

2529 Yolanda Court  
Pleasanton, CA 94566  
(510) 427-3571  
Sig-gis.com

**Scope of Work:**

UK wood pellet derived electricity: Carbon emission estimates from trees, thinnings and residues sourced in mixed pine-hardwood forests and pine plantations in the southeastern US

**Project report Phase 1 to:**

Southern Environmental Law Center (SELC) and National Wildlife Federation (NWF)

**Points of contact:**

David Carr, w; 434-977-4090 c: 434 981 6925, e: [dcarr@selcva.org](mailto:dcarr@selcva.org)

Max Broad, w: 202-797-6643, e: [broadm@nwf.org](mailto:broadm@nwf.org)

**Prepared on behalf of SIG by:**

Thomas Buchholz, Ph.D. c: 802 881 5590, e: [tbuchholz@sig-gis.com](mailto:tbuchholz@sig-gis.com)

John Gunn, Ph.D. c: 207 212 7723, e: [jgunn@sig-nal.org](mailto:jgunn@sig-nal.org)

Brian Kittler (Pinchot Institute for Conservation), c: 503 473 6501 e: [bkittler@pinchot.org](mailto:bkittler@pinchot.org)

**Date:**

October 25 2018



**Contents**

RATIONALE ..... 1

PHASE 1: FOREST MANAGEMENT BASELINE DEVELOPMENT ..... 1

1.1 SURVEY PREPARATION AND IMPLEMENTATION ..... 1

1.2 SURVEY ANALYSIS AND BASELINE WRITEUP ..... 2

    Forest ownership and forest types ..... 3

    Forest management ..... 3

    Changing management in absence of pellet mills ..... 4

CONCLUSIONS ..... 5

APPENDIX 1 ..... 6

PHASE 2: DRAX PELLETT MILL C LCA ..... 6

    1. Task 3: Forest growth and yield modeling ..... 6

    2. Deliverables: ..... 6

    3. Task 4: Pellet mill specific C LCA ..... 6

    4. Deliverables ..... 6

APPENDIX 2 ..... 7

COMPLETED SURVEYS ..... 7



## RATIONALE

Through a subsidiary, Drax Biomass, the UK electric power producer Drax owns and operates three pellet mills in Mississippi and Louisiana. In Louisiana, plants are located in Morehouse and Urania (LaSalle), with the Mississippi plant located in Amite, each of which have an annual nameplate capacity of ~450,000 metric tons of wood pellets. Morehouse and Amite were greenfield plants built by Drax, LaSalle was acquired from German Pellets in 2017. Since operations began, for all of these mills approximately 20% of feedstock volume is sawmill residuals and 80% are tree length logs. The Southern Environmental Law Center (SELC) and NWF are interested in better understanding the carbon life cycle assessment (C LCA) from pellets produced by these three mills and burnt for electricity production by Drax in the UK. To generate a robust C LCA, it is important to integrate a solid understanding of the landscape carbon dynamics in the presence and absence of these pellet mills. However, the impact of these mills on the surrounding forests is little understood.

This proposal is therefore split into two phases. This document reports on outcomes of Phase 1. Phase 1 (baseline development) SIG in collaboration with the Pinchot Institute for Conservation focused on improving our understanding on what the forest management options would have been in the absence of the pellet mills.

Based on outcomes from Phase 1, we offer the choice to SELC and NWF to pursue Phase 2 which entails a full C LCA for all three or a subset of the Drax pellet mills (see Appendix 2).

## PHASE 1: FOREST MANAGEMENT BASELINE DEVELOPMENT

### 1.1 Survey preparation and implementation

Based on Brian Kittler's networks in the region, connections through the Forest Stewards Guild, we identified over 20 professionals (loggers, foresters, trade representatives, state foresters, US Forest Service employees, university extension staff) with expertise in the biomass harvest in the relevant Drax woodsheds in Louisiana (all three mills), Mississippi (Amite), and Arkansas (Morehouse). We interviewed seven practitioners (foresters and loggers or trade representatives) and one university-based researcher in the region. Their expertise covers all three woodsheds and all three states mentioned above (Figure 1).



## Forest ownership and forest types

Survey respondents were consistent in describing the ownerships that provide biomass to Drax's plants as largely private industrial and non-industrial timberland owners. Non-industrial timberland owners seem to be a primary supply base for Drax plants since larger industrial timberland owners frequently have long-term supply agreements with pulp mills. Respondents suggest that these contractual relationships between pulp mills and large industrial landowners place non-industrial forests at a competitive disadvantage for accessing those market outlets for pulpwood produced in thinnings and final harvests.

