



Public Summary

Management Plan and Monitoring

The Westervelt Company
Forest Management Unit (FMU)
Located in the Southeastern US Region

May 9, 2018

This public management plan and monitoring summary is for The Westervelt Company's (TWC) Forest Management Unit (FMU) located primarily in Alabama in the Southeast region of the US. An ownership map is included at the end of this summary.

Since its initial certification to the FSC Forest Management Standard (v 1.0) in 2011, TWC has recognized the social, economic, and environmental benefits of FSC. However, recent changes in markets have resulted in diminished financial incentive or market preference for FSC certified content. In 2017, TWC opted to partially certify its ownership to the FSC FM Standard.

When Westervelt attained initial FSC Certification the entire company forest ownership was considered as one Forest Management Unit (FMU). Silvicultural practices and management objectives were similar across the ownership. However, Westervelt's forestland exists in three distinct geographic regions with unique acquisition history, market, and site differences. These could easily be considered three different FMUs due to the following characteristics:

1. Core Region- This legacy property was largely acquired in the 1930-1960s and is located primarily in Alabama. It has provided a sustainable source of raw material for our paper mills in the past, and currently for our existing sawmill and pellet mill. We have added to this land base through the years and continue to improve it to meet our management objectives. It is managed from our corporate headquarters and three field offices.
2. Atlantic Region – The majority of this property was acquired in 2006. It is located in the lower coastal plain of Virginia, South Carolina, and Georgia. It consists of high site index soils and favorable conditions for growing southern yellow pine. This Region is managed from our office in Statesboro, GA. We have no manufacturing sites and market all of our timber to other company's mills.
3. Chickasawhay Region- The majority of this property is located in southeast Mississippi and was acquired in 2005. It is managed from our Stateline, MS office. Similar to the Atlantic Region, this area exhibits favorable site and climate for timber production. We market all of our timber products to external production facilities.

The following table shows Westervelt’s intended future management of sustainability and approximate acres represented in each of the three regions. For the remainder of this Public Summary, “FMU” refers to the “Core” FMU which will remain in the scope of FSC Forest Management certification. The Core FMU is predominately in the state of Alabama, with a very small portion (0.2%) in east central Mississippi.

Table 1. TWC’s three FMUs with approximate acres and sustainability (certification) plan.

Region	Acres*	Sustainability Management Plan
Core (primarily AL)	374,944	FSC and SFI Certification
Atlantic (GA, SC, and VA)	83,007	SFI Certification
Chickasawhay (primarily MS)	62,118	SFI Certification

*As of May 2018

Management Objectives

We will maximize the land and timber value, realized and unrealized, of our forests as we produce quality timber products; enhance the wildlife habitat and recreational use; and maintain or improve the environmental integrity of the forest. Our forest will be managed in a sustainable manner consistent with the SFI and FSC (where applicable) forest management Standards. We will accomplish this through active learning coupled with financial and biological innovation.

Overview of Uses

The Westervelt Company utilizes its resource ownership to the fullest. While the primary use of the forest is for wood products, other opportunities abound. A Minerals Business is built around coal, gas, stone and other minerals resources. Hunting opportunities on company land are utilized through recreation leases by Westervelt Wildlife Services. Mitigation banking through Westervelt Ecological Services provides environmental services and benefits.

The Westervelt Company periodically reviews non-timber issues in its planning. We have investigated carbon credit and solar energy market opportunities and will continue to consider sustainably beneficial alternative land uses. Our Westervelt Ecological Services Group is continually looking for opportunities to develop conservation and wetlands mitigation banks. Currently, four banks are in operation that were removed from active timber management and put in conservation easements. Our South Carolina ownership is also under a working forest conservation easement ensuring forest use in perpetuity. The Westervelt Wildlife Services Group leases our forest for recreational use.

Environmental Considerations

Water resources and associated hydrologic functions

The FMU contains or borders a wide variety of water resources ranging from large rivers and lakes to streams and ponds. Portions of the FMU contain regionally important features such as cypress sloughs and ponds. These and other wetland areas are managed separately from forested stands, and are protected to retain their ecological values. State Best Management Practices (BMPs) for forestry are utilized to prevent adverse impacts of management activities on water resources both on the FMU and the areas located downstream.

