



Bringing Back the Water Case Study Series

Supported by  **LOR**
FOUNDATION

Pollinator Hedgerow Planting

Vilicus Farms in partnership with The Xerces Society for Invertebrate Conservation and MAD Agriculture



Snapshot:

Vilicus Farms is a 12,500 acre organic dryland crop farm located in Northern Hill County, Montana. Vilicus Farms grows over 20 species of grains and pulses in a 7 year rotation. The farm is owned and operated by Doug Crabtree and Anna Jones-Crabtree.

Vilicus Farms is the largest farming operation to hold a Bee Better Certification® from [The Xerces Society for Invertebrate Conservation](#). The Bee Better Certification® is a marker of

pollinator and biodiversity conservation on farms. Vilicus Farms helps earn its Bee Better Certified® status by incorporating perennial pollinator friendly plants into conservation strips in their field borders.

In October 2023, Vilicus Farms, in partnership with Xerces Society and with support from MAD Agriculture and The Montana Conservation Corps, planted a half mile of hedgerow with incorporated perennial pollinator species. The goals of this project are to hold more moisture on the landscape, reduce wind erosion, and increase pollinator habitat and species diversity.

The challenge:

Water

This area sees an average of 11" of annual precipitation. However, the region faces heightened variability in precipitation patterns due to changing climate conditions. Because Vilicus Farms do not irrigate or fertilize their crops they rely heavily on the weather and soil conditions to ensure the success of their crops.

Wind

The challenge of limited and variable precipitation in this region is exacerbated by the drying and eroding impacts of wind. On farming operations wind can cause moisture in the soil to evaporate more quickly. High winds can also cause topsoil erosion and the spread of unwanted seeds.

Biodiversity

Ecosystems with diverse plant species that flower over a long range of time throughout the year are essential habitat and food sources for pollinator insects. Pollinators are necessary for the survival of flowering plants including agricultural crops. Greater diversity of plant species is also beneficial to soil health.

The project:

Inspiration

Vilicus Farms has some existing hedgerows. These hedgerows are made up primarily of Caragana and were planted at some point in the past by a previous land manager. Hedgerows like these are commonly used as windbreaks to protect fields or homesites. Trees protect the area from wind and prevent moisture from evaporating out of the soil as quickly in these areas. Doug and Anna have observed that fields protected by these

hedgerows had significantly more yield, which is likely due to the plants in these fields having more access to water.

Vilicus Farms includes 300 miles of 20' wide conservation strips throughout their operation. These conservation strips are planted with perennial, pollinator friendly plants and are intended to increase biodiversity both above and below the soil. Doug and Anna have observed that taller perennial plants in these conservation strips act as a natural snow catch and that the crop yields near those areas was greater than in other parts of the field. This increased yield could be due in part to increased soil moisture in these areas resulting from snow melt.

Design and Planning

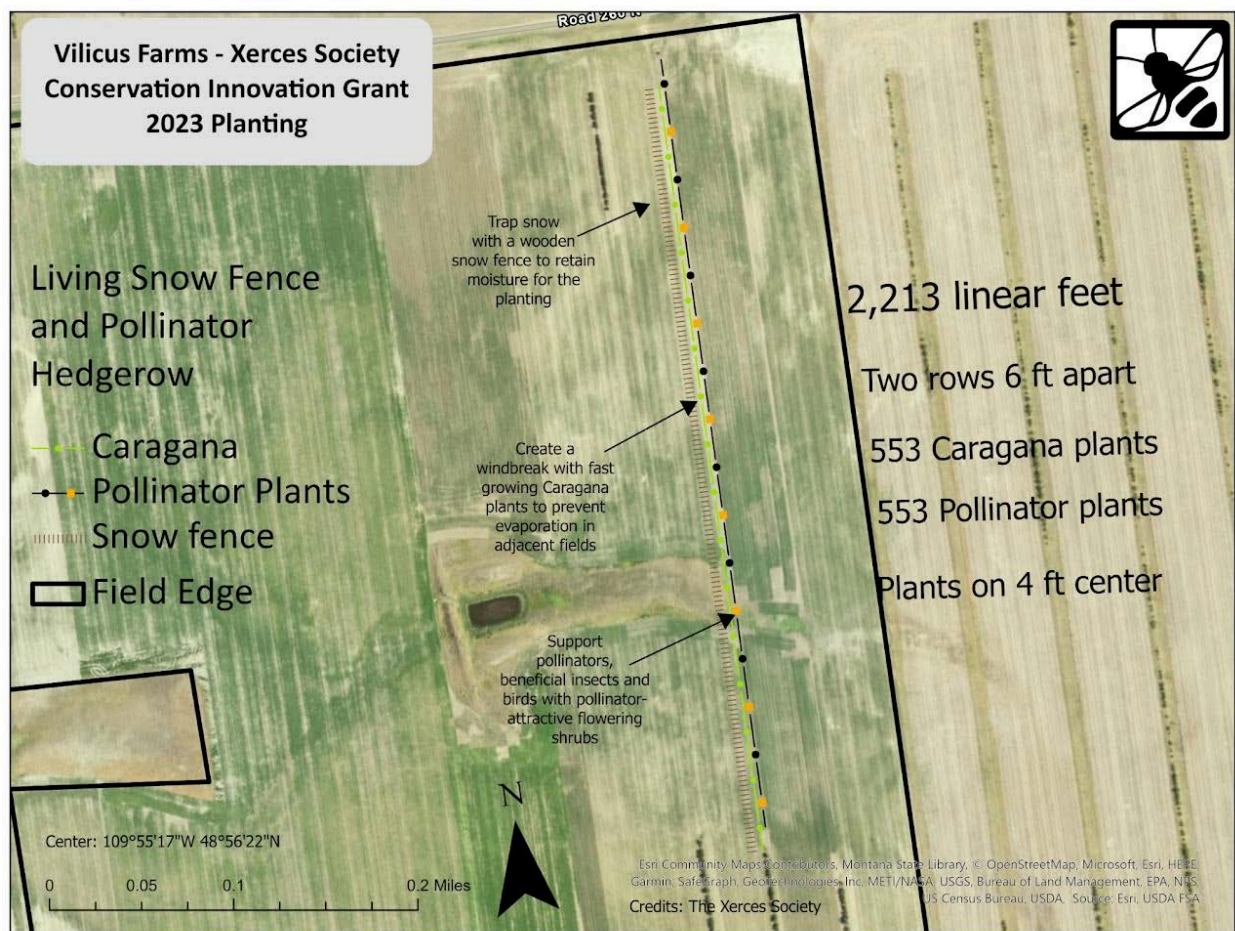
The objective of this project is to install new hedgerows that combine the benefits of wind protection, snow catch, and pollinator habitat. These new hedgerows include tree species known to be hardy to the landscape, as well as perennial shrubs that will attract pollinator species.