Survey respondents consistently described pine plantations as the main feedstock source for Drax's biomass supply. While some respondents mentioned that Drax only accepts softwood biomass (e.g. Respondent P6 in LA), some respondents (e.g. Respondent P4 in Arkansas; Respondent P3 in LA) mentioned that 5% to 20% hardwoods are delivered to Drax. Some hardwood is removed as a component of thinning non-industrial semi-natural pine plantations. A consulting forester in central Louisiana explained that regional hardwood pulpwood markets are largely seasonal and mainly focused on sweetgum, delivered to a regional hardwood pulp mill, but that Drax accepts hardwood chips. However, in-forest wood chipping operations are rare in the region (Respondents P1 and P3 in LA). Besides the presence of hardwood stands in the woodshed of a given Drax plant, the presence of hardwood sawmills seems to be crucial to a hardwood-based supply chain for Drax as well as the presence of small number of pulp mills that would be a preferred market for hardwood biomass. In other words, if no hardwood-based processing pulp and sawtimber industry exists, hardwood supply to Drax might be less likely.

Non-industrial timberland owners seem to be a primary supplier for Drax pellet plants since industrial timberland owners frequently have long-term supply agreements with local pulp mills.

## Forest management

Multiple respondents indicated that pine plantations on industrial and non-industrial timberland are managed very close to the same way (e.g. Respondent P5 in MS). Starting with a planting density of 400-750 trees per acre, a first thinning is typically applied around year 12 to 15 (in maximum range 11-18 years) down to a basal area of 70-80 square foot/acre. Typical thinning operations entail skid trail establishment every 35-40 ft and removal of around one third to half (32-35 tons; Respondent P3 in LA) of the remaining trees with a 'thin from below' strategy, i.e. a focus on cull and low-quality trees (dead, crooked) in between skid trails (e.g. Respondent P6 in LA). The timberland owner expects these thinnings to pay for themselves through the sale of pulp/biomass (commercial thinning). No pole or sawtimber dimensions are reached at that stage.

Non-industrial private timberland is partly managed for smaller diameter sawtimber and pole production, i.e. a regeneration cut (clearcutting) is applied starting at year 20. Industrial timberland is also managed for sawtimber production prolonging rotation lengths to 30-40 years (e.g. Respondent P4 in Arkansas) with a potential second thinning around year 25 removing less than 30 tons to get to 140 trees/acre (Respondent P3 in LA). At final harvest trees of this size yield 2 – 2.5 clear logs (16 ft) on a 16-inch DBH stem.

Respondents were consistent in their comments regarding the fact that tops and branches are rarely chipped (e.g. Respondents P1 and P3 in LA) and extracted from the forest. The dominant practice is to return forest residues back to the forest as driving mats on skid trails, to prevent soil erosion along streams, and wildlife habitat.

Hardwoods are managed with group selection and natural regeneration. Management for hardwood timber and to some extent pulp only affects a small fraction of Drax's feedstock supply.

### Changing management in absence of pellet mills

Survey respondents were consistent in their assessment that the pulp market in the region is strong, the pellet demand does support additional harvests (thinning from below) but does not affect plantation establishment or land use in general. While some comments from LA (Respondent P6) suggest that non-industrial timberland owners might have changed forest management practices (including abandonment) in the absence of a pellet market, most respondents stressed the fact that the pulp industry is strong in the region while also stressing that the biomass/pulp supply can easily accommodate pellet mills (e.g. respondent R1: "Presence of pellet mills not driving management decisions (AL and MS landowners).") to ensure a more constant operation of supply chains (shorten waiting periods for delivery, reducing quota-based limitations at pulp mills). A land use change away from pine plantations is unlikely. In regions where hunting leases provide revenue to landowners, conversion from forest to agriculture or pasture also seems unlikely.

At the same time, thinnings were neglected or delayed in years prior to Drax's entry into the market (e.g. Respondent P2 and P3 in Louisiana). This is also true in other parts of the region lacking low-grade markets, although variations among sourcing areas exist.

*"Many stands were not being thinned before Drax came due to a loss of pulpwood demand, and without them that would continue. That is the fact of it. 1 million tons a year that were not getting thinned [around each Drax mill]. 99% of that would be on private non-industrial lands because the larger landowners had the ability to get the supply agreements with the pulp mills." (Respondent P2, Louisiana)*

Survey respondents consistently mentioned that boles from thinnings that do not meet pulp quality standards (hardwoods, cull and deceased trees, etc.) would have been left in the forest in the absence of Drax' mills in the region. This undisputed impact is the most notable and could be used to model C stock change. However, the impact from a C debt perspective will most likely be small since the half-life of carbon stocks from dead down woody debris is short and the total quantity of cull material/biomass not meeting pulp dimensions is most likely small as well as undocumented.