Where necessary, forest roads may cross streams and other waterways for the purpose of forest management and recreational access. State BMPs are strictly followed to protect and improve water quality each time a crossing is deemed necessary. Crossing types include bridges, fords, and culverts, and could be temporary or permanent in nature. A continuous stream crossing inventory is conducted on the FMU to compile accurate records for the necessary permanent crossings. These data will be incorporated into TWC's GIS and used in management decision making.

Rare, Threatened and Endangered Species

The southeastern United States as a whole has a high level of biodiversity. This can be attributed to diverse physiographic features, relatively moderate climate, and an abundance of water resources (AL Wildlife Action Plan). The region is filled with often overlooked aquatic plant and animal species, and is considered a global hotspot for aquatic biodiversity. The FMU contains a wide range of flora and fauna, some of which are rare, threatened or endangered (RTE). Some RTE animal species known to occur on the TWC ownership are the American Bald Eagle, Eastern Indigo Snake (*Drymarchon corais*), Gopher Tortoise (*Gopherus polyphemus*), and Black Pine Snake (*Pituophis melanoleucus lodingi*), and numerous aquatic species. The Chickasawhay Mitigation Bank in southeastern Mississippi contains approximately 1,200 acres of habitat for the federally threatened Gopher Tortoise, and associated species such as the Eastern Indigo Snake and the Dark Gopher Frog (*Rana sevosa*). Threatened and endangered species are managed to meet or exceed federal and state guidelines for management.

TWC has obtained Natural Heritage data from each of the states in its ownership. These data are maintained and updated in databases available in the GIS system, and are utilized as a starting point for ecological considerations associated with forest management activities. An occurrence of an endangered species concentration on the FMU will also result in the site being preserved in TWC's Special Sites program in the GIS. The Endangered Species process is administered by Westervelt Wildlife Services.

Other Habitats and species of management concern

TWC has a working relationship with the respective Natural Heritage staff for each state contained in the FMU, and has used these relationships as well as consultations with other state and federal agencies as a guideline for assessing ecological conditions on the FMU. An assessment of Representative Sample Areas (RSAs) has been prepared for the FMU. As TWC landholdings are in the same Ecoregions throughout the states of ownership, similar Representative Sample Areas (RSAs) are used in this assessment. RSAs have been identified (according to the FSC-US Management Standard) that represent imperiled habitat complexes identified by state wildlife action plans and consultation with state, federal, and other agencies. Some of these areas occur on TWC property, while others are located outside of company ownership.

RSAs have been established for early, middle, and late successional longleaf pine forests. One area outside of the FMU on the Talladega National Forest in Bibb County, Alabama has been identified as an example of Type 2 old growth (per FSC-US Management Standard). Several examples of forested wetlands have also been identified as RSAs, containing cypress, gum and other tree species. The Cahaba River has also been set aside as an RSA of large streams and rivers, the most critically imperiled habitat complex in the state of Alabama as determined by the Alabama Department of Conservation and Natural Resources. TWC does not own this river, but owns land adjacent to the river.

Maintenance of High Conservation Value Forests

A High Conservation Value Forest (HCVF) assessment has been conducted on the FMU to determine the HCVFs present and guide management decisions on and around these areas. Data sources for this assessment include state Natural Heritage Agencies and databases (respective to the states in the FMU), World Wildlife Fund (WWF) terrestrial ecoregion assessments, Environmental Protection Agency (EPA) ecoregion data, University of Alabama Office of Archeological Research, peer-reviewed scientific literature, TWC GIS data and local knowledge. This assessment has been reviewed externally by experts in the area of HCVFs including Gary Dodge, Ph.D. (formerly with FSC-US) and John Hodges, Ph.D. This assessment is available as Appendix F to this document, and all HCVFs will be identified in the Special Site layer of the GIS and available to appropriate personnel.

Consultation with Alabama Natural Heritage staff (Al Shotz, Ph.D. and Michael Barbour) and analysis of Natural Heritage data served as a starting point for both the HCVF and RSA assessments on the FMU. TWC has a long-standing relationship with the Alabama Natural Heritage staff. This relationship began in 2001 and continues through the present time. Natural Heritage staff experts have completed state grant-funded research on one of the TWC HCVF sites (Old Bluffport Prairie) in 2007-2008.

The assessment resulted in the identification of the following HCVFs: Big Sandy Mitigation Bank in Tuscaloosa County, Alabama, Yellowleaf Mitigation Bank in Shelby County, Alabama, Alabama River Mitigation Bank in Wilcox and Monroe Counties,

Alabama, Chickasawhay Conservation Bank in Greene County, Mississippi, Old Bluffport Chalk Prairie in Sumter County, Alabama and a Ketona Dolomite Glade in Bibb County, Alabama. Management plans and monitoring criteria have been developed where appropriate for these areas and are summarized with the respective area below.

