

Project Final Report

ACPP Technical Providers for the Palmer River Watershed
13-08/319

Dates: 2014-2016

Massachusetts Association of Conservation Districts

Jeffrey LaFleur
Executive Director
jefflmacd@gmail.com
(978) 692-1904

Jane Peirce
jane.peirce@state.ma.us
(508) 767-2792

PREPARED FOR:

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER RESOURCES

AND

US ENVIRONMENTAL PROTECTION AGENCY
REGION 1

MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
Matthew A. Beaton, Secretary

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Martin Suuberg, Commissioner

BUREAU OF WATER RESOURCES
Douglas Fine, Assistant Commissioner

DIVISION OF MUNICIPAL SERVICES
Steven J. McCurdy, Director

This project has been financed with Federal Funds from the Environmental Protection Agency (EPA) to the Massachusetts Department of Environmental Protection (MassDEP) under an s. 319 competitive grant. The contents do not necessarily reflect the views and policies of EPA or of MassDEP, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

A. PROJECT SNAPSHOT

1. Project Start Date: February 10, 2014

2. Date Closed: June 30, 2016

3. Basin and HUC 12 Watershed Location: Narragansett, HUC-12: Palmer River

4. Segment and Waterbody Information: Hydrologic Unit 010900040701

5. Status of Waterbody: Category 5

6. Priority Pollutants Targeted: Nutrients and Pathogens

7. Estimated Annual Pollutant Removal and Method of Determination: 49,506 pounds of Nitrogen

8. BMPs Install, Number and Type:

Critical Area Planting x2

Underground Outlet x4

Grassed Waterway Heavy Use Area Protection x2

Roof Runoff Structure x3

Roofs and Covers

B. DESCRIPTIVE PROJECT SUMMARY:

The Palmer River Watershed in the Narragansett Bay Basin has been selected by the USDA Natural Resources Conservation Service (NRCS) as the target of the National Water Quality Initiative (NWQI) in Massachusetts.

The Palmer River watershed is approximately 33,193 acres or 51 square miles in area, 96 percent of which is in Massachusetts. Land in the watershed is 62 percent forested. Developed land accounts for 19 percent of the total land area and impervious surfaces such as rooftops, roads and parking lots, cover eight percent. About 10 percent of the watershed is agricultural land.

The Palmer River is impaired by pathogens and nutrients, some of which are related to agricultural activities. Pollutants from farms can effectively be mitigated through farm conservation practices and other nonpoint source BMPs. Under the NWQI, NRCS will dedicate additional technical and financial resources to address these impairments, other state and federal entities are engaging to support the NWQI effort, including the Massachusetts Department of Environmental Protection (MassDEP) and the Massachusetts Association of Conservation Districts (MACD). MassDEP, through its 319 Nonpoint Source Program, can also provide technical and financial resources. MACD, through its Accelerated Conservation Planning Program (ACPP) has field staff who can be engaged to work with Palmer River farmers to develop and implement conservation planning practices and nonpoint source BMPs to address NWQI goals. The Grantee is the Massachusetts Association of Conservation Districts (MACD).

C. FINANCIAL SUMMARY:

**Attachment B
Budget
ACPP Technical Providers for the Palmer River Watershed
Project # 13-08/319**

AMENDMENT 2

Expense Item	319 Amount	Amendment 2	Non-Federal Match	Total
Salaries				
MACD Salaries:				
Conservation Farm Planners (\$35-40/hr)	\$ 23,500	\$ 24,249.58	\$ 0	\$ 24,249.58
Project Coordinator (\$45-55/hr)	\$ 50,000	\$ 44,855.59	\$ 0	\$ 44,855.59
Rehoboth Agricultural Commission (\$22/hr)	\$ 7,500	\$ 3,250	\$ 25,000	\$ 28,250
Bristol County Conservation District (\$22/hr)	\$ 4,500	\$ 900	\$ 35,000	\$ 35,900
Subtotal	\$ 85,500	\$ 73,255.17	\$ 60,000	\$133,255.17
Subcontractual				
Farm consultant	\$ 56,000	\$ 57,580	\$ 0	\$ 57,580
Subtotal Subcontractual	\$ 56,000	\$ 57,580	\$ 0	\$ 57,580
Supplies & Misc				
BMP Materials and supplies	\$ 57,500	\$ 68,234	\$ 75,000	\$143,234
Travel	\$ 1,000	\$ 930.83	\$ 0	\$ 930.83
Subtotal Supplies & Misc	\$ 58,500	\$ 69,164.83	\$ 75,000	\$144,164.83
Totals	\$200,000	\$200,000	\$135,000	\$335,000
Percent	60%	60%	40%	100%

The Department will retain 10% of the total maximum obligation of the 319 grant funds or the final invoice submitted by the Grantee, whichever is greater, until all contract provisions are satisfied and final reports and other products are delivered and accepted. This 10% retainage shall be reflected on each invoice submitted by the Grantee and will be cumulative in the amount of \$20,000 (10% of the contract amount).

The Fair Share goals for the project are at the Services rate of 3.4% D/MBE and 3.8 % D/WBE on the total project dollars. To comply with DM/WBE participation goals it is anticipated that \$11,390 for DMBE and \$12,730 for DWBE will be expended.

Amended 7/7/2016 to better reflect project costs. Approved M. Harper, 7/7/2016.

