

Organic System Plan (OSP)
Addendum to the Organic Farm Plan Application
July 2021

Prepared for:

Rhode Island Farm Incubator

140 Exeter Road North Kingstown, RI 02852

USDA Farm# 1100 Tract 2449



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Introduction

The Farm's Organic System Plan has been developed to operate the farm as an organic practice specialty vegetable, herb, mushroom and cut flower farm. The Farm is certified as Rhode Island Good Agricultural Practices (GAP) and actively keeps records to maintain USDA Certified Organic status. These records include traceability, inputs and sources, natural resource management, with a focus on soil quality improvements and integrated pest management. Seasonal and multi-year crop plans will be adapted and updated for weather, climate, natural resources and regional market demand.

Goals

RI Farm Incubator achieves production goals by working with the existing natural resources available on the Farm. Over time the agro-ecological characteristics of the farm landscape will be improved through positive and passive cultural practice. Given the current agro-ecological conditions and future production goals 2020 will focus on implementing projects which improve soil quality, mitigate pest and disease pressure and tillage to remove perennial weeds. Consideration of interdependent organic system functionality is critical for management decision making.

Farm health will be improved through establishment of associated cultural practices by:

- Positive cultural field practices which will 1) increase soil health, 2) reduce inputs and 3) reduce nuisance pest and disease pressure
- Active cycling of cover crops (multispecies) reduces mechanical treatments of nuisance plants and can represent a large proportion of the nitrogen requirement for crops. Specifically, cover crops perform several functions including 1) to help offset the CO₂ released from tillage by creating a carbon sink, 2) create pollinator forage, 3) increase soil organic matter which can 4) decrease soil erosion and 5) catch and cycle soil nutrients.
- Conserving soil nutrients by planting catch crops, i.e. overwinter cover of winter rye/ vetch or summer smother crop of buckwheat or a soil building mixture of bell bean or sudex.
- Reducing invasive plant pressure in crop fields, i.e. Mugwort remediation by means of mechanical and biomechanical treatment.
- Conserve water by 1) increasing soil organic matter and thus soil moisture holding capacity and 2) reducing water usage, 3) decreasing erosion and subsequent transport of nutrients.
- Increasing perennial and annual cover crops in marginal space around crop fields to 1) increase generalist insect habitat proximate to cash crops, 2) conserve ground nesting insect habitat around crop fields, 3) reduce tillage.
- Adaptation of crop selection with consideration of variable climate and nuisance pest and disease pressure. Also consideration of the need for copper based downy mildew controls.
- Optimizing environmental conditions for winter squash by 1) varying plant populations, 2) increasing the number of pollinator alleys and crop protection to improve air flow. *UMASS regional notification center is a source for tracking

annual DM occurrence. Regional detection in mid July 2019. Detection in Washington County, RI typically in early August.

Organic System Plan

Section 2- Field Identification and Map.

Refer to Figure 2 and attached folder “Visual References”

Section 3- Seeds and Seed Treatment.

Refer to Appendix A, Crops List 2020.

Section 4- Greenhouse Seedling Production Information.

Refer to Organic System Plan Section 4 and Appendix B for inputs list and sources.

Section 5- Soil and Crop Fertility Management

Refer to Appendix B for inputs list and sources.

A. General Information

An Agro-ecological restoration plan for the property is active and ongoing. Activities include: soil quality assessment and analysis, inventories of plant communities, species of flora and fauna (including both native and invasive species), and other crop field conditions relating to weather/climate change, crop field drainage evaluation, remote imagery using drone and existing aerial/satellite photography, irrigation demand calculations and corresponding practices for soil and water conservation ie, reduced tillage, contour sub soiling, hedge rows, field breaks, pollinator strips, perennial grass buffers and beetle banks.

Records are kept for each field including soil quality and compaction, nuisance plant, insect pest and disease pressure. (Refer to Appendix; Crop Field Reports 2020)

Soil and crop health is monitored continually on a daily basis. Soil test results from 2018 through 2020 are available.

Visual inspection of fields and crops combined with soil quality assessment and plant tissue analysis will inform decisions. Improvements to soil quality can be made through the use of cover cropping, ecosystem service provisions such as pollinator habitat

and soil surface residue management (roller crimping of cover crops), mechanical tillage and subsoiling for decompaction. Bed preparation activity will include selective tillage.

Growing cash crops requires optimum soil quality. Applications of compost, lime and other OMRI approved soil amendments will be included with crop planting.

B. Compost Use

On site composting? Yes, minimal at first and growing over time. 3 bin system being established for 2020.