Big Sandy Mitigation Bank is a 1,060 acre site managed for stream and wetlands impact mitigation. The bank is located on a portion of Big Sandy and South Sandy Creeks in Tuscaloosa County, Alabama. This area has been restored to increase wetland biodiversity, and is protected in perpetuity through a conservation easement through the Freshwater Land Trust. The Interagency Review Team (IRT) composed of federal and state agencies performs annual monitoring on this bank. These monitoring efforts ensure compliance to the standards set forth by the management plan for the bank. Additional management activities may be required by the management plan for the bank, or may be conducted at the request of the IRT or other supervisory agency.

Yellowleaf Mitigation Bank is a 547 acre site managed for stream and wetlands impact mitigation. The bank is located along a portion of Yellowleaf Creek in Shelby County, Alabama. There are several rare and endangered mussel species found in this area, the triangular kidneyshell and southern clubshell mussel, as well as the Alabama spike, a state protected mussel species. The Cahaba lily, a plant species of special concern, is also found in the area. This bank is also protected in perpetuity through a conservation easement with the Freshwater Land Trust, and is monitored annually by the IRT. Additional management activities may be required by the management plan for the bank, or may be conducted at the request of the IRT or other supervisory agency.

Alabama River Mitigation Bank is a 971 acre site located in Wilcox and Monroe Counties. This site has a unique landscape position within the area that compels protection. It is part of the Alluvial/Deltaic Plain physiographic region, with ecology and geomorphology historically influenced by the Alabama River, which is approximately 2.2 miles southwest of the proposed Bank site. The Alabama Department of Conservation and Natural Resources (ADCNR) states that the lower Alabama River is one of Alabama's natural treasures having natural beauty including high bluffs and contains one of the richest freshwater mussel beds in Alabama. The lower Alabama River also provides a home for a host of interesting fish species such as alligator gar, paddlefish, Alabama darter, and one of the most endangered species on the planet, the Alabama sturgeon. A portion of Tallatchee Creek lies within the bank boundary. Interestingly, six specimens of freshwater mussel taxa were found in Tallatchee Creek, including one federally listed species, *Pleurobema perovatum* (Ovate Clubshell). This is the first known positive identification for *Pleurobema perovatum* in Monroe County, Alabama. Additionally, Westervelt Ecological Services is participating with the ADCNR and USFWS on the release and reintroduction of the Orangenacre Mucket (*Hamiota perovalis*) (Conrad, 1834), within a section of Tallatchee Creek.

The Chickasawhay Conservation Bank is a 1,223 acre site managed for the restoration of longleaf pine habitat. The bank is located in Greene County, Mississippi. This bank is managed to provide habitat for the gopher tortoise, a keystone species in the longleaf pine

community. As a keystone species, tortoises provide habitat for other animal species, many of which are becoming rare. This bank is monitored annually by the Tortoise Bank Review Team (TBRT) that is coordinated by the U.S. Fish and Wildlife Service (USFWS). Additional management activities may be required by the management plan for the bank, or may also be conducted at the request of the TBRT or other supervisory agency.

The Old Bluffport Chalk Prairie is a 7 acre site that has been identified as an area of special ecological concern by the Alabama Natural Heritage Program. This site, located in Sumter County, Alabama contains a high value chalk prairie (G2 rank). This prairie is free from major erosion and invasive species, one of the two most common agents of damage to this habitat complex. Numerous rare plant species are present, and are maintained by periodic application of prescribed fire. TWC implemented a successful prescribed burn in March of 2008 that has proven beneficial to the condition of the site. This site was included as part of a study by the Alabama Natural Heritage Program, and the ecological value has been well-documented. The site is monitored annually to insure that encroachments have not occurred, invasive species are not present, and that the area is free from overall damage (areas identified by ALNHP as critical to the maintenance of this habitat complex). Future management activities will be implemented as deemed necessary through the annual assessment process and consultation with ALNHP and other experts.