**Attachment B
Budget
ACPP Technical Providers for the Palmer River Watershed
Project # 13-08/319**

AMENDMENT 1

Expense Item	319 Amount	Amendment	Non-Federal Match	Total
Salaries				
MACD Salaries:				
Conservation Farm Planners (\$35-40/hr)	\$ 39,000	\$ 23,500	\$ 0	\$ 23,500
Project Coordinator (\$45-55/hr)	\$ 39,000	\$ 50,000	\$ 0	\$ 50,000
Rehoboth Agricultural Commission(\$22/hr)	\$ 7,500	\$ 7,500	\$ 25,000	\$ 32,500
Bristol County Conservation District (\$22/hr)	\$ 15,000	\$ 4,500	\$ 35,000	\$ 39,500
Subtotal	\$100,500	\$ 85,500	\$ 60,000	\$145,500
Subcontractual				
Farm consultant	\$ 40,000	\$56,000	\$ 0	\$ 56,000
Subtotal Subcontractual	\$ 40,000	\$56,000	\$ 0	\$ 56,000
Supplies & Misc				
BMP Materials and supplies	\$ 57,500	\$ 57,500	\$ 75,000	\$132,500
Travel	\$ 2,000	\$ 1,000	\$ 0	\$ 1,000
Subtotal Supplies & Misc	\$ 59,500	\$ 58,500	\$ 75,000	\$133,500
Totals	\$200,000	\$200,000	\$135,000	\$335,000
Percent	60%	60%	40%	100%

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The Fair Share goals for the project are at the Services rate of 3.4% D/MBE and 3.8 % D/WBE on the total project dollars. To comply with DM/WBE participation goals it is anticipated that \$11,390 for DMBE and \$12,730 for DWBE will be expended.

Amended 11/5/2015 to better reflect project costs. Approved M. Harper, 11/5/2015.

Original Project Budget:

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Budget
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Project # 13-08/319**

Expense Item	319 Amount	Non-Federal Match	Total
Salaries			
MACD Salaries:			
Conservation Farm Planners (\$35-40/hr)	\$39,000	\$ 0	\$ 39,000
Project Coordinator (\$45-55/hr)	\$39,000	\$ 0	\$ 39,000
Rehoboth Agricultural Commission(\$22/hr)	\$ 7,500	\$ 25,000	\$ 32,500
Bristol County Conservation District (\$22/hr)	\$ 15,000	\$ 35,000	\$ 50,000
Subtotal	\$100,500	\$ 60,000	\$160,500
Subcontractual			
Farm consultant	\$ 40,000	\$ 0	\$ 40,000
Subtotal Subcontractual	\$ 40,000	\$ 0	\$ 40,000
Supplies & Misc			
BMP Materials and supplies	\$ 57,500	\$ 75,000	\$ 132,500
Travel	\$ 2,000	\$ 0	\$ 2,000
Subtotal Supplies & Misc	\$ 59,500	\$ 75,000	\$ 134,500
Totals	\$200,000	\$ 135,000	\$335,000
Percent	60%	40%	100%

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The Fair Share goals for the project are at the Services rate of 3.4% D/MBE and 3.8 % D/WBE on the total project dollars. To comply with DM/WBE participation goals it is anticipated that \$11,390 for DMBE and \$12,730 for DWBE will be expended

D. DESCRIPTION OF BMPS AND PRACTICES PUT IN PLACE AND POLLUTANTS REMOVED:

A summary of modeled pollutant load reduction realized for each farm conservation plan.

NRCS BMP TYPE (#) (Completed)	Watershed	Total Acreage	Process/ Reference for determining TN Reduction	TN Reduction (Lbs/Yr)
CRITICAL AREA PLANTING (342)	Palmer River	1.5	0.39	3.9
GRASSED WATERWAY (412)	Palmer River	.8	0.39	2.1
HEAVY USE AREA (561)	Palmer River	18,068 ft ²	* See below	49,500
UNDERGROUND OUTLET (620)	Palmer River	1,176 ft	N/A	
ROOFS AND COVERS (367)	Palmer River	11,000 ft ²	* See below	
ROOF RUNOFF STRUCTURE (558)	Palmer River	920 ft ²	* See below	
TOTAL TN Reduction				49,506

The percent TN loading reduction efficiency or credit from “Non-Point Source BMPs and Efficiencies Currently Used in Scenario Builder Table” was multiplied by the export TN loading determined per acre per year (6.7 lbs/acre/yr) and again by the total acres for each BMP.

Dairy cow manure contains 1# N / milking cow / day X 300 days (lactation period) = 300 # N / cow / year.
 Dry cow produces 0.5# N / dry cow / day X 60 days = 30# N / cow / year
 That's 330 # N / cow / year. These plans accounted for 200 cows, that's 66,000 # N / year. Assuming a 75% efficiency for the “Animal Waste Management Livestock” system (NRCS Scenario Builder of BMPs), that's approximately 49,500 # N removed. Since it's a system, and all of the practices are contributing to the improvement, spread that 49,500 # N removed over the entire area of the headquarters being treated.