From a mill specific perspective, the Lasalle pellet mill will receive around 30% (25%-50%) of its feedstock from a co-located sawmill currently under construction. It's implications on regional forest carbon stocks is most likely the smallest of all three mills. While survey respondents consistently referred to a strong forest product market in the region, the pellet mill located in Amite might be the most likely to provide noticeable additional demand for pulp-quality biomass due to a suppressed pulp market; i.e. affect local forest management decisions.

Hardwoods provide only a small fraction of Drax's feedstock. This includes hardwoods harvested from pine plantation thinnings as well as from hardwood stands. Since survey respondents were consistent on their focus on pine plantations as a feedstock source for Drax, we recommend that we not dedicate time on hardwood management and its implications on forest carbon stock but rather to keep the focus on pine plantation management in order to focus on the larger impacts on forest management in the region.

## Conclusions

We recommend to model as a baseline (absence of Drax) a scenario where thinnings are forgone and planting densities remain the same as with pellet demand. No abandonment or land use change would occur, rotation lengths would remain the same. While ownership type does not affect growth and yield modeling, it is interesting that Drax derives most of its feedstock from non-industrial private timberlands.

For this scenario comparison, we further recommend to reduce log sizes from 16 (absence of Drax) to 12 ft and a reduction of the top diameter limit from 3 to 1.5 inch (see e.g. Respondent P3 in Louisiana). Due to the lack of high-quality data, we would assume that cull/dead trees would also constitute a small proportion of a thinning operation and ignored in a baseline vs. current practice comparison.

We further recommend to run a carbon LCA scenario where the LaSalle (Urania) pellet mill would derive 25%-50% of its feedstock from a newly co-located sawmill. This scenario will provide insights into the carbon implications of using industrial residues vs. forest derived feedstock.

Several respondents mentioned the increased risk of insect infestations if pine plantations go unthinned. We would recommend to describe this risk qualitatively and provide ranges of carbon impacts when insect risks would be incorporated into the carbon LCA modeling exercise based on the available literature. Alternatively, to improve accuracy, insect infestation risk could be also a modeling component with a separate budget line item.

## APPENDIX 1

### PHASE 2: DRAX PELLETT MILL C LCA

#### 1. Task 3: Forest growth and yield modeling

A feedstock specific forest growth and yield modeling exercise will produce a dataset on landscape carbon dynamics for each of the selected mills. Using Forest Inventory Assessment (FIA) data, we will employ the Forest Vegetation Simulator (FVS) to generate C outcomes for a 40-year future. We will retrieve FIA data for all relevant pellet mill woodsheds and forest types. FIA data points from outside the woodsheds will be included as needed to satisfy basic statistical metrics (e.g. a 90% confidence interval) on a pellet mill woodshed-level.

We will create FVS compatible tree lists from FIA data and run simulations on the Southeastern FVS variant simulations using silvicultural scenarios as defined in Phase 1.

#### 2. Deliverables:

D3.1 Retrieve relevant FIA data; potentially augmented with FIA plots outside of woodshed

D3.2 Dataset containing pellet mill specific landscape C dynamics

#### 3. Task 4: Pellet mill specific C LCA

Results will be plugged into the C LCA accounting framework developed during the BERC 2012<sup>1</sup> study and further downscaled for the NRDC 2015<sup>2</sup> project. The assumption that use of more residuals results in more sawtimber harvest will be eliminated or neutralized. Outcomes will be reported for pellets exported to Drax electricity plants in the UK. Methods and results will be presented and discussed in a brief (max. 10p) report.

#### 4. Deliverables

D4.1 Excel spreadsheet with C LCA outcomes for Drax pellet mills

D4.2 Brief report outlining methods and results

---

<sup>1</sup> Colnes, A, K Doshi, H Emick, et al. 2012. Biomass Supply and Carbon Accounting for Southeastern Forests. Biomass Energy Resource Center (BERC), Montpelier, VT, USA.

<sup>2</sup> NRDC 2015. Think Wood Pellets Are Green? Think Again. NRDC Issue Brief, IB: 15-05-A. New York, NY: Natural Resource Defence Council (NRDC). <https://www.nrdc.org/sites/default/files/bioenergy-modelling-IB.pdf>



## APPENDIX 2

### COMPLETED SURVEYS

#### INTERVIEWEE INFORMATION

Respondent ID: R1

Respondent category: Researcher

#### QUESTIONS

**1. What are typical forest owners who sell biomass?**

Industrial, non-industrial, public

Indicated that NIPF are the dominant landowner in much of MS.

**2. What are typical forest types that provide biomass to Drax? Please break down by forest owner.**

**3. The following questions explore what the current management of these forest types is. Please break down by forest owner.**

**3.1 Describe thinning practices by forest types**

Type and age of thinnings

Percentage of harvest going to biomass (in sqft/% of basal area or total volume of harvest, green tons, etc.). Break down by bole vs. tops/branches.

