

New Jersey Audubon Society

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Background

New Jersey Audubon Society Headquarters

9 Hardscrabble Rd.
Bernardsville, New Jersey 07924
<http://www.njaudubon.org/Home.aspx>

Laine Farms

865 Anwell Rd.
Hillsborough, NJ 08844-3902

The New Jersey Audubon's biomass project was developed to promote bird population growth and clean energy. The project took place from September 2008 to December 2010. In this timeframe the idea was to plant native grasses to grow bird populations. According to The New Jersey Audubon Society, bird populations had fallen due to the declining amount of native grasslands in New Jersey. After the birds' mating season the grass was harvested, pelletized, and then burned for heat. The farming and pelletizing was outsourced to a company by the name of Laine Farms.

The New Jersey Audubon Society worked with Laine Farms to attempt to develop and establish a market for warm season grasses. Additionally, The New Jersey Audubon Society recruited workers to track and catalogue bird population growth. The bird population was projected to rise because the fields were previously row crops. Birds do not repopulate well in row crop land, which means that the first count would be minimal. After the implementation of native grassland, the bird population would be expected to rise. Laine Farms believes that their data should be considered preliminary due to fluctuating costs, variations in site insulation and heating systems, and equipment limitations. These factors and the short time frame of the project leads to data that is solid, but preliminary.

Driving Forces

While working on the project, the New Jersey Audubon Society received funding from The Natural Resources Conservation Service. The Natural Resources Conservation Service required the completion of several goals at the projects conclusion. These goals were a major motivator for the development and completion of the project.

The first goal entailed setting up a centralized pelletizing facility for warm season grass pellet production. This goal was vital because of the lack of WSG (warm season grass) facilities. The New Jersey Audubon Society and Laine Farms were motivated to develop an efficient method for farmers to create WSG pellets. Although new facilities are important, the implementation of a facility is only as important as its viability.

The Natural Resources Conservation Service states that the second project goal was to perform a comparison of the cost and income of WSG pellet production. Seeing the accomplishment of this goal was a great motivator for Laine Farms who was hoping to implement WSG pelletization to gain additional income.

The third goal encouraged the installation of pellet furnaces at two Audubon Society locations. The plan with these installations was to demonstrate the operation of a pellet furnace and analyze the operation while reducing energy costs. This data would be used to determine the viability of grass grown to promote bird growth. The data would also be used to determine the viability of that same grass being used as a heat source.

The success of the project would be highly dependent on the fourth goal. The fourth goal was the main project motivation for the Audubon Society. This goal was to annually evaluate grassland bird habitats associated with native grass fields. The Audubon Society was interested in seeing a growth in bird population from the planting of these warm season grasses.

Economics

During the project it was found that heating Audubon Society facilities with a biomass furnace would reduce energy costs by 40% when compared with traditional heating systems. In 2008 Laine Farms was awarded a grant from the United States Department of Agriculture, Natural Resources Conservation Service. The \$75,000 grant was awarded to help them with the purchase of equipment.

Even with the help of the grant, Laine Farms found that ideal pellet producing equipment was costly. This cost meant that small scale operations would have difficulties producing quality pellets with less than top-of-the-line equipment. When producing pellets with less than top-of-the-line equipment, Laine Farms found that their cost of production was \$165 per ton of pellets. The market value of that same ton of pellets at that time was \$187 per ton. For that instance Laine Farms had a profit of \$22 (13% return on investment). This return was too small to consider these machines economical. Although it was not desirable to produce their pellets commercially, it was desirable to produce the pellets for their own company's use.

Laine Farms found that the pellets, when burnt, deposited a large amount of ash and clinker. This left over residue put out the fire, leading to boiler inefficiencies. The goals of reduced fuel cost were never met with the biomass boiler because they would not run consistently. The lack of a steady flow of quality pellets from the pelletizers was a large reason for the inconsistent run time. The combination of inefficient pellet production and inefficient pellet burning led to the saving in annual heating cost to never be met.

Production and Utilization

As discussed in the "Economics" section, difficulties arose with the pelletizing mills as well as with the pellet stoves. Laine Farms found that the purchased equipment did not meet the claims of the manufactures. Heat pellets call for a high pressure, 40 lbs/ft³. The demand for high pressure at a fast production rate led to the machines malfunction and need for repair. The first mill was a small 15 hp Chinese mill, which made pellets at a slow speed with a density of about 20-25 lbs/ft³. After using that mill, Laine Farms purchased a second 30 hp mill. The second mill made 300-500 pounds of pellets per hour at a density of about 35-40 lbs/ft³. They found that most pellets, with the exception of wood, had high ash content. This high ash content pellet snuffed out the fire when burned.

The feedstock came from the South Branch Wildlife Management Area, Merck Tract. This location was chosen because Laine Farms was familiar with the land which consists of a 51 acre plot. Merck Tract was planted with Indiangrass, Switchgrass, Big Bluestem, and Little Bluestem which are all native grasses. When harvested this land yielded two tons per acre, which is two tons short of what it would be expected to yield in following years. The New Jersey Audubon Society found that the utilization of the native grasses increased the bird population.



WSG fields at South Branch Wildlife Management Area



The Central Boiler Maxim M250 at the Scherman-Hoffman Wildlife Sanctuary, for boiler information visit

<http://www.maximheat.com/models>

Two New Jersey Audubon facilities received furnaces to test the product. These two centers were Scherman-Hoffman Wildlife Sanctuary and the Wattles Stewardship Center. The intention was for these furnaces to provide heat and domestic hot water at the rate of 250,000 BTU's per hour. These furnaces retail at around \$8,000 a piece and are equipped with many useful features, such as a top loading hopper and an automatic ignition. It was found that these units worked well, but only when supplied with a consistent quality fuel. If the pelletizing units had been able to consistently put out pellets with a density of 40 lbs/ft², the boilers would have had a chance of producing sufficient energy amounts.

Sources

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