NRCS BMP TYPE (#) (Planned for Future Projects)	Watershed	Total Acreage	Process/ Reference for determining TN Reduction	TN Reduction (Lbs/Yr)
DIVERSION (362)	Palmer River	540 ft	N/A	
IRRIGATION SYSTEM-FLOOD BENCH	Palmer River	1,328 ft ² (.03)	.33	.06
UNDERGROUND OUTLET (620)	Palmer River	1,100 ft	N/A	
FENCE (382)	Palmer River	8,700 ft	Land Use Change N/A	
WATER CONTROL STRUCTURE	Palmer River	12"	N/A	
ACCESS ROAD	Palmer River	6,720 ft	Land Use Change N/A	
ROOFS AND COVERS (367)	Palmer River	22,782 ft ²	Combined with 313	
ROOF RUNOFF STRUCTURE (558)	Palmer River	840 ft	Combined with 313	
NUTRIENT MANAGEMENT (590)	Palmer River	642	Land Use Change N/A	
WASTE STORAGE FACILITY (313)	Palmer River	142,692 ft ³ (130 head)	.75	32,175
WASTE TRANSFER (634)	Palmer River	610'	Combined with 313	
HEAVY USE AREA PROTECTION (561)	Palmer River	5,680 ft ²	Combined with 313	
VEGETATED TREATMENT AREA (635)	Palmer River	3,840 ft ²	.20	.12
WASTE TREATMENT (629)	Palmer River	6,255 ft ²	Combined with 313	
PUMPING PLANT (533)	Palmer River	6,255 ft ²	N/A	
PRESCRIBED GRAZING (528)	Palmer River	12	.09	7.24
Total TN Planned Reduction				32,182.4
<p>Dairy cow manure contains 1# N / milking cow / day X 300 days (lactation period) = 300 # N / cow / year. Dry cow produces 0.5# N / dry cow / day X 60 days = 30# N / cow / year That's 330 # N / cow / year. These plans accounted for 130 cows that are 42,900 # N / year. Assuming 75% efficiency for the "Animal Waste Management Livestock" system (NRCS Scenario Builder of BMPs), that's approximately 32,175 # N removed. Since it's a system, and all of the practices are contributing to the improvement, spread that 32,175 # N removed over the entire area of the headquarters being treated.</p>				

1. A maximum number of farm conservation plans that comprehensively outline the best management practices needed to protect water quality and remediate nonpoint source pollution generated from farm activities. Plans may include renovation or replacement of existing BMPs as well as identification of new BMPs needed to fully address all NPS. Once a plan is developed-and approved by NRCS, implementation should be undertaken with support from technical and financial assistance available under this and partner programs.

Six NRCS Approved Conservation Plans were developed and two Comprehensive Nutrient Management Plans (CNMP's). CNMPs are conservation plans unique to livestock operations. These plans document practices and strategies adopted by livestock operations to address natural resource concerns related to soil erosion, livestock manure and disposal of organic by-products

2. A summary of BMPs implemented, with a goal to fully implement all BMPs recommended by approved farm conservation plans. Include a description and location of BMPs, financial and technical resources provided, and sources of financing in addition to farmer contributions.

Palmer River NRCS Conservation Practices Planned and/or Completed

Planned Practices

- Palmer River West Branch
 - Irrigation System- Flood Bench Irrigation- 1328 ft²
 - Diversion (362) – 540 ft
 - Underground Outlet – 2 10 x 10 rock-lined basins
 - Water control Structure – 12” culvert
 - Access Road – 6720 ft²
- Palmer River Main Branch
 - Roofs and Covers (367) – 5,000 ft²
 - Roof Runoff Structure (558) – 120 ft
 - Roof Runoff Structure (558) – 200 ft
 - Underground Outlet (620) – 100 ft
 - Underground Outlet (620) – 200ft
 - Fence (382) – 1,200 ft
 - Nutrient Management (590) – 80 ac
- Main Branch Palmer
 - Waste Storage Facility (313) – 54,329 ft³
 - Waste Transfer (634) – 100 ft
 - Nutrient Management (590) – 262 ac
- Clear Run Brook
 - Nutrient Management (590) – 50 ac
 - Waste Storage Facility (313) – concrete stacking pad - 23083 ft²
 - Roofs and Covers (367) – hoop roof on walls – 4182 ft²
 - Heavy Use Area Protection (561) - undetermined- ~4000 ft²
 - Roofs and Covers (367) – undetermined - ~4000 ft²
 - Underground Outlet (620) - undetermined
 - Roof Runoff Structure (558) - undetermined

- Heavy Use Area Protection (561) –1380 ft²
- Waste Storage Facility (313) – 65280 ft²
- Nutrient Management (590) – 250 ac
- Roofs and Covers (367) – 9600 ft²
- Roof Runoff Structure (558) – 320 ft
- Underground Outlet (620) – 300 ft
- Waste Transfer (634) – 410 ft
- Vegetated Treatment Area (635) – 3840 ft²
- Waste Transfer (634) – 100 ft²
- Waste Treatment (629) – 6255 ft²
- Pumping Plant (533) – servicing 6255 ft²
- Heavy Use Area Protection (561) – 200 ft²
- Heavy Use Area Protection (561) – 100 ft²
- Torey Creek
 - Fence (382) – 7500 ft on 12 ac
 - Prescribed grazing (528) – 12 ac

<u>Completed Practices</u>	<u>Date Completed</u>
● Palmer River Main Branch	
○ Critical Area Planting (342)- 0.5 ac	July 2015
○ Underground Outlet (620)- 180 ft servicing 32 acre field	August 2015
○ Critical Area Planting (342)- 1 ac August 2015	August 2015
○ Grassed Waterway (412)- 0.8 ac July 2015	July 2015
○ Heavy Use Area Protection (561) – 5,000 ft ²	August 2015
● Clear Run Brook	
○ Roof Runoff Structure (558) –120 ft	December 2015
○ Underground Outlet (620) – 320 ft	December 2015
○ Underground Outlet (620) – 402 ft	December 2015
○ Underground Outlet (620) – 274 ft	December 2015
○ Roofs and Covers (367) – 11000 ft ²	December 2015
○ Roof Runoff Structure (558) – 350 ft	June 2016
○ Roof Runoff Structure (558) – 450 ft	June 2016
○ Heavy Use Area Protection (561) – 0.3 ac	May 2016

Practice Descriptions

- Diversion (362)
 - Definition - A channel generally constructed across the slope with a supporting ridge on the lower side.
 - Purpose –
 - Break up concentrations of water on long slopes, on undulating land surfaces, and on land that is generally considered too flat or irregular for terracing.
 - Divert water away from farmsteads, agricultural waste systems, and other improvements.
 - Collect or direct water for storage, waterspreading or water-harvesting systems.

