Conservation Innovation Grant (CIG) Fact Sheet

Summary

This project is based on a Virginia farm in Rappahannock County. Bean Hollow Grassfed was established in 2012 at Over Jordan Farm in Rappahannock County and because of continuously grazed fields without any rotation for the past twenty years, the farm has poor soil health. Improving the farm’s productivity was attempted through the rotational mob-grazing of a flock of sheep plus stocker cattle.

Farm restoration was measured through soil monitoring performed every six months, time-lapse photography, wildlife surveys, and tracking animal weights and farm finances. Project results were shared with the community through field days, participating organization newsletters, handouts summarizing project impacts, conference presentations and online materials.

Over the course of the project there has been an overall increase in soil health and productivity. The farm has also turned a profit by the completion of this grant.

Project Objectives

- Establish a farm demonstration to show innovative multi-species mob grazing practices for restoring healthy pasture soils and profitable grazing to pasture managers.
- Engage a group of local livestock farmers to educate neighbors and peers about the demonstration farm and its results.
- Encourage livestock farmers to adopt these innovative pasture management practices.
- Encourage livestock farmers to think about pasture management in terms of long term productivity equaling soil health and productivity.

Cooperator Profile

- The demonstration project centers on Over Jordan Farm, a 200 acre property in Rappahannock County. The original farmers retired and entered into a long-term lease on 110 acres of farmland with newly formed Bean Hollow Grassfed, owned and operated by Dr. Michael Sands.
- Dr. Sands has over 30 years of experience in sustainable agriculture, environmental conservation and community based economic development. Now a Senior Associate of the Liberty Prairie Foundation, he served as the organization’s founding Executive Director from 1995 to 2010.
Background

- Virginia’s northern Piedmont region has long been a pasture-based farming area, and many farms are continuously grazed to short stubble heights which results in poor plant cover, soil compaction and weed pressure.

- Because of continuous grazing, Piedmont pastures tend to be dominated by Fescue KY31 with minimal warm season pasture plant diversity. Consequently, animal performance during Virginia’s 3-4 summer months is very limited.

- A diverse plant community provides substrate for micro- and macro-organisms important to soil health. Plants with different rooting depths and growing seasons help maintain pasture canopy and forage supply throughout the year, and improve water and nutrient utilization.

- Practicing ‘mob grazing’, or field rotations with short grazing and long rest periods, is thought to foster more native plant diversity, increase animal productivity, build soil organic matter and associated soil food webs, and increase water retention-drought resilience.

- A multi-species system that mob grazes cattle and sheep together may result in higher animal gains per acre therefore creating a more profitable farm operation.

Methods

- Farm infrastructure—watering systems, fencing, native warm season grass planting—was installed to facilitate a rotational grazing plan. Infrastructure costs were $62,173, with NRCS cost-share programs (EQIP) covering $42,299 of project costs.

- The 110 acre farm was broken into 10 permanently fenced pastures. Each pasture was dominated by one of four vegetative communities: Existing seed bank, Existing seed bank with overseeding, Native warm season grasses and fescue stockpile for winter grazing.

- Within each pasture, temporary fencing was used to create 1-3 paddocks for rotation. Sheep and cattle grazed together to a 4-6 inch residual in each paddock, with rotations of 4-7 days and rest periods of up to 60-90 days.

- In four of the pastures, a sampling field transect was selected to monitor changes in soil and vegetative cover characteristics of the pastures.

- Each year, in the spring and fall, the field transects were sampled to measure plant diversity and soil biotic and abiotic characteristics, including: soil organic matter, pH, soil compaction, soil nutrients, soil biology, moisture, temperature, infiltration and earthworm counts.

- Bird species were surveyed twice a year, and butterfly and bee species surveyed once a year.

- Data was collected on animal weights and farm financial performance.

- Time lapse cameras took daily photos of the sample fields over the course of the three-year project.
Results: Technical Findings

- Using the Cornell Soil Health Laboratory's "Overall Soil Health Quality Rating" as an aggregate guide, soil health improved in three of four pastures with the greatest increase in ratings being observed in the two pastures with a long history of livestock pasture use.

- Organic matter increased in all four sample transects, indicating that field management has had a positive impact on soil health.

- Microbial communities had low ratios of active to total bacteria, fungi and nematodes, potentially indicating high anaerobic conditions. Anaerobic conditions may have also been exacerbated by persistent soil compaction, which showed little change over the study period.

- Indicator species, such as orchard grass and red clover, have increased both visually and in survey numbers over the course of the project. Since both of these species are sensitive to overgrazing, it can be assumed the fields are being managed with enough recovery time for high quality forage to establish and bounce back.

- Animal units per acre increased from 0.17 AU/acre to 0.5 between 2013 and 2016. During the same period, reliance on imported hay declined.

Results: Outreach Activities

- Articles about the demonstration project were placed in four publications, including: Piedmont View Winter 2014, Piedmont View Summer 2016, 2016 Buy Fresh Buy Local guide with distribution of over 250,000 and Rappahannock News Summer 2016.

- Presentations about the project were given at the VABF conference 2015, Farm Business Development Center (Illinois) 2015, Virginia NRSC CIG Showcase 2016 and the 2016 National Small Farm Conference.

Conclusion for Farmers

- A rotational grazing system with mixed livestock has improved soil health over the three-year study period.

- While overall soil health improved, soil compaction remained a constraint on soil function at end of project. To address this issue, targeted planting of vegetation with soil penetrating characteristics, such as daikon radish or rapeseed, is one soil management technique being considered.
**Conclusion for Farmers continued**

- Planting a native warm season grass field can help address soil compaction, summer grazing slump, and balance agricultural use and natural habitat.

- After three years of operation, infrastructure costs for rotational grazing system were recaptured. In 2016, custom grazing fees and sale of 204 lambs anticipated to generate net revenue of $12,000.

- Conversion of hayfields to pastures provided a mechanism for rebuilding and keeping soil nutrients on the farm. Hay was imported in late winter, but in less quantity than anticipated, so importing nutrients to the farm was cheaper than producing on site.

**Table 1: Farm profits over the course of the project**

<table>
<thead>
<tr>
<th>Year</th>
<th>Lambs Sold</th>
<th>Custom Grazing</th>
<th>Expenses</th>
<th>Net Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>-</td>
<td>-</td>
<td>-$11,650</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>$13,664</td>
<td>$2,786</td>
<td>-$16,498</td>
<td>-$47</td>
</tr>
<tr>
<td>2015</td>
<td>$20,531</td>
<td>$8,255</td>
<td>-$28,647</td>
<td>$139</td>
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<td>2016*</td>
<td>$29,000</td>
<td>$8,000</td>
<td>-$25,000</td>
<td>$12,000</td>
</tr>
</tbody>
</table>

*2016 numbers are estimates

**Conclusions for Policy Makers**

- Providing funding for farm infrastructure cost-share programs related to the development of rotational grazing systems will encourage more adopters.

- While the project results don’t make a significant scientific statement, on-the-ground observations clearly show a difference in farm health and animal performance. Information and opportunities to learn about rotational grazing should be provided to farmers.

- Support longer-term funding for similar projects. Three years does not provide sufficient time to gauge the benefits of implementing the practices, given farm conditions at beginning. Follow-up data collection is recommended to more effectively assess long-term benefits.

**Resources/More Information**

Visit [www.pecva.org](http://www.pecva.org) to view and download the project Tech Fact Sheet and the video presentation.