List all ingredients/additives? Plant waste, potting soil, food scraps, coarse woody debris (from on-site), straw (on-site).

Describe your composting method? Static aerated pile.

What is your C:N ratio? 30:1

Do you monitor temperature, if yes, what temp? Yes, 140F.

How long is this temperature maintained? 3 days

If compost is windrowed, how many times are materials turned? N/A

Do you produce or use compost tea or vermicompost tea? No

Do you use any products of anaerobic digestion? No

C. Manure Use

No manure has been used on the Farm for at least three years. No records of any inputs from previous land owner. No intention of using manure in 2020.

D. Natural Resources

Refer to attached folder

The Farm Conservation Plan has been developed with USDA NRCS. That plan includes appropriate agricultural use of the property and defines important species and landscape restoration projects which will help achieve and maintain organic certification. The first contract with NRCS (See Figure 1) includes practices for “brush management 314”, “herbaceous weed treatment 315”, “multi species cover crop 340”, “conservation cover 327”, “structures for wildlife 649” practice to encourage American Kestrel, Barn owl and bats”, “high tunnel 325”. Other practices are described in the following sections.

Emphasis on preventative practices to decrease nuisance plants translates to decreased reliance on short term response to pest pressure. Long term soil stability is achieved on many farms worldwide through the use of the “Many Little Hammer’s” approach to soil quality.¹

By creating diverse habitat for beneficial insects and microbe populations, nuisance insect damage can be mitigated.

By planting cover crops as the primary soil nutrient preparation, nuisance plant pressure can be decreased with smother crops while improving soil quality.

The use of selective tillage, timely use of annual cover crops and selective mechanical cultivation at or just below the surface, can limit soil disturbance to allow for soil quality improvement to occur rapidly and persist year over year.

Water Use

Initial irrigation can be supported by the farm’s bedrock drilled wellhead. A second irrigation well is being developed with NRCS. Planned completion by Summer 2021.

Drip irrigation is used for all field crops. Micro drip maximizes the available water for plants in the root zone while minimizing loss due to evapotranspiration and runoff. On

¹ Matt Liebman and Eric Gallant, 1997

demand drip irrigation also decreases nutrient leaching. An additional benefit is the decreased amount of moisture available for nuisance plant species outside the planted row. Decreasing runoff from irrigation reduces soil erosion.

Water conservation is important to the long term sustainability of the subsurface aquifer, The Annaquatucket Aquifer, also part of the Hunts/ Annaquatucket (HAP). Drip irrigation decreases the volume of water required to be withdrawn from the aquifer and minimizes evapotranspiration.

Section 6- Crop Management

A. Crop Rotation Plan

- Create a dynamic crop rotation to:
 - Increase soil health
 - Create opportunities for agro-ecological service improvements such as generalist insect habitat and decreased disturbance of native habitat.
- Integrated pest management includes intercropping pollinator strips and mixed cash crop rows.
 - Alternating planted cash crops within fields to mitigate vectoring of pests and disease. Selection of species to be planted is based upon field observations.
 - Spring vegetables will include overwintering lettuce and spinach. Winter grown kale and chard, leeks and scallions.
 - These areas will be followed with multi species cover crop. Fast growing catch crops, winterkill daikon radish for decompacting soil and components such as crimson clover for spring smother and conservation of nitrogen and organic matter levels.
 - Bell bean, yellow and red clover to smother warm season annual weeds and provide nitrogen.
 - Butternut and winter squash is followed up with removal of plastic, cultivation and leveling of field and planting of winter cover crop. Rye and Vetch 2019-2020.
 - Summer vegetable rows have plastic removed, soil mixed or rototilled then planted with winter cover.
- Cover crop seed mixtures are based on soil conditions, soil quality improvement goals, crop sequencing plans, and availability of organic seed.

- Seed mixtures are broadcast into prepared seed bed.
- Seed Drill to be rented from Stanton Equipment in CT or custom work to be performed by a neighboring Farm.
- Multi species cover crop mixtures will include:
 - red and white clover mixture, a medium height Japanese millet, buckwheat, hairy vetch, Austrian field pea, red clover/ Crimson clover mix, a medium height perennial rye, medium red/ Dutch white clover mix, a medium height yellow/ white/ red clover mix with daikon, vetch, Oats/ Peas/ vetch, winter kill daikon, cow pea, bell bean and medium clover in Spring.
- Additional overseeding of clover in Spring as needed.
- Cash crops grown on Field's 2, 5 and 6 in 2019-2020 totaling 7 acres.
- Field 2 spring 2020 multi species cover crop vetch and rye. Winter killed catch crop and spring overseeding of green manure.
- Cover crops planted in Fields 5, 7 and 8 (see p. 11) in the Autumn and Winter of 2018. Spring 2019 were followed compaction testing and will be mechanically sub soiled alleviate compaction. 250-300 psi in several areas to 8-12" depth. Fall cover crops will include daikon radish.