- Protect terrace systems by diverting water from the top terrace where topography, land use, or land ownership prevents terracing the land above.
 - Intercept surface and shallow subsurface flow.
 - Reduce runoff damages from upland runoff.
 - Reduce erosion and runoff on urban or developing areas and at construction or mining sites.
 - Divert water away from active gullies or critically eroding areas.
 - Supplement water management on conservation cropping or stripcropping systems.
- Waste Storage Facility (313)
 - Definition- A waste storage impoundment made by constructing a pond (embankment and/or excavated pit or dugout), or by fabricating a structure.
 - Purpose- To temporarily store wastes such as manure, wastewater, and contaminated runoff as a storage function component of an agricultural waste management system.
- Roofs and Covers (367)
 - A rigid, semi-rigid, or flexible manufactured membrane, composite material, or roof structure placed over a waste management facility.
 - To provide a roof or cover for:
 - water quality improvement
 - Diversion of clean water from animal management areas (i.e. barnyard, feedlot or exercise area), waste storage facilities, waste treatment facilities, or agrichemical handling facilities.
 - capture of biogas for energy production
 - reducing net effect of greenhouse gas emissions
 - air quality improvement and odor reduction
- Heavy Use Area Protection (561)
 - Definition - The stabilization of areas frequently and intensively used by people, animals or vehicles by establishing vegetative cover, by surfacing with suitable materials, and/or by installing needed structures.
 - Purpose –
 - Reduce soil erosion
 - Improve water quantity and quality
 - Improve air quality
 - Improve aesthetics
 - Improve livestock health
- Nutrient Management (590)
 - Definition- Managing the amount (rate), source, placement (method of application), and timing of plant nutrients and soil amendments.
 - Purpose-
 - To budget, supply, and conserve nutrients for plant production.
 - To minimize agricultural nonpoint source pollution of surface and groundwater resources.
 - To properly utilize manure or organic byproducts as a plant nutrient source.
 - To protect air quality by reducing odors, nitrogen emissions (ammonia, oxides of nitrogen), and the formation of atmospheric particulates.
 - To maintain or improve the physical, chemical, and biological condition of soil.
- Roof Runoff Structure (558)
 - Definition- Structures that collect, control, and transport precipitation from roofs.
 - Purpose- To improve water quality, reduce soil erosion, increase infiltration, protect structures, and/or increase water quantity.

- **Underground Outlet (620)**
 - Definition- A conduit or system of conduits installed beneath the surface of the ground to convey surface water to a suitable outlet.
 - Purpose- To carry water to a suitable outlet from terraces, water and sediment control basins, diversions, waterways, surface drains or other similar practices without causing damage by erosion or flooding.
- **Waste Transfer (634)**
 - A system using structures, conduits, or equipment to convey byproducts (wastes) from agricultural operations to points of usage
 - To transfer agricultural material associated with production, processing, and/or harvesting through a hopper or reception pit, a pump (if applicable), a conduit, and/or hauling equipment to:
 - a storage/treatment facility
 - a loading area, and/or
 - agricultural land for final utilization as a resource.
- **Vegetated Treatment Area (635)**
 - Definition- An area of permanent vegetation used for agricultural wastewater treatment.
 - Purpose- To improve water quality by reducing loading of nutrients, organics, pathogens, and other contaminants associated with livestock, poultry, and other agricultural operations.
- **Waste Treatment (629)**
 - Definition- The mechanical, chemical or biological treatment of agricultural waste.
 - Purpose- To use mechanical, chemical, or biological treatment facilities and/processes as part of an agricultural waste management system:
 - To improve ground and surface water quality by reducing the nutrient content, organic strength, and/or pathogen levels of agricultural waste.
 - To improve air quality by reducing odors and gaseous emissions
 - To produce value added byproducts
 - To facilitate desirable waste handling, storage, or land application alternatives.
- **Pumping Plant (533)**
 - Definition- A facility that delivers water at a designed pressure and flow rate. Includes the required pump(s), associated power unit(s), plumbing, appurtenances, and may include on-site fuel or energy source(s), and protective structures.
 - Purpose- This practice may be applied as a part of a resource management system to achieve one or more of the following:
 - Delivery of water for irrigation, watering facilities, wetlands, or fire protection.
 - Removal of excessive subsurface or surface water.
 - Provide efficient use of water on irrigated land.
 - Transfer of animal waste as part of a manure transfer system.
 - Improvement of energy use efficiency
 - Improvement of air quality
- **Fence (382)**
 - Definition- A constructed barrier to animals or people.
 - Purpose- This practice facilitates the accomplishment of conservation objectives by providing a means to control movement of animals and people, including vehicles.
- **Prescribed Grazing (528)**
 - Definition- Managing the harvest of vegetation with grazing and/or browsing animals.
 - Purpose-

- Improve or maintain desired species composition and vigor of plant communities.
 - Improve or maintain quantity and quality of forage for grazing and browsing animals' health and productivity.
 - Improve or maintain surface and/or subsurface water quality and quantity.
 - Improve or maintain riparian and watershed function.
 - Reduce accelerated soil erosion, and maintain or improve soil condition.
 - Improve or maintain the quantity and quality of food and/or cover available for wildlife.
 - Manage fine fuel loads to achieve desired conditions.
- Critical Area Planting (342)
 - Definition- Establishing permanent vegetation, on sites with or expected to have high erosion rates and sites that are degraded due to physical, chemical or biological conditions that cannot be established with other conservation practices.
 - Purpose- Stabilize areas with existing or expected high rates of soil erosion by water. Stabilize areas with existing or expected high rates of soil erosion by wind. Restore degraded sites that cannot be stabilized through normal methods.
 - Underground Outlet (620)
 - Definition- A conduit or system of conduits installed beneath the surface of the ground to convey surface water to a suitable outlet.
 - Purpose- To carry water to a suitable outlet from terraces, water and sediment control basins, diversions, waterways, surface drains or other similar practices without causing damage by erosion or flooding.
 - Grassed Waterway (412)
 - Definition- A shaped or graded channel that is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet.
 - Purpose- To convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding. To reduce gully erosion. To protect/improve water quality.

