL Miller (eds), Longleaf pine ecosystem: ecology, silviculture, and restoration. New York, Springer, Springer Series on Environmental Management, p. 157-213.

Sutton, Pat. Email Message 2015 South Carolina Butterfly Count – SC-FM History and SC-Hobcaw History as of 1993.

USDA Forest Service, Francis Marion and Sumter National Forest. 2014. AtRisk Meeting Notes, Aquatic Wildlife, Terrestrial Wildlife, and AtRisk Plants. Meeting of experts and interested parties to discuss at-risk species on April 16 and 17. Supervisor's Office, Columbia, SC.

USDA Forest Service, Francis Marion and Sumter National Forest. 2011. Francis Marion National Forest Freshwater Mussel Surveys – Final Report. Prepared by the Catena Group, Hillsborough, NC.

Weakley, Alan S. 2015. Flora of the Southern and Mid-Atlantic States. Working Draft of 21 May 2015. University of North Carolina Herbarium, North Carolina Botanical Garden, University of Chapel Hill, Chapel Hill, NC.