Handling of tops and branches (scattered, burnt on site, chipped and shipped)

OK with leaving it on site if the prices and markets are there.

What are basic differences non-industrial and industrial forest owners?

**How would this change in the absence of the pellet market?** E.g. no or reduced thinning cycles? Alternative treatment of slash besides chipped and shipped?

Not much influence on management decisions. Haven't seen all the pulp going to pellets. Still have OSB that use any kind of wood and species, also plywood plants. So there are new plants being built. Presence of pellet mills not driving management decisions (AL and MS landowners).

### 3.2 Describe regeneration practices

Type and age of regeneration cuts

Percentage of harvest going to biomass (in sqft/% of basal area or total volume of harvest, green tons, etc). Break down by bole vs. tops/branches.

Handling of tops and branches (scattered, burnt on site, chipped and shipped)

What are basic differences non-industrial and industrial forest owners?

**How would this change in the absence of the pellet market?** E.g. convert to ag land? Abandon forestry (let grow)? Lower planting densities? Other species?

### 4. Any comment you want to share?

What are typical forest management issues in your region?

Whom else should we interview?

Not that familiar with LA, and not familiar with Gloster much either. But knows Amory, MS (FSC?). But knows of plant in Quitman, MS in operation for < 2 years, doing torrefied pellets. Had a big investment, supported by France, closed down operation. Were sourcing from landowners in the area. Had plenty of supply.

Landowners willing to get involved, but not at lower price. Don't want to disrupt habitat – hunt on property or lease it out for hunting. Getting someone to do the woodchipping for small landowners.

Not many wood pellet facilities down in MS. Natural forest management, would rather just leave the low grade stuff on hardwood sites and not manage. Knock it down or leave it on site.

FSC plantation management – previously established before 1994. Small landowners, small tracts of loblolly or long-leaf. Landowners are not converting natural forest to plantations.

Weyerhaeuser has extensive plantations, but has lots of hunting clubs and hunting coops. So, less likely to convert to non-forest.

Wood pellet thing is not taking off here. Amory, MS has been around awhile though and seem to keep it going. Don't know where they get their wood from, maybe from sawmills. Most of MS is NIPF. **Markets have been so uncertain for so long, but they generally don't want to be bothered with doing anything different.**

## INTERVIEWEE INFORMATION

Respondent ID: P1

Respondent category: Consulting Forester

## QUESTIONS

### 1. What are typical forest owners (that you work with and) who sell biomass?

Industrial, non-industrial, public

NIPF, minority landowners (all outside of wood supply area), mostly smaller than 100 acres, More natural stands vs. planted stands.

### 2. What are typical forest types that (you work with and that) provide biomass to Drax? Please break down by forest owner.

What are basic differences non-industrial and industrial forest owners?

Natural hardwood stands

### 3. The following questions explore what the current management of these forest types is. Please break down by forest owner.

#### 3.1 Describe thinning practices by forest types

Type and age of thinnings

Percentage of harvest going to biomass (in sqft/% of basal area or total volume of harvest, green tons, etc). Break down by bole vs. tops/branches.

Handling of tops and branches (scattered, burnt on site, chipped and shipped)

What are basic differences non-industrial and industrial forest owners?

**How would this change in the absence of the pellet market?** E.g. no or reduced thinning cycles? Alternative treatment of slash besides chipped and shipped?

Right now, in the absence of low grade market, landowners generally choose not to manage stands and let it grow.

#### 3.2 Describe regeneration practices

Type and age of regeneration cuts

Percentage of harvest going to biomass (in sqft/% of basal area or total volume of harvest, green tons, etc.). Break down by bole vs. tops/branches.

Handling of tops and branches (scattered, burnt on site, chipped and shipped)

What are basic differences non-industrial and industrial forest owners?

**How would this change in the absence of the pellet market?** E.g. convert to ag land?  
Abandon forestry (let grow)? Lower planting densities? Other species?

#### 4. Any comment you want to share?

What are typical forest management issues in your region?

Whom else should we interview?

The pellet market doesn't influence forest management as much as it could. Alex is a consulting forester in MS, AL, LA – did some ground-breaking work in Alabama with minority landowners and cost-share practices (funded by US Endowment), but only had experience with one mill accepting chips to make pellets. Site preparation costs are a barrier for NIPF landowners to engage in intensive forest management. Used an in-woods chipper to thin and a final harvest (needed to get understory material off the site).

JG Question: Are people planting pine plantation in anticipation of pellet markets?  
"People got carried away in 80s and 90s planting loblolly, so there is a lot of fiber out there. Already a tough time getting wood to markets, so people aren't willing to invest in converting to plantations. A lot of landowners are missing thinning opportunities because of lack of markets."