Technical and Regulatory Support Provided:

1. Report on how many farmers are reached, numbers of meetings and workshops held, including a list of issues or outcomes that lead to further action. Summarize regulatory issues, follow-up actions taken, and further recommendations. Report will include a section on lessons learned.

There are 24 farms in the Palmer that MACD provided technical assistance to.

There are three dairy operations in the Palmer and these received the majority of technical assistance in the form on-site meetings, grant paperwork, conservation farm planning, Comprehensive Nutrient Management Planning, general contracting assistance and overall project implementation. Each of these operations received and successfully implemented State (MDAR) grant contracts and have pending Federal (NRCS-EQIP) grant contracts in addition to their "in-kind" contributions toward whole farm conservation practices. While there is always work to be done, through the conservation practice implementation of this Palmer River initiative these farms will have achieved (by @ 2018) their conservation farm planning objectives. Overcoming a general lack of trust in the government and specifically in NRCS was the largest challenge with these farms.

Five vegetable farmers received technical assistance in the form of on-site meetings, grant paperwork for conservation and food safety purposes, conservation farm planning and practice implementation. This group received the second largest amount of technical assistance. The primary issue with vegetable farmers was complying with both the Food Safety Modernization Act and new State nutrient management regulations. Practices to control surface water run off erosion which could contaminate crops and rivers combined with installing wash stations, using plastic instead of wooden vegetable storage bins, installing specialized irrigation water filters and constructing secure above ground fuel storage were implemented. Understanding the dynamics and demands of the quickly evolving marketplace and how that may or may not be in line with prior approved BMP's and conservation farm practices is the largest challenge with these farms.

Three cattle operations received technical assistance in the form of conservation farm planning, mapping and support work in preparation for Comprehensive Nutrient Management Planning in 2016-2017, assistance with EQIP applications and grant funding for fencing of resource areas. Fence construction along with implementation of grassed buffer strips outside of these fences is a relatively inexpensive yet effective means to immediately reduce nutrient loading in sensitive water bodies. Farmer cooperation was swift and "in-kind" matching was readily achievable.

Two mixed livestock farms (poultry, swine & sheep) received technical assistance in the form of on-site visits to evaluate current operations, evaluate potential enhancements and explore the possibility of grant cost sharing programs. These operations have effectively implemented BMP's but are constantly striving to improve. Fencing, gutters and subsurface drainage to route water away from heavy use areas seem to be the most important issues facing these farms.

Two equine operations received technical assistance in the form of conservation farm planning, preparation work for Comprehensive Nutrient Management Planning in 2016-2017 and assistance with EQIP applications and contacts. It appears that the largest challenge with these commercial equine operations is that technical specifications for sizing of manure storage facilities seems disproportionate (over-built and too expensive) to the size of the operation. As a result, fencing, gutters and sub-surface drainage are the focus.

Two equine operations received technical assistance in the form of exploring innovative manure composting techniques. The largest (on-going) challenge with these operations has been implementing such techniques on account of communication & technology exchange challenges amongst other research entities.

Six equine operations and one mixed livestock farm received technical assistance in the form of telephone calls followed by one or two on-site meetings to discuss their current manure handling practices. Total TA provided per farm was less than 5 hours as these were smaller "back-yard" operations.

MACD - Palmer River Initiative Technical and Regulatory Support

July - September 2014

Farm	Activity
Almeida, Edlin	App to MDAR - AFSIP grant, assistance with & successful CQP audit
Ferry, John	Farm plan preparation, coordination of nutrient workshop
Four Town - Clegg, Chris	App to MDAR - AFSIP grant, successful AMA (pump) grant,

	SAM registration
Noons, Steven	App to MDAR - AFSIP grant, inspection for AEEP grant
Oakdale - Pray, Richard	App to MDAR - AFSIP grant, successful EQIP (drain tile & planting) grant, insp. for AEEP grant assistance with & successful CQP audit
Pray, Russell	Coordination of EQIP farm & nutrient mgmt. plan

October - December 2014

Farm	Activity
Almeida, Edlin	Assistance with nutrient management record keeping
Wolf-Cardarelli, Wendy	Initial on-site for farm plan & potential EQIP
Demone, Grechen	Initial on-site for farm plan & potential EQIP
Ferry, John	NRCS on-site, farm plan preparation
Four Town - Clegg, Chris	AFSIP grant acceptance
Noons, Steven	AFSIP grant acceptance, AEEP grant acceptance
Oakdale - Pray, Richard	AFSIP grant acceptance, AEEP grant acceptance, EQIP engineering
Pray, Russell	Coordination of nutrient mgmt plan
Souza, John	AFSIP grant acceptance, AEEP grant acceptance, Coordination of experimental water treatment
Williams, Carol	Initial on-site for farm plan & potential EQIP

January - March 2015

Farm	Activity
Almeida, Edlin	On-sites, EQIP application - manure storage facility
Wolf-Cardarelli, Wendy	On-sites, EQIP application - manure storage facility, roof run-off & subsurface drainage
Demone, Grechen	On-site, potential UMass compost pilot site, continued discussions