B. Weed Management Plan

- Crop rotation to include functional planting mixtures of cover crop seed in buffers and fields.
- Intentional use of marginal space to foster insectary habitat.
- Selective mechanical cultivation to manage weeds.
- Using cover crop sequences to improve soil health.

- Diverse intercropped fields and nursery beds to increase pollinator and generalist insect habitat.
- Reduce the weed seed bank over time through several activities
 - Perennial nuisance plant remediation of fields.²
 - Mowing annuals before inflorescence.
 - Planting warm season grass and pollinator strips on field margins and parallel to crop rows i.e. 'pollinator strip' or 'beetle bank'.
 -
 - Prevention of weed seed set with fallow mowing and aisle cultivation

² Refer to google earth map

with manual and mechanical controls.

- Flame weeding to be included in future development of any bare ground production system.
- Plastic mulch is used for winter squash and sweet potato and all summer crops. Removed before the ground freezes.

C. Pest Management Plan

Reliance on OMRI listed pesticides or introduced predatory insects will be kept to a minimum. Instead, emphasis will be placed on a system of integrated pest management methods designed to prevent and mitigate nuisance plant, disease and pest pressure.

Promoting beneficial and pollinator insects will be achieved in several ways. Organic buffer plantings along the entire perimeter of the farm and within crop fields. Annual field rotation will include 15- 20 acres of soil building cover crops. Non tilled areas, hedge rows and beetle banks will be established within crop fields to support habitat for arthropods and nesting insects such as wasps and hoverflies.

Planning is ongoing for establishment of these practices.

- Insects which require proactive management include:
 - Flea beetle, managed with trap crops and row cover.
 - Grub, no controls used
 - Striped Cucumber beetle, row cover used to prevent vectoring of disease and interruption of egg laying cycle.
 - Squash bug, row cover used to prevent vectoring of disease and interruption of egg laying cycle.
 - Colorado Potato beetle, minimization of cash crops susceptible to CPB, row cover used to prevent vectoring of disease and interruption of egg laying cycle.

- Animals which will require active management include:
 - Animals will be hunted as needed.
 - Deer
 - Turkey
 - Canada goose
 - Coyote
 - Eastern cottontail rabbit

Disease Management Plan

Integrated Pest Management for the Farm is focused on methods to establish a regenerative farming system. This will be achieved by implementing numerous conservation practices such as use of positive cultural practices in fields and marginal spaces to reduce disease harborage.

Cultural practices before, during and after cash crops will help to mitigate disease and pest pressure through decreasing potential harborage from plant debris.

Practices such as prompt transplanting, drip irrigation to minimize moisture present on the leaves and adequate soil quality promotes robust plant health.

Regular crop rotation will also serve to minimize the potential for soil-borne disease.

Plant residues are incorporated as quickly as possible to minimize disease and pest harborage sites.

Use of cover crops to mitigate disease in soil is also planned. This includes mustard to follow lettuce and squash but not before other brassica cash crops.

Allopathic cover crops such as mustard and winter rye will be planted to mitigate disease and pest pressure.

The Umass Alert System along with a strong network of contacts in the farming community throughout the region maintains active awareness of pest risk.

Detection of downy mildew at Shewatuck Farm occurred on August 12, 2019. Preventative spraying has been occurring prior to observation based on a report from the Umass Alert system. Detection has occurred in Washington County, RI. Application of several different OMRI listed copper fungicides are used to prevent downy mildew. Badge X2 was used in 2019.

Cercospora is managed through prompt transplanting of seedlings and use of drip irrigation in place of overhead.

Section 7- Maintenance for Organic Integrity

A. Adjoining Land Use

The farm has been evaluated for potential sources of risk to organic integrity. The location of the Farm in relation to two neighboring turf farms poses the highest risk of contamination. Residential properties are more than 50 feet from all Organic fields. To minimize this risk, several actions have been taken.