Typical Markets: Sawtimber and poles, small pulp mills. Some chip-n-saw, GP near Gloster and Brookhaven. Some low-grade thinning material goes to chip-n-saw.

**\*Small and large acreages going to pasture vs. forest when markets are slim and beef prices are good.**

A lot of landowners are not comfortable with thinking about the long-term and being patient when markets are not good. [JG note: implies short term view vs. long-term anticipatory management activities]

**Just don't have a lot of markets. Which causes lots of other issues.**

## INTERVIEWEE INFORMATION

Respondent ID: P2

Respondent category: Consulting Forester

## QUESTIONS

### 1. What are typical forest owners (that you work with and) who sell biomass feedstocks?

Almost all smaller non-industrial owners. My largest NIPF client is 55,000 acres. They are keenly interested in wildlife and wildlife management. Everything they do for that landowner is wildlife oriented.

I do occasionally buy timber from larger industrial owners, i.e. REITs like RMS, they'll put out a package and we'll bid on it when we need to help meet our orders. We don't engage in the planning side of things for the REITs we just buy their wood from time to time. Typically the REITs and TIMOs are the preferred source of fiber for the pulp mills, but we do send some of their wood to Drax.

With the smaller landowners we do management planning, thinning, final harvest, etc., working with contract loggers like Lowell Hubbard.

### 2. What are typical forest types that (you work with and that) provide biomass to Drax? Please break down by forest owner.

What are basic differences non-industrial and industrial forest owners?

There is a huge plantation estate in north Louisiana, the REITs and TIMOs make supply agreements with the paper mills, leaving the smaller private landowners without an opportunity to do much in the way of management in their lands.

The region is driven by pine management. Both NIPF and PIF want a first thinning; they need a revenue stream. NIPF plantation management is not as intensive as the industrial owners but typically it is good management. First thinning happens 11 – 18 years. Length of the rotation for 16 inch DBH log as sawtimber, 22 – 35 years depending on the site. At final harvest trees of this size yield 2 – 2.5 clear logs on a 16-inch DBH stem.

The private non-industrial folks are not quite as good as the industrial owners. The large landowners are more intensive in terms of site prep and everything else. So the small landowners plantations are more variable than the large industrial owners. I.e. the small landowners' pine trees are usually of lower quality. They may have areas on their plantation that look a lot different than other areas of their plantation, largely due to site prep.

More hardwood, sweet gum particularly. Hardwood markets are seasonal. The largest user of hardwood is a pulpmill. There is one mill that accepts hardwood pulpwood. Drax can take some hardwood as chips. Some certain percentage.

**3. The following questions explore what the current management of these forest types is. Please break down by forest owner.**

**3.1 Describe thinning practices by forest types**

Type and age of thinnings:

Thin from below – 11 – 18 years, removing worst stems, take out diseased trees, damaged trees, reduce stand density. Come back and do a second thinning and do a final harvest. They don't thin from above. There is not typically any other type of silviculture. There is some alternative silviculture in the hardwoods. Group selection, etc. higher value hardwood products.

Percentage of harvest going to biomass (in sqft/% of basal area or total volume of harvest, green tons, etc). Break down by bole vs. tops/branches.

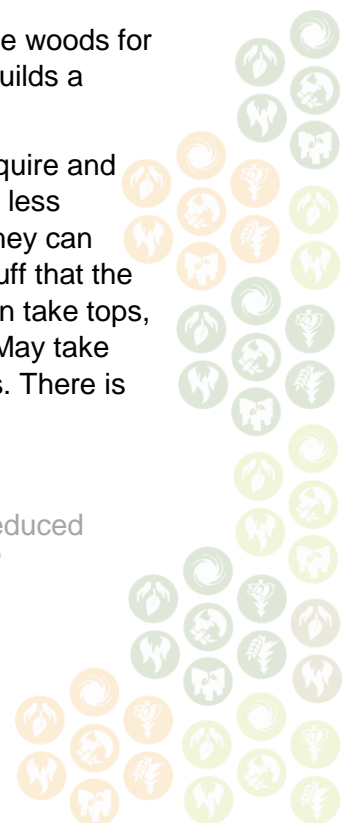
Probably right now 25 – 60% of what they harvest for thinnings that they do. Depends on the week, location, quality of the material. Wood orders, each mill gives out wood orders weekly. This is what you can bring to the mill in a given week. Throughout the course of any month, the paper mills and Drax will have any issues that slow them down. Past that, it's the quality of the material that each mill requires to meet the specs.

Handling of tops and branches (scattered, burnt on site, chipped and shipped)

I see the use of tops coming, but we typically bring back the debris out into the woods for soil health. I like the effect of it in the woods for the decomposition process, builds a better soil over time. But I see a market for it coming.