Ferry, John	On-sites, NRCS approved farm plan completed
Four Town - Clegg, Chris	AMA contract assistance
Hillman, Russel	On-site, potential EQIP applicant & compost site
Noons, Steven	On-site, AEEP grant assistance
Oakdale - Pray, Richard	On-sites, successful EQIP contract modification, AEEP grant assistance
Pray, Russell	On-site, successful coordination of NRCS farm plan
Souza, John	AEEP grant assistance
Williams, Carol	Correspondence on potential manure pad

April - June 2015

Farm	Activity
Almeida, Edlin	Compilation of engineering information for manure storage, on-sites for soil tests, pre-CNMP work, AEEP application for fuel storage, AFSIP application for food storage bins
Arruda, Val	Initial discussion, on-sites & coordination of potential horse compost pilot
Brown, George	Initial correspondence on potential UMass horse compost pilot, TA only
Demone, Grechen	Continued discussion, on-sites & coordination of potential horse compost pilot, AEEP application for fencing
Ferry, John	NRCS EQIP application submitted, update Conservation Farm Plan practices, on-sites for soil tests, pre-CNMP work, AEEP application for HUA pad & roof
Four Town - Clegg, Chris	AMA contract assistance and AFSIP grant assistance & successful implementation of deer fencing
Keith, Sue	On-site, initial review of horse composting options, TA only
Noons, Steven	On-site, AEEP & AFSIP grant assistance & successful implementation of fuel storage & food storage bins
Oakdale - Pray, Richard	On-sites, successful EQIP contract modification & survey, AEEP & AFSIP grant assistance & successful

implementation of grassed diversion, subsurface drainage, food processing room & washing station

Souza, John
On-sites for AFSIP grant assistance & successful implementation of washing station, coordination of water testing & successful implementation of water filter

Wolf-Cardarelli, Wendy
On-site for soil evaluation for EQIP contract, AEEP application for compost pad

July - September 2015

Farm	Activity
Almeida, Edlin	Coordination of soil/manure tests, Nutrient Mgmt. Plan, coordination of conversion of highly erodible soil areas to hay land, NRCS engineering review
Arruda, Val	Continued communication towards horse compost
Wolf-Cardarelli, Wendy	NRCS Cultural Resources review, assistance w/ farm plan, EQIP contract signed & funds obligated for roof run-off & subsurface drainage, AEEP review
Demone, Grechen	Continued communication towards horse compost, AEEP preliminary review
DeSousa, John	Coordination of engineering, contractor, financing of EQIP contracts, AEEP on-site & preliminary review
Ferry, John	NRCS cultural resources review, EQIP contract signed & funds obligated for heavy use structure roof, AEEP on-site & preliminary review, assistance w/ engineering, contractor selection & financing of project, implementation of stream fencing (successful completion & payment)
Noons, Steven	Coordination of 2015 AEEP practice implementation (successful completion & payment)
Oakdale - Pray, Richard	Assistance w/ implementation of EQIP practices, coordination of 2015 AEEP practice implementation (successful completion & payment)
Pray, Russell	On-site, follow up on farm plan implementation, hay land planting

October - December 2015

Farm	Activity
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Almeida, Edlin	Coordination & assistance with AEEP and AFSIP contract paperwork/obligations
Arruda, Val	Continued communication towards horse compost
Demone, Grechen	Continued communication towards horse compost
DeSousa, John	Coordination of engineering w/ NRCS for updated plans, meetings with contractors for quotes, meeting w/ financial institution, coordination & assistance with AEEP contract paperwork/obligation, on-sites for documentation of roof-run off & subsurface drainage project, successful implementation
Ferry, John	Coordination of engineering w/ NRCS for updated plans, meetings with contractors for quotes, meeting w/ financial institution, coordination & assistance with AEEP contract paperwork/obligation, on-sites for documentation of HUA roof construction, successful implementation
Green, Illana	On-site meeting for alternative horse composting strategies, TA only
Oakdale - Pray, Richard	Assistance with EQIP contract modification for grass diversion & storm water run-off
Noon, Steven	On-site meeting, discussion of RI-DEM & MADEP reviews

January - March 2016

Farm	Activity
Almeida, Edlin	On-sites for CNMP work, soil & manure testing, mapping, resource inventory, EQIP app for manure storage
Beniot, Bill	Correspondence & initial on-site for conservation farm plan for equine, surface drainage, TA only
Correia, Eric	Initial correspondence, on-site meetings w/ contractors, planned fencing for cattle
DeSousa, John	Coordination of paperwork & NRCS payments for gutters/subsurface drain, on-sites w/ contractors for manure storage quotes
Ferry, John	On-sites for CNMP work, soil & manure testing, mapping, resource inventory, EQIP app for manure storage

Fonseca, Nuno	Initial correspondence, on-site meetings w/ NRCS, EQIP application for HUA roof & fencing for cattle
Gamba, Sharon	Correspondence & initial on-site for conservation farm planning for equine, TA only
Gosselin, Trish	Fairfield Farm (equine), initial site visits, coordination w/ NRCS, EQIP application assistance & pre-CNMP work
Homestead Farm	Initial on-site, gutters & fencing potential, manure storage review & strategy, TA only
Oakdale - Pray, Richard	Follow up on EQIP contract modification & payment for grass diversion & subsurface drainage
Noon, Steven	Correspondence regarding leased acreage, sub-lease tenants & additional conservation practices, including meeting w/ Correia(cattle) & Roland (equine)