The FMU contains a Ketona Dolomite Glade (G1) that is approximately one acre in size and is located in Bibb County, Alabama. This community type is endemic to the Bibb County, Alabama area and contains various global and state-ranked rare plant species. The site is monitored annually to insure that encroachments have not occurred, invasive species are not present, and that the area is free from overall damage (areas identified by ALNHP as critical to the maintenance of this habitat complex). Future management activities will be implemented as deemed necessary through the annual assessment process and consultation with ALNHP and other experts. In 2013 a spot of Cogan grass was treated in order to eradicate the invasive species. In 2017, hand-felling of encroaching trees and shrubs was conducted to preserve the glade ecosystem.

TWC is committed to the management of these sites as well as other HCVF sites that may be discovered on the FMU. Training for TWC staff will be conducted by experts in the area of HCVFs as necessary, and Natural Heritage databases will be updated periodically. As land holdings change and sound conservation knowledge increases, additional HCVFs may be identified on the FMU. These areas will be verified by the TWC Biodiversity Team and HCVF experts, and appropriate management strategies and monitoring will be conducted. Potential management strategies will be evaluated for biological, operational and economic feasibility and implemented where appropriate.

Future Identification and Management of HCVFs on the FMU

Land holdings within the FMU change from time to time, as properties may be acquired, divested or traded for other properties that fit the company's strategic goals. Knowledge

of regional and overall biodiversity research, data and management standards is also likely to increase over time. These factors may identify the need for the addition of HCVPs within the FMU, and TWC is committed to the identification and maintenance of these areas. Active management of areas will be considered and implemented where feasible. The following areas will play a vital role in the evolution of this process.

- Training
 - TWC has relied on Natural Heritage experts for training of TWC staff on both company-wide levels (environmental training) and small group levels (field tours of HCVPs). These or other experts will provide training to TWC staff on an as-needed basis.
 - Changes in accepted conservation practices will be reflected in the management/maintenance strategies.
- Consultation
 - TWC staff, as well as other relevant personnel, will meet with Natural Heritage and other experts on an as-needed basis to evaluate the condition of the HCVPs and discuss relevant developments in land ownership and conservation practices.
- Data
 - Natural Heritage databases for the states within the FMU will be kept up to date by TWC staff.
 - New elemental occurrences or other changes will be considered and reflected in management practices.
 - Verification of GIS data on the FMU may lead to the identification of new HCVP areas.

HCVPs managed by TWC and their respective management strategies will be evaluated on an annual basis and updated as necessary. Potential HCVP sites should be submitted to appropriate TWC staff members by TWC personnel when they are discovered. Evaluation, identification and implementation of future HCVP sites shall be conducted as necessary. Management strategies will be evaluated for ecological and economic fitness and implemented where determined to be feasible.

TWC Planning Processes

TWC conducts a Timber Sale Planning Process on each tract prior to land management and site disturbing activities. The conditions prior to harvest activities are reviewed and appropriate plans are developed and stored as part of the individual tract files and records.

TWC practices natural and artificial regeneration and a form of management that mimics natural disturbance patterns and conditions. The current condition of the forest, made up of predominately a mix of southern pines and hardwoods, is not unlike that which has occurred naturally across the southeast in the presence of fire. By maintaining fire in the ecosystem, the pioneer species that are shade intolerant are being maintained across the forest.

Company Foresters are constantly on the look-out for invasive species and noxious weeds to eradicate and control the spread of such species. TWC works closely with the state forestry agencies in identifying exotic species such as cogongrass, and coordinating control efforts. We also cooperate with them on Southern Pine Beetle detection and wildfire control.

Current Land use

Table 2 shows the percentage of the FMU in various cover types. Currently, 74 percent of the FMU is in planted semi-natural pine forests. The characteristics of these semi-natural pine forests were assessed for Planted Pine Forests on the TWC FMU.

Table 2. FMU Composition by Forest Cover Type.

Planted Pine	74%
Natural Pine	2%
Hardwood	16%
Mixed	5%
Other	3%

The forested stands of the FMU have been classified by general stage of succession (seral stage) according to Oliver and Larson (1990) for both pine and hardwood stands. Since old-growth forests have been virtually absent from much of the FMU since the early twentieth century (AL Action Plan), the understory reinitiation phase also includes stands that have begun to exhibit old growth characteristics. The majority of the stands that exhibit old growth characteristics on the FMU are in bottomland hardwood stands, ravines, and other areas.