- Establish positive communication with neighboring farms, residents, businesses, Town works and State highway departments as well as utility companies to determine actual practices and substances used on adjacent land. See attached “Adjoining land use forms”.
 - The turf farm, Sodco, minimizes the use of non OMRI listed fungicide.
 - Use of herbicide is minimized, crop rotation and cultural practice is carefully managed.
 - Fertilizer application is minimized and poses no threat to transport into transitioning fields.
 - Liquid kelp is applied with sprayers.
- “No Spray” signs have been posted along Exeter Road and Indian Corner Road to increase awareness.
 - Contact with the State Department of Transportation and Town of North Kingstown Public Works Department has concluded that no herbicide is sprayed on the roadside margins. Mowing is managed by the Farm Incubator. See attached letters from RIDOT and Town.
- The practice for “windbreak shelterbelt establishment 380” will be critical to establishing a perimeter buffer. In places the buffer will include a dense outer row of coniferous tree (*Arborvitae*), a deciduous low woody buffer and an inner grassed buffer.
 - Over time little blue stem and/ or other buffer grasses will be planted along the perimeter of the Farm.
- Refer to Conservation Plan Map for reference to crop field buffers and shelterbelt locations.

- The Farm Incubator will also maintain bees for pollination and honey. Honey bees, and other native pollinator insects, will be a critical part of the Farm's crop planning and could provide much of the required pollination function for winter squash, cut flowers, and perennial garden flowers in addition to other trial growing, seed breeding and educational programs.

B1. Transitional Crops

See Appendix A

B2. Conventional Crops

Refer to OSP Application

C. Equipment

- Equipment includes key elements required to achieve a gradual buildup of planting and harvest and post-harvest activity.
- Field work will be done with:
 - John Deere 5055E, loader. 60 HP- New
 - Rotary tiller 7' - New
 - Pendulum spreader- Used, Refer to attached folder entitled "Monitoring Records" for cleaning record.
 - Danish tines- New
 - Hilling Disks 20"- New
 - Undercutter bar- New
 - Planter- New
 - Plastic mulch layer with Drip irrigation.- New
 - 25' Single side 200 gallon boom sprayer. Planned for 2022.
 - Grain Drill/ planter- Rented. Refer to attached folder entitled "Monitoring Records" for cleaning record.
 - Shindaiwa push spreader- New

D. Harvest

- Mechanical harvest of mesclun, arugula, and spinach with a Sutton Ag Harvest Star. Cleaning log available.
- Harvest of head lettuce, kale, bunching greens and spinach will be done with knives and small handheld implements and

harvested into crates for transfer to the packing house.

- Harvest bins are new cardboard or new reusable bulk bins.
- All reusable bins, shipping totes and harvest crates are power washed before and after use.

E. Post Harvest Handling

- Crops including carrots, beets, winter squash, sweet potatoes, winter squash all cleaned with brush washer.
- Lettuce head and bunching greens will be cooled and washed on stainless tables with high pressure wash.
- Loose greens which are soaked have added OMRI list sanitizer. Three stage wash procedure includes single soak with water and sanitizer, and two rinse stages.
- Mesclun leaf drying will be done in a commercial food service drying centrifuge. Refer to Equipment Cleaning log.
- A drilled bedrock well serves the Facility. This includes Packinghouse brush washer.
- All reusable bins, shipping totes and harvest crates are power washed before and after use.

F. Crop Storage

- Storage Facility receives regular cleaning and sanitation.
 - FRP Walls, Stainless sinks, epoxy/ concrete floors
- Facility is used for Organic or transition products only.
- Storage bins, harvest crates, shipping totes, 5 gal buckets brush cleaned with diluted castile soap and rinsed thoroughly.
- All reusable bins, shipping totes and harvest crates are power washed before and after use.
- Walk-in cooler temperature is monitored daily and recorded on log.
- Dry Storage Area is temperature controlled with HVAC system and has a digital thermostat.

G. Transportation

- Transportation of product is achieved with two primary means, pickup and delivery.
- When product is transported to markets via rented truck a Vehicle Inspection

Report is filed. (Refer to Vehicle inspection log).

- Delivery with employee vehicles serves local customers within 10 miles.
- When product is picked-up by a wholesale buyer the buyer is asked to have completed a Vehicle Inspection Report or record of last cleaning.
- Products in bulk bins are transferred directly from Farm Storage Facility to the delivery truck.
- Farm member share pickup occurs weekly beginning in June 2020. This will be curbside pickup.

Section 8. Record Keeping System

Refer to Appendix for available records.

Cultural History of Farm Under Previous Owners

Fifty-four acres of crop fields were planted with winter rye Summer of 2018. Non-organic winter rye seed supplied through Green Thumb Farms in Maine was planted by Schartner Farms in late September of 2017 with prior disking and leveling of fields. No fertilizer was applied. Previous rye crop was harvested in July of 2017 and was planted without fertilizer addition in September of 2016. Fields were fallow until September 2017 planting.