April - June 2016

Farm	Activity
Almeida, Edlin	Completion of CNMP, coordination of NRCS EQIP application & associated engineering for manure storage, on-site for Cultural Resources analysis
Almeida, John	Initial correspondence on grant opportunities in 2017 for livestock & vegetables
Correia, Eric	On-sites, meeting w/ contractors, successful implementation of fencing & in-kind site preparation
DeSousa, John	On-sites for engineering & contractors for manure storage construction & site preparation, successful commencement of construction (to be finished in July 2016).
Ferry, John	Completion of CNMP, coordination of NRCS EQIP application & associated engineering for manure storage, completion of HUA extension/roof/bedded pack
Fonseca, Nuno	On-sites for contractors, coordination & documentation of HUA pad, NRCS mapping for CNMP
Gamba, Sharon	Correspondence & initial on-site for conservation farm planning for equine, TA only
Gosselin, Trish	On-sites for engineering & pre-CNMP work
Homestead Farm	Follow up on potential grant opportunities for conservation

	practices
Lacasse, Christine	Initial correspondence, coordination of future on-site for TA
Slinko, Edward	Initial correspondence regarding storm water run-off, TA only
Sousa, John	On-site, EQIP application for ebb & flow benches & other water conservation practices

Outreach and education:

Outreach and education activities conducted including number of workshops and farm tours, locations, agendas, number of participants, materials and information provided, and fact sheets and recommendations that are developed under this task.

Type of Event	Location	Host	# Participants	Info Provided
Soil Health Workshop/Demo	BCAHS	BCCD	125	Farming with Nature: Improving Soil Health on Vegetable Farms. NRCS's National Soil Health Team provided classroom and hands on demonstrations on the economics of soil health, the benefits of deep zone tillage, and cover crops for soil health.
Meeting with Rehoboth BoS	RCOA	RAC	20	Introduction to project, purpose , role of Town Boards, signing of agreement between MACD and Town of Rehoboth.
Palmer River Introduction	RCOA	RAC	20	Introduced project to the general public and other municipal boards.
Equine Workshop	RCOA	RAC	50	Special workshop just for equine industry. Introduction to project and how service providers can assist Equine industry. Presentation on aerated composting for small equine operations.
Palmer River Update Mtg	RCOA	RAC	12	Power point on purpose of project, status on objectives and identification of BMP's implemented to date.
Town Website Update	RAC	RAC	N/A	Fact Sheet about project, Info on how to access services and links to partner websites. www.town.rehoboth.ma.us/agricultural-commission/pages/palmer-river-initiative

Acronyms:

- BCAHS: Bristol County Agricultural High School*
- RCOA: Rehoboth Council on Aging*
- BCCD: Bristol County Conservation District*
- RAC: Rehoboth Agricultural Commission*

All meetings hosted by Rehoboth Agricultural Commission were taped and broadcast on Rehoboth Community TV (RCTV). RCTV is the local access television station for public, educational and government programming for Rehoboth. Broadcast are made on regular schedule post meeting and available on demand at the community TV website. www.rehobothtv.org/

Lesson Learned/Recommendation: Working with the local Agricultural Commission provided a great benefit for our project. A town agricultural commission (AgCom) is a standing committee of town government, created through a vote of Town Meeting and appointed by the Board of Selectmen or governing body of the town. AgComs represent the farming community, encourage the pursuit of agriculture, promote agricultural economic development and protect farmlands and farm businesses, and preserve, revitalize and sustain agricultural businesses and land. As of December, 2015, there are 165 Agricultural Commissions within the Commonwealth of Massachusetts.

Working with the Rehoboth Ag Commission not only connected our project to the local farmers and land owners but brought the project to the municipal government level by connecting the Board of Selectman, Board of Health, Conservation Commission and Agricultural Natural Resources Commission. As a follow up to the public meetings, the RAC helped connect us to the individual producers by setting up one on one introductory meetings for us. Through the RAC we were able to bring our project into the homes of every resident through community TV. Every meeting we had with the RAC, whether a planning meeting or public presentation, was taped and broadcast to the Town.

We would be remiss not to mention the support of the former RAC Chair Walt Monroe. Walt saw the benefit of the project from day one and put forth his full support and advocacy to ensuring the project’s success. Unfortunately Walt passed away suddenly in August 2015. The RAC continues its steadfast support for this project in Walt’s honor.

Access to Resources: An Excel spreadsheet that defines the programs and resources available. Report on numbers of farmers that access services and what results are.

The chart below highlights the state and federal funds (excluding 319 funds) that we assisted farmers and land owners in accessing since we began the project. We saw a 7,014% increase in conservation funding from 2013 to 2016. This is based on NRCS having one EQIP contract totaling \$16,398 for the Palmer River in FY13 when the project began.

Program	#Farms	# Practices	Type of Practices	Funding Contracted
FY14 EQIP	1	8	grass waterway, diversion	\$ 10,102
FY14 AMA	1	1	pumping station	\$ 29,000
TOTAL FY14				\$ 39,102
FY15 AFSIP	4	4	Vegetable wash water, leachate filtering,	\$ 39,184
FY15 AEEP	3	5	grass waterway, subsurface drainage, vegetable wash water	\$ 20,500
FY15 EQIP	3			\$153,777
TOTAL FY15				\$213,461
FY16 EQIP	5	15	manure storage, barn yard run-off, milk house waste, heavy use area cover,	\$863,000

			subsurface drainage, fencing	
FY16 AEEP	3	3	heavy use area, manure storage, fuel storage	\$ 40,000
FY16 AFSIP	1	1	vegetable packing bins	\$ 11,000
			TOTAL FY16	\$914,000
			GRAND TOTAL	\$1,166,563

*Contracts still being processed at time of report development. NRCS made up to \$970,000 available in EQIP funds for FY16.

Acronyms:

EQIP: Environmental Quality Incentive Program (USDA/NRCS)

AMA: Agricultural Management Assistance (USDA/NRCS)

AEEP: Agricultural Environmental Enhancement Program(MDAR)

AFSIP: Agricultural Food Safety Improvement Program (MDAR)

Access to resources also included 319 funds we allocated for BMP implementation. We utilized 16.5 percent more in 319 BMP implementation than we originally budgeted. Utilizing 319 funds allowed us to come in quickly and implement a project that produced immediate results. (i.e. exclusionary fencing to keep cattle out of waterways) The fast response also allowed us to build credibility with producers by proving we can get projects done quickly. We also utilized 319 funds to fill gaps left by EQIP or AEEP funding.