Table 3. Percent of FMU by Forest Type and Seral Stage

Species group	Stand Development Stage	Percent
Hardwood	Stand Initiation	2%
Hardwood	Stem Exclusion	4%
Hardwood	Understory Reinitiation	11%
Pine	Stand Initiation	28%
Pine	Stem Exclusion	40%
Pine	Understory Reinitiation	15%

Assessment of Planted Forests on Westervelt's Forest Management Unit

TWC's forestland ownership contains approximately 525,000 acres located in Alabama, Georgia, Mississippi, South Carolina, and Virginia. The majority of the FSC Certified FMU is composed of semi-natural planted pine forests. These planted forests retain many of the attributes of the natural forest stands of the Ecoregions they are located in, and do not meet the classification for "Plantations" outlined in the definition in the FSC-US Forest Management Standard. TWC planted forests do not include plantings of exotic species or subspecies, block plantings of clonal tree material, or conversion of naturally non-forested areas to forest plantings. This section is an assessment of the planted forests on the TWC FMU.

TWC uses a variety of seed sources for planting stock on the FMU. Typical tree species planted include Loblolly Pine (*Pinus taeda*), Longleaf Pine (*Pinus palustris*) and Slash Pine (*Pinus elliottii*). Each of these species is native to the FMU, and exhibit characteristics similar to those found in natural forests. Hardwood species are present in the form of various red and white oaks (*Quercus spp.*), red maple (*Acer rubrum*), yellow poplar (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*) and other hardwood species. These represent a varying proportion of the species composition depending on successional stage, site characteristics, and management practices.

An ongoing soils mapping project has resulted in the majority of the FMU being mapped, and new acquisitions to the FMU are mapped as they occur. Through the use of these soils data, tree species are matched to the site prior to planting to ensure selected species are appropriate for the site characteristics. These soils data also serve as a basis for stand level management decisions such as fertilization, which is employed where necessary to improve soil nutrients.

Understory species composition also varies with the successional stage of the stand, management practices and site characteristics. Many native understory species are more abundant immediately following stand harvest (stand initiation stage), decline during the stem exclusion stage, and increase again during the understory reinitiation stage, just as one would expect from a naturally regenerated stand. Management practices such as thinning and prescribed burning are some silvicultural tools employed by TWC that can increase the abundance and distribution of native understory species. TWC has a comprehensive invasive species control process to recognize and eliminate threats to understory and overall forest diversity (cogongrass, kudzu, etc.).

Planted pine stands are managed to financial maturity with management regimes that typically employ one or two thinning treatments before final harvest. Thinning from below is the typical method of thinning, as smaller trees are removed to favor larger crop trees. A row thinning method serves as the base for first thin treatments, and trees between the rows are selected and removed by logging operators. This produces a stand with trees on a variable spacing, as one would expect from a natural stand in the understory reinitiation phase of succession. The species composition of the stand also

changes in response to these thinning treatments, typically resulting in increased hardwood tree species and the release of pre-merchantable pine trees from the understory.

Snag trees are typically left in harvested areas where they do not pose a threat to the safety of humans and other assets. These trees can vary in size depending on the species and the cause of mortality, and even after they have fallen they persist as woody debris on the floor of the stand. Living area and single tree retention are left in harvested sites (see TWC Retention Process) to provide within-stand structural diversity. These retained patches and trees mimic areas created naturally by smaller disturbances in natural forest stands.

TWC strives to maintain a mosaic of forest stands at a landscape level to mimic the natural forest landscape, and to provide maximum wildlife habitat diversity. Harvest shapes are highly variable in shape and size, which further mimics different types and scales of natural disturbances from fire, tornadoes, hurricanes, southern pine beetle outbreaks, and other natural disturbances (see FMU Assessment for further detail). Stands adjacent to harvested units are not harvested until minimum size and age restrictions are met for the regenerating stand to perpetuate landscape-level stand diversity. As is the case throughout most of the FMU, old growth timber has been virtually removed from the landscape (Alabama Wildlife Action plan, page 31), but some forests retaining old-growth characteristics persist in ravines, bottomland hardwood forests and other areas.

Socio-economic Conditions

Westervelt clearly realizes the value of a well-managed forest ownership in generating revenue and providing raw materials. We also recognize both the positive and negative impacts that our management activities can potentially have on a variety of stakeholders. Our goal is to understand these impacts through membership in organizations representing potential stakeholders, maintaining active lines of communication, and using specialized management in known areas of impact, as needed.