Every mill, paper mill, pellet mill, they all have a specification on what they require and what they can use. The pellet mill specification is that they can take a smaller less desirable stem than the paper mill. Drax has a wider variety of material that they can take than any other delivery point in Northern Louisiana. They will take the stuff that the paper mill does not want. If you have a chipper in the woods the pellet mill can take tops, limbs, everything. Very small stuff that you could never get into a paper mill. May take parts of hardwood trees (typically sweet gum), limbs but not higher value logs. There is one hardwood pulp mill in the region.

**How would this change in the absence of the pellet market?** E.g. no or reduced thinning cycles? Alternative treatment of slash besides chipped and shipped?



Many stands were not being thinned before Drax came due to a loss of pulpwood demand, and without them that would continue. That is the fact of it. 1 million tons a year that were not getting thinned [around each Drax mill]. 99% of that would be on private non-industrial lands because the larger landowners had the ability to get the supply agreements with the pulp mills.

### 3.2 Describe regeneration practices

In years past there was a fair amount of seed tree but now it is more than 95% clear cut and replant. The seedtree cuts you end up with way too many seedlings or too few seedlings.

**How would this change in the absence of the pellet market?** E.g. convert to ag land? Abandon forestry (let grow)? Lower planting densities? Other species?

The highest and best use of the land is pine production so when we had a dip in markets we did not see a lot of conversion to agriculture, those landowners had faith that something would come in to support the industry. Cattle are not as much of an option as it used to be. Fewer people are living on the land they used to.

### 4. Any comment you want to share?

The biggest issue is that without Drax our forest management on NIPF lands would not be going well. The demand from Drax allows a lot of stands to be thinned when they need to be thinned. There is not a huge issue with fire, but young unthinned plantations that don't get thinned are ripe ips beetle infestation. When a paper mill went away there was more trouble with ips beetles than any other time because there was so many 15 – 16 year old plantations that were unthinned and stressed and prime easy pickings for the ipse beetle.

Planting densities have not changed over time. The issue is thinning.

## INTERVIEWEE INFORMATION

Respondent ID: P3

Respondent category: Consulting Forester

## QUESTIONS

### 1. What are typical forest owners (that you work with and) who sell biomass?

Industrial, non-industrial, public

[...] the new Urania softwood sawmill will be sending 100% of residuals to Drax.

### 2. What are typical forest types that (you work with and that) provide biomass to Drax? Please break down by forest owner.

What are basic differences non-industrial and industrial forest owners?

So much of the area has been converted to pine plantations from the natural mixed hardwood pine do probably 80 to 90% of what Drax receives originates from privately owned pine plantations.

The bulk of our material comes as chips and roundwood from NIPFs, (20, 40, 80 acres on up to the bigger REITs and TIMOs. Hunt is one of four ATFS certified landowners in a Tree Farm group. Drax prefers the certified wood.

### 3. The following questions explore what the current management of these forest types is. Please break down by forest owner.

#### 3.1 Describe thinning practices by forest types

[...] grow a littler longer due to our plywood mill. We do a first thin at plus or minus 15 year old (depending on site index), a second thin at 25, final harvest at 35 years.

At first thin we go from 500 trees per acre down to 220 trees per acre, removing 32 - 35 tons per acre. On the second thin we remove less than 30 tons per acre to get down to 140 trees.

On NIPF lands, lack of markets have recently caused people to thin later than they would like. There was a backlog of wood in all age classes. Drax has helped but there is still a glut.



Percentage of harvest going to biomass (in sqft/% of basal area or total volume of harvest, green tons, etc). Break down by bole vs. tops/branches?

First thinning 100% of material goes to pulpwood, in a second thinning it is a 50:50 mix of pulpwood and chip and saw log.

Drax will take a “rat-tail” top down to 1.5 to 2 inches and a minimum length of 12 ft. Many papermills have a 16 ft length and 3 inch tip specification. Generally, pulpwood is pulpwood and there is not much (if any) material of difference between what Drax takes and what the pulpmills take.

Handling of tops and branches (scattered, burnt on site, chipped and shipped)?

Normally scatter slash through the woods, we use it in BMPs too (e.g. slash skid trails).

**How would this change in the absence of the pellet market?** E.g. no or reduced thinning cycles? Alternative treatment of slash besides chipped and shipped?

With Drax being there they have allowed folks, the glut of timber coming in, Drax has helped get that in place. 100% of residuals produced by Hunt’s new pine sawmill will go to Drax. They will open in January.

Drax is really no different then the other pulpmills, it’s pretty much the same. We don’t have to have a Drax sort or a pulp mill sort.