This project supported the planting of half a mile of new hedgerow. These hedgerows were designed with the help of The Xerces Society for Invertebrate Conservation to be more ecologically diverse, consisting of one row of perennial shrubs and one row of larger trees. Selection of plant species was based on criteria such as drought tolerance and deer resistance, the team referenced the NRCS plant data to make their selections. All plants were sourced from two native plant nurseries located in Missoula and Hamilton, Montana. The plants were transported by truck and stored in a quonset at Vilicus Farms until planting.



In order to give the plants the best chance of survival in the dry climate, the team planned to do the planting in October and install a wooden snow fence beside the hedgerow to catch snow during the winter to help water and insulate the plants. A weed barrier in the form of burlap will protect the hedgerow as it gets established, this material was chosen because it should biodegrade over time.

In summer 2023 prior to the installation of the hedgerows The Xerces Society for Invertebrate Conservation visited the site to collect initial data on insect biodiversity, soil moisture retention, and carbon sequestration on the site. This data will be used in comparison with future data after the establishment of the hedgerow. Xerces Society will continue monitoring the site through 2027.



Execution

To execute the project Vilicus utilized the labor of members of their farm team and enlisted the help of six individuals from the Montana Conservation Corps to assist with labor on the project. Four individual volunteers also joined the planting efforts.

The work took place over 8 days in mid October. The team planted the hedgerow first, so the plants could get in the ground as quickly as possible and the snow fence was installed afterwards. Initially, gas-powered hand augers were used to dig holes, supplemented by hand shovels. However, sections of denser soil necessitated the rental of a small tractor fitted with a post hole digger. During the planting process, some plants were watered using a water truck to help them get established and ensure the best chance of survival.



Support

The planning and project development was done in partnership with [The Xerces Society for Invertebrate Conservation](#), they will provide data collection critical to understanding the impact and success of the project. [Xerces Society](#) also covered all material costs of the project including the plants. [MAD Agriculture](#) supported the [Montana Conservation Corps](#) work. This is the first agriculture-based project undertaken by the Montana Conservation Corps. It is a requirement that their work benefit the public good and their involvement in this project highlights the impactful role of agriculture in carbon sequestration and habitat provision.

The results:

Evaluation

At the time of this study the plantings are covered by snow accumulated on the fence, indicating the effectiveness of the snow fence in place. This snow should provide moisture for the plants as it melts. It is also possible that the snow is serving as insulation for the plants during the cold season.

After the snow melts there will be an evaluation to determine the success of the various plant species. It will take several seasons to obtain complete data on the success of the plantings and their impact on crop yields and insect populations.

Doug and Anna plan to install similar hedgerows throughout their farm. In the next few years the team will continue observing to learn the rate of growth and determine the viability of the different plant varieties in order to make decisions regarding species and maturity of plantings for future hedgerows on the farm.



The Xerces Society for Invertebrate Conservation will be returning to monitor the site over the next three years to observe changes from their initial data in the areas of insect population, moisture retention, and carbon sequestration.

To collect more complete data on the insect population Xerces Society will be installing in-field sensing devices from FaunaPhotonics which can record the presence of winged insects at the project site. They will be looking for change in pollinator and beneficial insect populations.

Additionally, Xerces Society will evaluate the soil water holding capacity using soil core lab analysis, and is working with partner organizations to calculate changes in carbon sequestration at the project site.

.

Reflections

After completing the project Doug and Anna have reflected on some considerations for the expansion of this project.

- The materials for the project were more expensive than anticipated, without the support of Xerces Society this project would have been cost prohibitive.
- The burlap weed barrier was a particularly expensive material, the team would consider using a different product in the future or experiment with establishing a “base layer” of native grasses to outcompete weeds prior to installing the larger plantings.
- This project was also more labor intensive than anticipated.
- In future installations Doug and Anna would consider leaving gaps in the hedgerow to allow for easier passage of wildlife and equipment.
- Depending on the availability of labor, Doug and Anna may experiment with planting the hedgerows at different times of the year.

Support for the Bringing Back the Water case study series was provided by the LOR Foundation.
About the LOR Foundation: LOR works with rural communities in the Mountain West to enhance livability and prosperity while preserving the character that makes each community unique.