

CASE STUDY: WATER CONSERVATION

Conservation Practice Standards: Irrigation System Sprinkler: Code 442; Pumping Plant for Water Control: Code 533; Irrigation Water Conveyance High-Pressure, Underground Plastic Pipeline: Code 430DD

Since 1984 Rick Belanger and his family, who operate a vegetable farm in Lewiston, Maine, have been drawing irrigation water out of Moody Brook. They grow potatoes, pumpkins, beans, tomatoes, cucumbers, sweet corn, squash, and numerous other vegetables. This past year they started the transition from a big gun irrigation system to a center pivot irrigation system.

The new system will cut down on their labor costs. With the big gun system it took three people about five hours to set up pipe and move equipment, and then it took one person about ten hours through the night to irrigate. After this, taking the system down would take three people about four hours. Assuming that no problems arose, total time for one irrigation cycle would equal about 37 billable hours. Depending on the amount of rainfall, they would irrigate four to five times a season, which meant that about 200 hours of labor costs were being spent on irrigation every season. The new center pivot system should take one person about 30 minutes to program. Assuming a wage of \$10 per hour, the Belanger's are saving about \$1,975 each season in labor costs.

The center pivot system will also use less water than their previous system. The big gun irrigator used about 600 gallons/minute, while the center pivot irrigator will use 300 gallons/minute, cutting water usage in half. Center pivot systems also have more efficient water usage than big gun systems. A center pivot irrigator efficiency rating is 75-85%, while a big gun irrigator efficiency rating is 50-60%.

In addition to the reductions in labor costs and water usage, the Belangers will reduce fuel usage (from 8 gallons per hour to 2 gallons per hour), and will have access to the two tractors that were used to power the previous irrigation system. Production is not expected to change much, but the quality of the produce should improve, especially with crops that are highly sensitive to water needs such as potatoes and sweet corn. In addition, disease incidence may be reduced due to less leaf and tissue damage (water fall from center pivot systems is gentler than from big gun systems).

The installation process for the center pivot system began when Rick applied for Agricultural Management Assistance (AMA) program dollars through the NRCS. Once funding was secured and all the necessary paperwork conquered, construction began.

Before money could be granted there were several environmental reviews needed. One review, required to comply with Section 106 of the National Historic Preservation Act, was the project's effect on local cultural resources. Northern Ecological Associates, Inc. out of Portland, Maine and the Maine State Historic Preservation Officer conducted a survey which resulted in no archaeological resources being found in the project area.

The field was surveyed and the irrigator path mapped out. A few trees needed to be cut from one corner of the field.

Fortunately, the field to be irrigated is relatively flat so the irrigator will be able to easily traverse the area. The pipeline from Moody Brook to the location of the pivot was laid out. There is an approximate 3,075-foot stretch of pipe that the water must travel from the brook to the pivot.

The pipe has a vertical rise of 120 feet before it reaches the center pivot. It crosses under Cotton Road, and is buried 4 feet deep.

The Belangers did most of the pipe work themselves. A pump station was constructed near Moody Brook to move the water to the field. The station consists of a two-walled cement platform that houses a John Deere 4045T-125HP engine.

The Belanger's needed a large pump in order to obtain a pressure high enough to move the water through the long stretch of pipe.



Belanger's center pivot system.



Sprinkler heads on center pivot.

The pivot system was installed by MPG Truck and Tractor out of Presque Isle, Maine. The irrigator consists of one 135-foot section, three 179-foot sections, and an end boom measuring 66 feet. There are four mobile towers and one stationary tower. The main control panel is located at the stationary center tower and is voice activated. To readjust the settings for the sprinkler system one must change them here. There is also a separate power box located at each mobile tower. Sprinkler heads are spaced evenly along the irrigator and needed to be installed in a specific order to account for the different water pressures that will reach them.

The total cost of the project was \$98,869. The system irrigates a 35-acre field, which brings the total per acre cost to \$2,825. Using a 15-year useful life, this translates into about \$284 per acre per year. After accounting for the annual labor savings mentioned earlier (\$1,975), this cost is closer to \$230 per acre per year. The Belangers plan on installing another center pivot system, which will connect to the current pipeline and service an area of about 50 acres. This will lower the total per acre cost. The installation cost breakdown is as follows:

PROJECT INSTALLATION COSTS

Item	Description	Cost
Underground Pipe	3,075 feet	\$32,512
Pump		\$15,739
Pump Pad		\$3,134
4 Tower Irrigation System		\$41,636
Pivot Pad		\$5,848
Total Installation Cost		\$98,869

These prices include parts, labor, and associated shipping fees.