Figure 1- Property Boundary



Figure 2- Crop Fields outlined in yellow.

The northwest field was planted with winter rye for 2017-2018. Following harvest in July 2018 the 3.5 ac field was mowed continually until present time. Next steps include planting soil building grass/ clover mixture or perennial rye.

A buffer plan is proposed along the eastern and southern sides of the farm, approximately 2500 linear feet of perimeter. to include existing trees, perennial grasses and a warm season annual grass buffer. Total width of buffer exceeds 120' in most places.

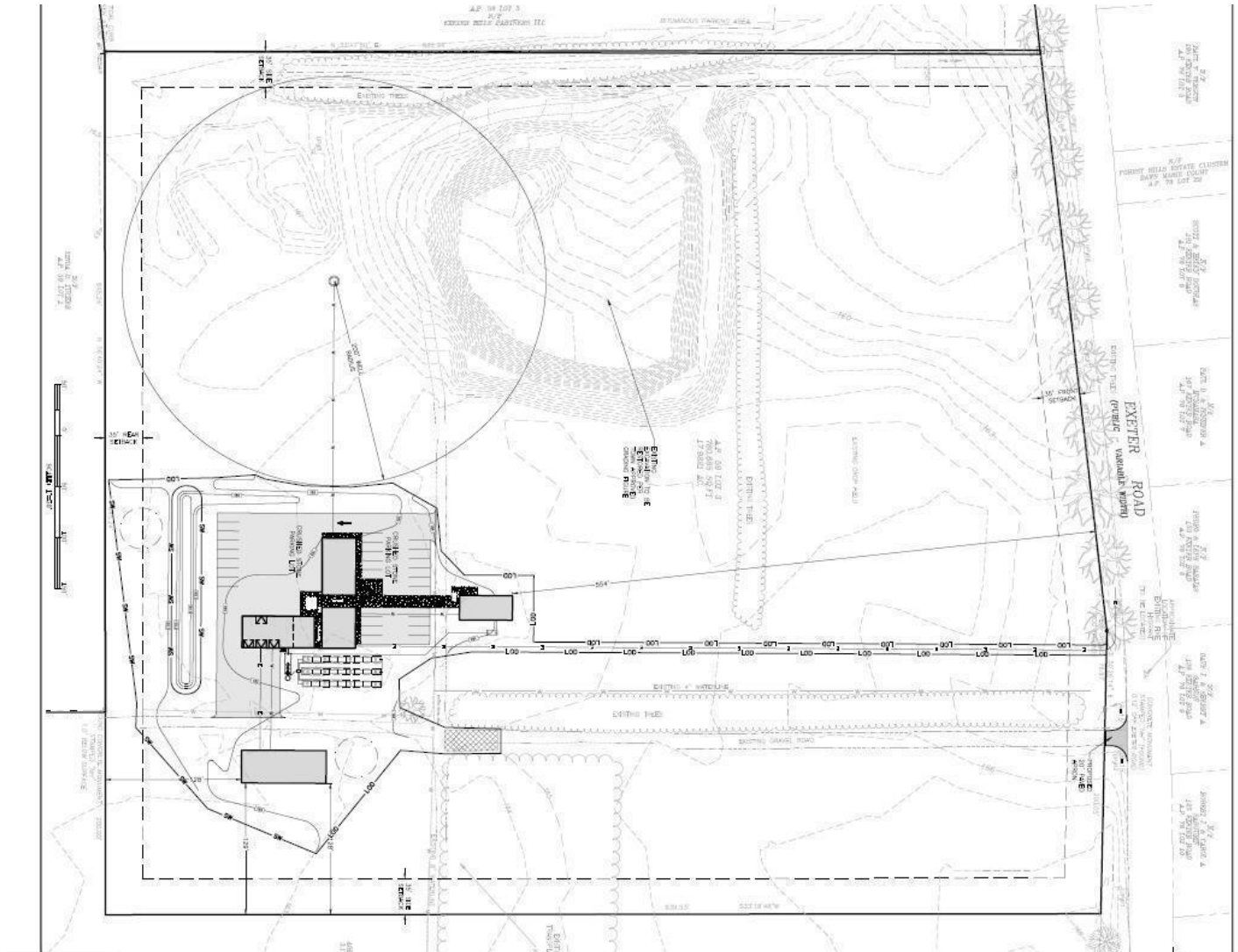


Figure 3- Campus Site Plan