A study (The Economic Impacts of Privately Owned Forests), published by the National Alliance of Forest Owners illustrates the economic contribution of privately owned and managed forests. In the Southern region (that includes all of Westervelt's forestry operations), an average of 7.6 jobs are created per 1,000 acres of ownership, \$248.45 of payroll contributions per acre, \$9.29 of state tax revenue per acre, and \$277 contributed to GDP per acre was reported. According to these numbers, Westervelt's 525,000 acres of forestland in five southern states contributes nearly 4,000 jobs, over 130 million dollars in payroll, over 4.8 million dollars in state tax contribution, and 145 million in GDP.

Profile of Adjacent Lands

Many of the forests of the southeastern United States have become fragmented, and many former large land owners have divested their properties. Properties surrounding the FMU are owned by various individuals, corporations, state and federal agencies and other municipalities. TWC strives to maintain a working relationship with surrounding landowners and other forest stakeholders, and has a number of easements and access agreements with these landowners. All of the FMU is managed under a recreational lease program which allows hunting clubs and other individuals outside of the company to enjoy the recreational values of the FMU.

Description of the Silviculture

Using the best knowledge available, we will invest in the most economically effective silvicultural technology to grow, manage, harvest and regenerate high-value timber products. Most areas intensively managed will utilize even-aged silvicultural systems. We will train our employees to make site specific prescriptions using individual knowledge and financial scheduling models to employ the best combinations of the following tools and techniques.

- Timely thinning and regeneration timber harvest
- Site preparation utilizing competition control and tillage
- Genetically improved and vigorous seedlings
- Fertilization
- Timely use of prescribed fire
- Detection and control of invasive species
- Cost-effective performance by all suppliers and contractors

On pine lands, we will produce quality sawtimber using an average 25-year rotation, varying according to site productivity and species. We will utilize periodic thinning to concentrate and sustain growth on crop trees to meet target timber size.

On hardwood lands, we will produce quality sawtimber using an average 65-year rotation. We will employ the best knowledge and a combination of natural and artificial regeneration techniques to establish, grow and protect species of higher value.

Pine-hardwood management units are managed to mimic the historical occurrence of mixed species forests in upland pine/hardwood transition zones. To this end, these units may exhibit a broad range of stocking densities and stand characteristics based on predominant species. They can include non-harvested SMZs and inoperable areas which are left to grow and develop as natural stands, or harvested stands whose management potential is limited by access, terrain, size, soil conditions, etc. Stands with an acceptable mix of natural regeneration following harvest will be left to grow naturally. Other units may receive minimal stand establishment treatments following harvest to help establish a mixed species stand. Typical treatments could include a directed hand herbicide

application and/or interplanting with pine seedlings to ensure an acceptable mix of pine and hardwood.

Annual Allowable Cut (AAC) Rationale for TWC FMU

TWC utilizes optimization software for tactical and strategic harvest scheduling to ensure that ecological and operational constraints are met on the FMU. TWC actively manages hardwood, pine, and mixed pine-hardwood stands on its FMU and utilizes the model to ensure that scheduled harvests reflect the overall management strategy. While model goals in this process are financially focused, constraints are placed in the process to guarantee responsible management. To name a few, constraints are in place in the model to regulate the overall amount of clearcut harvesting each year and to perpetuate managed forest types into the future. The number of natural stand types (including hardwood and mixed pine/hardwood) available for harvest each year is also constrained by the model. In addition, all stands that are harvested are required to be reforested promptly.

The planning horizon used in the process is long by Southern U.S. standards (currently 100 years) and care is taken at the end of each process to view by-period inventory outputs as a check to ensure long-term sustainability. Should unsustainable future inventories be noted, then constraining of this and related variables can be used to correct the issue. Unsustainable future inventory numbers have not been an issue as the process seeks financial sustainability, which is closely coupled with harvest and inventory sustainability. In all, this process along with the sustainable forest management practices that TWC employs provide managers with a sustainable Annual Allowable Cut plan that is dynamic and optimal with respect to financial and ecological considerations.

Harvesting Techniques and Equipment Used

Harvesting that utilizes the removal of most of the trees in an area results in the next forested stand regenerating to an even-aged structure. This technique mimics the natural disturbance regimes of wind and fire. The areas that are thinned promote healthy (considering disease and insects) stands that have room for crop trees to flourish.

Harvest Opening Size Justification for TWC FMU

Tornadoes, hurricanes, windstorms, fires, insects and other disturbances have historically shaped the forest matrix found throughout the TWC FMU. Wind events (tornadoes, hurricanes and straight line winds) have often been the source of a wide range of stand-replacing disturbances. Forest health issues (diseases and insects such as the southern pine beetle) contribute to disturbance regimes as well and also are responsible for a wide range of stand-replacing disturbances.