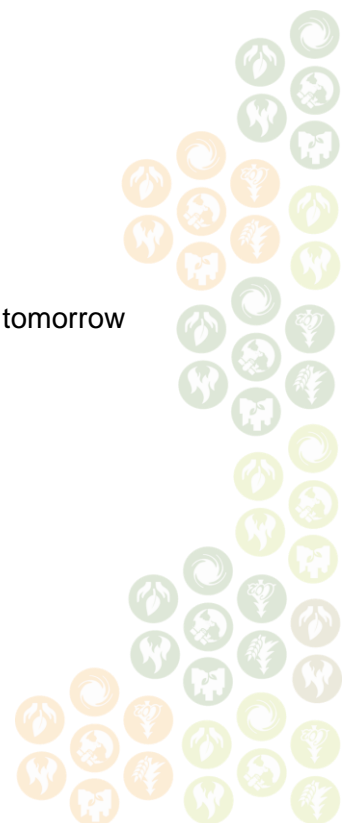
### **3.2 Describe regeneration practices**

Type and age of regeneration cuts

See above. It is all planted no seed tree.

#### **4. Any comment you want to share?**

We feel the sustainability of the region is there and will be sustainable today and tomorrow and 10 years from now.



## INTERVIEWEE INFORMATION

Respondent ID: P4

Respondent category: Practitioner representative

## QUESTIONS

### 1. What are typical forest owners (that you work with and) who sell biomass?

Industrial, non-industrial, public

Most of of AK timberland is owned by Georgia Pacific (GP) and Weyerhaeuser, 60% is non-industrial timberland, this is the primary source for Drax.

Paper mills take pine and first thinning, Drax uses any kind, hard and soft, they use everything. They get 'second harvest' when they sell the pulp, harvest lot sizes are 40-80 acres.

GP and Weyerhaeuser use a 15 yr rotation, then harvest poles, then 30-40 yrs pine sawlogs for Weyerhaeuser, GP uses smaller trees. Weyerhaeuser often manages for timber.

### 2. What are typical forest types that (you work with and that) provide biomass to Drax? Please break down by forest owner.

What are basic differences non-industrial and industrial forest owners?

Primarily source for Drax is from non-ind. timberland – he would guess AK is the busiest area and lots of loggers down there

Anthony forest products and Anthony timber products (same family/used to be) CANFOR bought some of pulp mills

Pine is predominant, some hardwood but very few of those sawmills exist, hardwood is more northern AK; prob 80 pine and 20 bottomland hardwood as feedstock.

### 3. The following questions explore what the current management of these forest types is. Please break down by forest owner.

#### 3.1 Describe thinning practices by forest types

Type and age of thinnings

Percentage of harvest going to biomass (in sqft/% of basal area or total volume of harvest, green tons, etc). Break down by bole vs. tops/branches.

Handling of tops and branches (scattered, burnt on site, chipped and shipped)

What are basic differences non-industrial and industrial forest owners?

First thinning after 13-15 yrs as a pure pulpwood cut, then poles 20-25 yrs, then last 12-15 yrs yield sawlogs.

Hardwood would grow back naturally, but pine is replanted.

**How would this change in the absence of the pellet market?** E.g. no or reduced thinning cycles? Alternative treatment of slash besides chipped and shipped?

Don't think it would have changed for replanting ('not that dramatically')

They get 150 loads of lumber a day, that might be more now.

Regional industry (pulp) is growing, GP is still a major player, Drax is competing with them

Not much change, just more competition

Use of residues if not taken for pellets for landings and to keep soil in place along streams etc. – **ground cover**

### 3.2 Describe regeneration practices

Type and age of regeneration cuts

Percentage of harvest going to biomass (in sqft/% of basal area or total volume of harvest, green tons, etc.). Break down by bole vs. tops/branches.

Handling of tops and branches (scattered, burnt on site, chipped and shipped)

What are basic differences non-industrial and industrial forest owners?

Our forest have expanded 10 mio acre over last 10 yrs in the SW AK, lots of Canadian companies have moved in recently. There is a lot of timber, that drives Drax, driver is not a dying pulp industry

**How would this change in the absence of the pellet market?** E.g. convert to ag land? Abandon forestry (let grow)? Lower planting densities? Other species?

#### 4. Any comment you want to share?

What are typical forest management issues in your region?

Whom else should we interview?



## INTERVIEWEE INFORMATION

Respondent ID: P5

Respondent category: Practitioner representative

## QUESTIONS

### 1. What are typical forest owners (that you work with and) who sell biomass?

Industrial, non-industrial, public

Most land is privately owned in Mississippi. There is also an abundance of Company owned property too.

### 2. What are typical forest types that (you work with and that) provide biomass to Drax? Please break down by forest owner.

What are basic differences non-industrial and industrial forest owners?

Pine in hill country to mixed stands of pine and hardwood to the river and creek bottoms.

