

Lukens (ACR265/CAFR5205) OPDR Attachment Y

Modeling Plan

1. A description of all silviculture methods modeled.

The conversion of the Project Area is modeled based on clearcutting.

2. A list of all legal constraints that affect management activities on the Project Area.

There are no legal constraints that affect conversion activities in the Project Area.

3. A description of the site indexes used for each species and an explanation of the source of the site index values used.

Site indices from NRCS corresponded closely to site index estimates made from direct measurement data. Site index at base age 50 (SI50) was determined from tree measurements (dominant/co-dominant total height and age) taken in the project area, applying a coastal plain loblolly pine site index curve from Amateis and Burkhardt (1985)¹. Average site indices of loblolly pine for Mixed Pine and Pine strata were 104 and 94, respectively, feet total height at base age 50.

| Stratum/stand | Site index of reference species | Reference species |
|----------------------|--|--------------------------|
| Hardwood | 95 | Sweetgum |
| Mixed Pine | 97 | Loblolly pine |
| Pine | 97 | Loblolly pine |

4. A description of the model used and an explanation of how the model was calibrated for local use, if applicable.

The projected growth on the project was modeled using the Southern Variant of the Forest Vegetation Simulator (FVS). FVS is a computer simulation model developed by the USDA Forest Service² that predicts tree growth and changes in forest stand characteristics over time, based on data input from a forest inventory. It uses variants that are calibrated for specific geographic regions throughout the United States and can simulate a range of management treatments, including no active management, for most major forest types. The growth

¹ Amateis, R. L. and H. E. Burkhardt. 1985. Site Index Curves for Loblolly Pine Plantations on Cutover Site-Prepared Lands. Southern Journal of Applied Forestry, 9:166-169.

² Dixon, Gary E. comp. 2002. Essential FVS: A user's guide to the Forest Vegetation Simulator. Internal Rep. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Forest Management Center. 219p. (Last Revised: April 7, 2008)

equations used by FVS can be found in Dixon¹⁶ and Donnelly & Lilly³. FVS is an ARB-approved growth model.

All tree data entered into FVS was sourced from the back-modeled 2015 inventory. Measured tree heights were entered in the database for all trees (i.e. the initial dataset from which projections were modeled included no FVS-imputed heights). Standing dead trees were assigned FVS tree history codes of 8 or 9 (undetermined time of mortality). FVS damage codes were assigned as follows:

Code 96 (broken/missing top) assigned where field-estimated defect of top third of merchantable stem volume of the tree exceeded 50%

Code 25 (defect pulpwood and sawtimber volume) assigned where field-estimated defect was recorded for any portion of merchantable stem volume of the tree, and severity entered as 1-99 (99 = 100%) representing weighted average overall percent defect calculated from defect recorded for the top, bottom and/or middle thirds, referencing the same proportions of merchantable stem volume represented in each of the three assessed thirds (see above)

Location was assigned as 81103 (corresponding to Croatan National Forest, closest national forest to project area) and ecoregion 232Ib (Tidal Area).

³ Donnelly, Dennis and Barry Lilly. 2001. Southern Variant Overview: Forest Vegetation Simulator. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Forest Management Center. 63p. (Last Revised June 2009)