An analysis was conducted to quantify the range of harvest openings created by TWC's typical forest management activities. TWC records from the following major wind disturbance events were utilized: Hurricane Ivan in 2004, Hurricane Katrina in 2005, and the tornadoes that occurred on April 27, 2011. As these events were documented as a

result of damage observed to the FMU, these events are representative of historic occurrences. The data does not include disturbance opening size observed on lands adjacent to the FMU, and as such tends to underestimate the damage caused by these large-scale events. For instance, the April 27, 2011 tornadoes may have damaged 100 acres of the FMU, but this may only represent a small portion of the thousands of acres damaged by the entire tornado track. These disturbance events observed on the FMU produced a range of opening sizes from .15 acres to 191 acres.

TWC maintains records of actual harvest data in their GIS, and records dating back to 2003 were used in this analysis. This period is roughly consistent with the timeline of the disturbances. During this time period there were 138,602 acres harvested, with openings ranging from 1 to 357 acres in size. Almost 100 percent (99.35%) of these harvests were between the range of .15 to 191 acres in size calculated from the documented disturbance events.

TWC's operational harvest size range is within the bounds of the openings created by natural disturbances on the FMU. A tract may be larger or smaller in size depending upon economic, operational, forest health, or other concerns at the time of harvest, and will be considered by TWC staff when planning the harvest treatment. TWC will evaluate the range of clearcut sizes each year when developing the annual addition to the harvest schedule to ensure that the range is maintained.

Harvesting Equipment Used

We employ harvesting contractors with equipment that can accomplish tree removal objectives while reducing damage to soils during wet seasons and protect sensitive soils, erosive soils, and steep terrain during harvesting. Some examples are:

- Tracked fellerbunchers -utilized where steep terrain must be harvested to reduce damage to soil and prevent possible erosion problems. These machines are also used where wet soil conditions exist to prevent soil disturbance and rutting.
- Low ground pressure tire systems - grapple skidders and wheeled fellerbunchers utilize these systems on all of our harvesting operations to prevent soil churning and tire spin.
- High flotation tires - utilized by crews to allow access to felled timber in wet conditions to prevent disturbance and rutting.
- Eco-tracks – utilized on grapple skidders to increase tire footprint and lessen damage to soils during periods of wet conditions. Eco-tracks also reduce soil compaction on heavy clay sites.
- Low ground pressure tire systems on ferry trucks - utilized by crews to prevent damage to sensitive road systems during the wet season. These vehicles ferry loaded trailers from the harvest unit to trailer drop zones along paved or gravel surfaced roads.

These vehicles operate at slow speeds, with low tire pressure, avoiding tire spin and rutting problems on wet roads.

Summary of Forest Monitoring

Forest Products Harvested

Rational for determining sustainable production levels (Annual Allowable Cut) utilizes our Timber Information and Planning System (TIPS). The harvest scheduling system utilizes a database that is continually updated with timber volumes and conditions, and a growth and yield modeling system able to project yields based on management criteria. The system develops and evaluates cutting/management plans based on 5 to 50 year planning windows.

Regeneration and Condition of the Forest

Stand data updates are made anytime there is a significant change to tree stocking levels. Upon completion of a harvest, stand updates “reset” the data to reflect the harvest action. Once the new stand is established, another update documents the year-one results (stocking, species, etc.). A Stand Establishment Assessment is conducted at year two for all pine stands. During this time, foresters are assessing the outcome of their reforestation efforts.

Another aspect of our forest monitoring is conducting a 10-year inventory of forest stands to update our TIPS system and also monitor growth rates. The 10-year inventory is also used by foresters to make thin plans.

After stands are thinned, an inventory is conducted to assess effectiveness and update the stand database with the residual stocking numbers. This new stand data is then modeled in the growth and yield system and scheduled for subsequent actions (fertilization, 2nd thin, harvest, etc.)

During each phase of forest inventory, planning, and operations, all employees are responsible for monitoring forest conditions. Issues such as invasive species, illegal dumping, water quality and erosion, and endangered species occurrences are noted and reported to the appropriate process performers. These issues then receive corrective actions as needed to ensure a health working forest is maintained.