### 3. The following questions explore what the current management of these forest types is. Please break down by forest owner.

#### 3.1 Describe thinning practices by forest types

Type and age of thinnings

Percentage of harvest going to biomass (in sqft/% of basal area or total volume of harvest, green tons, etc). Break down by bole vs. tops/branches.

Handling of tops and branches (scattered, burnt on site, chipped and shipped)

What are basic differences non-industrial and industrial forest owners?

Pine Plantation thinning at age 13-15 years hold usually to a basal area of 70-80 with only a small percentage going to biomass. Pine Plantation thinning is mostly going to the paper/liner board mills. There are very few in woods chipping operations in Mississippi. Debris is mostly scattered thru stand. Private and company owned lands are managed very close to the same way.

We need every outlet possible for pine pulpwood in our state. Absence of the biomass mill would result in longer delivery lines to other mills. and more quotas would be inevitable. We are growing way more than we can cut and sell.

**How would this change in the absence of the pellet market?** E.g. no or reduced thinning cycles? Alternative treatment of slash besides chipped and shipped?

### 3.2 Describe regeneration practices

Type and age of regeneration cuts

Percentage of harvest going to biomass (in sqft/% of basal area or total volume of harvest, green tons, etc.). Break down by bole vs. tops/branches.

Handling of tops and branches (scattered, burnt on site, chipped and shipped)

What are basic differences non-industrial and industrial forest owners?

Most clearcuts are replanted using around 650-750 trees per acre depending on seedling type and site. Some may not spend money to replant and let it regenerate naturally and the land suitable for ag uses may be cleared. Right now the Biomass doesn't have a huge affect on how landowners are managing their properties. We are grateful for biomass mills we have to relieve some pressure off other mills but certainly could use several more Biomass facilities.

**How would this change in the absence of the pellet market?** E.g. convert to ag land? Abandon forestry (let grow)? Lower planting densities? Other species?

### 4. Any comment you want to share?

What are typical forest management issues in your region?

Whom else should we interview?

## INTERVIEWEE INFORMATION

Respondent ID: P6

Respondent category: Practitioner representative (tree farmer and forester)

## QUESTIONS

### 1. What are typical forest owners (that you work with and) who sell biomass?

Industrial, non-industrial, public

Morehouse parish large number of private family timberlands, little bit corporate timberland

Lasalle corporate ownership but mix of private and public

Amite is similar to Lasalle with a mix of corporate small land owners and public ownerships

### 2. What are typical forest types that (you work with and that) provide biomass to Drax? Please break down by forest owner.

What are basic differences non-industrial and industrial forest owners?

All softwood some hardwood along streams, pellet mills only accept softwood, all hardwood goes to pulp mills

Pulp market was very depressed bc of paper mill closures. Harvest first thinnings, pellet has provided much needed market so landowners can manage their forest better

### 3. The following questions explore what the current management of these forest types is. Please break down by forest owner.

#### 3.1 Describe thinning practices by forest types

Type and age of thinnings

Percentage of harvest going to biomass (in sqft/% of basal area or total volume of harvest, green tons, etc). Break down by bole vs. tops/branches.

Handling of tops and branches (scattered, burnt on site, chipped and shipped)

What are basic differences non-industrial and industrial forest owners?

Gen meth is harvest one path through forest, then go 35-40 ft and go another path, in between then thin out deciesd and crooked, remove 1/3 of trees

After 15-20 yrs commercial thinning (that s the goal, expenses are covered), this keeps forest as forest, 100% is pulp/biomass. Could be done as early as 8-10 yrs on good soils, 12-15 is the average thinning age.

**How would this change in the absence of the pellet market?** E.g. no or reduced thinning cycles? Alternative treatment of slash besides chipped and shipped?

Stands would continue to grow, become mature thick stands subject to insect infestation. Once tree become thick enough land owner would go in and clear everything and discontinue forestry.

Without pellet or new paper mill there would be definitely a loss of growth and value very likely.

### 3.2 Describe regeneration practices

Type and age of regeneration cuts

Percentage of harvest going to biomass (in sqft/% of basal area or total volume of harvest, green tons, etc.). Break down by bole vs. tops/branches.

Handling of tops and branches (scattered, burnt on site, chipped and shipped)

What are basic differences non-industrial and industrial forest owners?

**How would this change in the absence of the pellet market?** E.g. convert to ag land? Abandon forestry (let grow)? Lower planting densities? Other species?

Sell land to real estate, reverting to ag land may be an option, not many people right now wanting to do that though

Cost is \$100/acre to plant and treat a new plantation, the alternative is to just 'let grow'

Slash is redistributed along skid trails and used to reinforce trails

### 4. Any comment you want to share?

What are typical forest management issues in your region?

Whom else should we interview?

