vegetation. Many of these studies are inconclusive, funded by forest industry, and focus on species richness (including ruderals and exotics) with no attention to species composition. Miller et al 2009 found that preserving biodiversity in managed forests is possible with "judicious, targeted use of forest chemicals". However, the study states that "…there are tradeoffs between intensity of silvicultural practices and potential terrestrial biodiversity. The extreme form of intensive management is the agricultural model, i.e., site preparation and subsequent vegetation control that eliminates most vegetation except for crop trees, resulting in a highly productive stand from a wood production standpoint, but with limited ecological value."

A 2004 study found that "Current site-preparation techniques rely on herbicide combinations ('tank mixes' that affect a broad spectrum of plants), often coupled with mechanical treatments and >1 years post-planting applications to enhance the spectrum and duration of vegetation control. This near-total control of associated vegetation at establishment and more rapid pine canopy closure, coupled with shortened and repeated rotations, likely will affect plant diversity…" Short rotations allow less time for herbaceous establishment before canopy closure which results in less seed rain and depletion of the seed bank (Miller and Miller, 2004).

Mechanical site prep is correlated with high mid-story density which suppresses herbaceous layer. Chemical site prep is correlated with low understory species richness and high midstory density. Additionally, agricultural history (repeated soil disturbance and herbicide application) has a strong influence on vegetation structure and composition (Hedman et al, 2000)

Chemical and physical soil disturbances cause changes in the ectomycorrhizal fungal assemblage that likely have significant and lasting ecological impacts (Jones, et al, 2003).

Additionally, a study looked at the use of herbicides used to establish longleaf pine stand. The rates of application were less than what is typically used by forest industry. Species richness was similar to reference sites, but composition included more ruderal and old-field species less emblematic of high-quality sites (Addlington et al, 2012).

Implementation of Alternative 6 will result in the continuation of these destructive industrial forestry practices on the site.

The Alternative 6 location provides habitat for the federal candidate, state listed threatened gopher tortoise and federal candidate, state rare gopher frog. Gopher tortoise and their burrows would remain and would not be impacted by mining, but the poor-quality existing habitat would remain. Gopher tortoise and gopher frog would not have to be relocated, but the existing silvicultural activities would continue. The implementation of Alternative 4 would not be expected to have an effect on these species.

A cultural resource survey identified a total of 16 archaeological locations within the extent of the permit area. These included 7 isolated finds and 9 archaeological sites. Of these sites, 5 are the remains of early-to-middle-twentieth century domestic assemblages. None of the sites were recommended as eligible for NRHP inclusion and isolated finds are, by their nature, ineligible for NRHP inclusion. One resource was located outside of the permit area boundary is recommended as potentially eligible for NRHP inclusion under Criterion C. This resource is a mid-century ranch home constructed in 1950. Though currently abandoned, the integrity of the structure is intact and its architecture is significant as a representative example of a mid-twentieth century ranch house. The cultural resource survey recommended avoidance of this property. Additionally, the house is currently located near an existing chip mill and railroad tracks and is currently exposed to heavy audible effects. Due to avoidance measures the historic resource will not suffer adverse visual and audible effects as a result of the proposed mining operations. The house will not be impacted by the project.