Silvicultural Activity Summary

Silvicultural Activities – 2017

<u>Activity</u>	<u>Acres</u>
Reforestation:	
Bareroot Hardwood	141
Bareroot Loblolly	2,359
Container Loblolly	12,341
Container Longleaf	342
Total	15,183

Site Prep:	
Mechanical	4,291
Chemical	14,985
Burns	156
Total	19,432

Vegetation Control:	
Release	2,785
Weed Control	8,697
Invasive Species	136
Total	11,618

Fertilization	
Urea	8,178
DAP	3,065
Total	11,243

During 2017, 8,417 acres were harvest cut and 4,147 acres were thinned. Reforestation involved planting approximately 4.3 million trees.

Silvicultural Activities – 2016

<u>Activity</u>	<u>Acres</u>
Reforestation:	
Bareroot Hardwood	121
Bareroot Loblolly	2,719
Container Loblolly	11,375
Container Longleaf	550
Total	14,765
Site Prep:	
Mechanical	4,958
Chemical	13,512
Burns	256
Total	18,726
Vegetation Control:	
Release	2,724
Weed Control	3,981
Invasive Species	559
Total	7,264
Fertilization	
Urea	8,100
DAP	3,223
Total	11,323

During 2016, 14,682 acres were harvest cut and 7,670 acres were thinned. Reforestation involved planting approximately 7.5 million trees.

**Silvicultural Activities –
2015**

<u>Activity</u>	<u>Acres</u>
Reforestation:	
Bareroot Hardwood	
Bareroot Loblolly	411
Container Loblolly	4,720
Container Longleaf	11,698
Total	900
	<hr/> 17,729
Site Prep:	
Mechanical	
Chemical	4,104
Burns	13,170
	1,525
Total	18,799
Vegetation Control:	
Release	
Weed Control	1,393
Invasive Species	6,355
Total	702
	<hr/> 8,450
Boundary Line:	
Maintenance	Miles 475
Fertilization	
Urea	11,857
DAP	5,716
Total	17,573
	<hr/> <hr/>

**During 2015, 12,622 acres were harvest cut and 8,282 acres were thinned
Reforestation during 2015 involved planting well over 9 million trees.**

Silvicultural Activities – 2014

<u>Activity</u>	<u>Acres</u>
Reforestation:	
Bareroot Hardwood	328
Bareroot Loblolly	4,897
Container Loblolly	11,330
Container Longleaf	976
Total	17,531
Site Prep:	
Mechanical	3,669
Chemical	14,440
Burns	1,454
# Burns	20
Total	19,563
Vegetation Control:	
Release	934
Weed Control	8,022
Invasive Species	332
Total	9,288
Boundary Line:	
Maintenance	Miles 292.09
Fertilization	
Urea	10,182
Biosolid-Pellet	1,146
Biosolid-Cake	627
Total	11,955

**During 2014, 10,765 acres were harvest cut and 10,343 acres were thinned
Reforestation during 2014 involved planting 9.2 million trees.**

**Silvicultural Activities –
2013**

<u>Activity</u>	<u>Acres</u>
Fertilization	
Dap	6796
Urea	8850
Biosolid-Pellet	1633
Reforestation:	
Bareroot Hardwood	209
Bareroot Loblolly	2,162
Container Loblolly	11,669
Container Longleaf	45
Total	14,085
Site Prep:	
Mechanical	5,010
Chemical	14,366
Burns	2,422
# Burns	20
Total	21,798
Vegetation Control:	
Release	2,064
Weed Control	7,150
Invasive Species	633
Total	9,847
Boundary Line:	
Maintenance	Miles 468.11

**During 2013 11,004 acres were harvest cut and 6,600 acres were thinned.
Reforestation during 2013 involved planting 7.6 million trees.**

Environmental and Social Impacts of Harvesting and Other Activities

On all forest operations, we will sustain and enhance the biological productivity of the land as measured by timber productivity, water quality and wildlife populations. Best Management Practices and the sustainable forestry guidelines will be our minimum standard for operations. Periodic internal and third party audits will be conducted to measure performance in our environmental and silvicultural operations.

We use approximately 20 contract loggers to deliver wood to over 70 markets which significantly impacts the local economies.

Productivity and Efficiency of Forest Management

The Westervelt Company is a process focused company striving to understand our impacts on the forest and provide value to our customers. We actively search for ways to improve productivity, environmental performance and the quality of our management through continuous improvement projects.

Westervelt Ownership Map showing the three FMUs. Only the Core FMU (shown in green) is currently enrolled in FSC Forest Management certification.