		319 FUNDS
Farm	BMP Project	Amount
Ferry Dairy	Stream crossing and exclusion Fencing	\$ 3,500
Ferry Dairy	Soil Testing for Comprehensive Nutrient Management Plan	\$ 252
Almeida Farms	Soil Testing for Comprehensive Nutrient Management Plan	\$ 483
Eric Correia Cattle	Exclusion fencing and buffer strip from Rocky Run	\$ 3,749
Desouza Dairy	Manure storage, barn yard run-off & subsurface drains,	\$ 14,250
Nuno Fonseca Cattle	Heavy Use Area pad on pathway to roof, gutters & subsurface drainage	\$ 28,000
Ferry Dairy	Manure storage, leachate & milk house waste filtering	\$ 18,000
	TOTAL	\$ 68,234

Evaluate program successes and challenges to determine how the project outcomes can be used in furtherance of a Regulatory Certainty initiative:

1. A white paper outlining how the outcome of this project can serve as the basis for a Regulatory Certainty program.

Water Quality Initiative

Palmer River Watershed Pilot, Rehoboth, MA

A partnership between MDAR, MADEP, MACD and the USDA/NRCS was created in 2013 to explore technical and policy issues in facilitating agency collaboration to recognize farmers that have implemented conservation and adopted water quality best management practices. The project was initiated in the Palmer River because NRCS in coordination with MADEP established the National Water Quality Initiative (NWQI) supporting the voluntary conservation actions of farmers to enhance water quality in the Palmer River. MDAR, MADEP, MACD and NRCS solidify collaborative agreement by MOU in March 2013. MADEP and MDAR sign MOU at the Commissioner level.

Steps Towards Certainty

- The project began with education and outreach. The Rehoboth Agriculture Commission provides outreach to farmers regarding the pilot and maintains trust within the agriculture community. Bristol County Conservation District assists with community education specific to soil health and NRCS programs. NRCS identified farmers lacking current conservation plans and assisted MACD in providing outreach to those farmers.
- MDAR's Commonwealth Quality Program (CQP) identified by MDAR, MADEP, MACD and NRCS to be a possible home for a water quality certainty component by verifying implementation of conservation BMP's.
- Roughly \$1.2 million dollars in State and Federal program funds invested in the Palmer to support conservation implementation.
- Conservation plans were developed for six farms and comprehensive nutrient management plans developed for two farms. Two soil health workshops held for 150 participants
- An increase in State and Federal regulations often create hardship for the farming community and the Palmer Pilot shows direct technical assistance from a neutral party is highly effective in expediting on farm conservation measures.
- CQP has a certification process in place which focuses on food safety. This infrastructure could be leveraged to support water quality certainty using lessons learned from the Palmer Pilot.
- If CQP were to be used, the Commonwealth would own and manage WQ Certainty and operational and management details would need to be worked out in a Phase 2.
- As is the case with CQP now, significant focus would be placed on farmer outreach, education and direct technical assistance from State and Federal programs.

Summary

- The Palmer River Pilot serves two purposes.
 - It is the first designated watershed for the NRCS National Water Quality Initiative(NWQI) in which Farm Bill funds were used to expedite on farm conservation practices with the goal of delisting a 303D waterbody.

- The concept of water quality certainty was piloted in the Palmer by the combined collaboration of MADEP, MDAR, NRCS and MACD.
- The combined efforts of State, Federal and nonprofit organizations have resulted in significant funds being targeted to the installation of on farm conservation practices to address WQ issues.
- The MOU signed by MDAR, MADEP, NRCS and MACD and the resulting collaboration in the Palmer has heightened farmer awareness of available State and Federal resources and resulted in a much stronger partnership overall.

Recommendation

- Recommend MDAR and MADEP leadership continue this partnership and signing a new MOU for Phase 2.
- Phase 2 would focus on which water quality screening tool/checklist to use for on farm review
- Delivery of technical assistance and linking State, Federal and nonprofit resources to address WQ on farm issues.
- Data analysis to identify outreach priorities
- Working with Agriculture Commissions to support outreach
- Education materials to complement existing CQP tools
- Leveraging funds to build capacity

E. Lessons Learned:

The Rehoboth Agricultural Commission and MDAR Commonwealth Quality Program staff were invaluable at providing initial personal introductions to “key” farmers in the Palmer River Watershed. From these on-site meetings over a tractor tire or off-site coffee shop, establishing a relationship was the responsibility of MACD field staff. The most critical aspect of this “do or die” approach was that of taking the time to meet farmers at their convenience and where they are most comfortable (ie. milk room at 6:30pm). After establishing a dialogue through these situations, permission was much more easily obtained to walk properties. By keeping an open mind to practices observed and bringing these into this informal dialogue, farmers themselves often pointed out areas that needed improvement. Motivation to tackle these needed improvements were often based upon the economic bottom line but also almost always achieved a conservation goal. The success of this pilot program can largely be credited to the following activities: 1. helping farmers act upon the knowledge that their long term economic viability was directly correlated to their effectiveness at maintaining and enhancing their existing conservation practices; 2. helping farmers navigate the government grant application process (State and Federal) and understand the background technical support that goes into a seemingly simple practice; 3. helping farmers communicate with their family and financial institution regarding implementation and understanding of the government grant reimbursement process in order to secure financing; 4. helping farmers secure and educate contractors who could implement conservation practices according to required specifications; and 5. setting and managing appropriate expectations with all involved parties throughout the entire project.