

**CLEAN WATER ACT
SECTION 319 NONPOINT SOURCE POLLUTION PROGRAM
DEMONSTRATION PROJECT
FINAL REPORT**

**Demonstration of a Manure Composting Facility to Improve Water Quality
on East Canyon Creek, Morgan County, Utah**

By

Morgan Soil Conservation District

**This project was conducted in cooperation with the State of Utah and the United States
Environmental Protection Agency, Region VIII.**

**Grant # C9998187-01
State (UDAF) Contract #02-1677**

EXECUTIVE SUMMARY

PROJECT TITLE: Demonstration of a Manure Composting Facility to Improve Water Quality in East Canyon Creek, Morgan County Utah

PROJECT START DATE: 06/01/2001 PROJECT COMPLETION DATE: 05/01/2005

FUNDING:	TOTAL BUDGET	\$551,000
	TOTAL EPA GRANT	\$50,000
	TOTAL EXPENDITURE OF EPA FUNDS	\$50,000
	TOTAL SECTION 319 MATCH ACCRUED	\$33,333
	BUDGET REVISIONS	N/A
	TOTAL EXPENDITURES	\$551,000

SUMMARY ACCOMPLISHMENTS:

The completion of a manure management system at the Dee Waldron Dairy to demonstrate the reduction of animal wastes loading into the East Canyon Creek Watershed was the major accomplishment of this project. The manure management system features a composting facility which demonstrates alternate methods of containment and proper utilization of animal manure.

TABLE OF CONTENTS

	PAGE
EXECUTIVE SUMMARY.....	ii
TABLE OF CONTENTS.....	iii
1.0 INTRODUCTION.....	1
2.0 PROJECT GOALS, OBJECTIVES AND ACTIVITIES.....	1
2.1 PLANNED AND ACTUAL MILESTONES, PRODUCTS, AND COMPLETION DATES.....	2
2.2 EVALUATION OF GOAL ACHIEVEMENT.....	3
3.0 LONG TERM RESULTS IN STREAM/LAKE WATER QUALITY AND WATERSHED PROTECTION CHANGES.....	3
4.0 BEST MANAGEMENT PRACTICES (BMPS) DEVELOPED AND/OR REVISED.....	3
5.0 MONITORING RESULTS FOR DEMONSTRATION PROJECT.....	3
5.1 BMP EFFECTIVENESS EVALUATION.....	3
5.2 RESULTS OF BMP OPERATION AND MAINTENANCE REVIEWS.....	4
5.3 RESULTS OF MONITORING.....	4
6.0 PUBLIC INVOLVEMENT AND COORDINATION.....	4
6.1 STATE AGENCIES.....	4
6.2 FEDERAL AGENCIES.....	4
6.3 LOCAL GROUPS, GOVERNMENTS, ETC.....	5
6.4 OTHER FUNDING SOURCES.....	5
7.0 ASPECTS OF THE PROJECT THAT DID NOT WORK WELL.....	5
8.0 FUTURE ACTIVITY RECOMMENDATIONS.....	5
9.0 APPENDIX.....	5

1.0 INTRODUCTION

Agricultural producers are aware of the need to contain animal waste and to remove livestock from sensitive riparian areas. The utilization of a composting facility provides animal feeding operations with a way to remain economically and environmentally viable through implementation of best management practices (BMPs) by reducing sediment and manure runoff through the housing of animals that would normally reside along the river. The composting facility can also be used as a community showcase and as a demonstration of BMPs that can be utilized to improve water quality in Morgan County.

2.0 PROJECT GOALS, OBJECTIVES, AND ACTIVITIES

The overall goals of this project are to develop a Comprehensive Nutrient Management Plan (CRMP), to construct an animal waste management system, and to develop conservation plans detailing appropriate BMPs demonstrating how manure composting can reduce nonpoint source pollution. The composting facility will allow the producer/owner/operator to effectively contain and manage the waste from all of the dairy and beef cattle and will provide him with a value added product to market, and will enable him to make adjustments in other areas and aspects of his operation, thus improving water quality. Livestock currently being fed and wintered in the East Canyon Creek riparian zone with free access to the stream can be housed near the dairy and compost facility allowing restoration of riparian zone.

This demonstration project will showcase these BMPs to area producers which will encourage them to adopt and implement similar activities to improve water quality. Livestock producers who utilize similar composting facilities, will be provided guidance on cost effective methods to meet crop nutrient needs through soil testing and proper application of fertilizers at rates to best meet the needs of crops.

BMPs installed are included in the NRCS Technical Guide and are identified by practice code numbers.

Goal #1: Develop and implement a CNMP for an animal feeding operation in Morgan County, Utah consisting of an animal waste system featuring a composting facility in order to demonstrate alternative methods of containment and proper utilization of animal manures.

Objective 1: Reduce pollutants and keep livestock manure from entering East Canyon Creek by implementing a planned Animal Waste Management System (AWMS).

Task 1- Write CNMP and design AWMS, including compost facility.

Task 2- Implement CNMP and AWMS and construct compost facility.

Goal #2: Develop and implement a conservation plan to improve the stability of East Canyon Creek channel and enhance and restore the associated riparian corridor.

Objective 1: Restore East Canyon Creek riparian zones connected with Dee's Dairy by excluding livestock and rehabilitating degraded areas.

Task 3- Develop a stream bank and riparian improvement plan.

Task 4- Implement restoration plan.

Goal #3: Plan and implement BMPs to improve upland management in order to reduce sediment and nutrient runoff to the Weber River and its tributaries.

Objective 1: Improve management of uplands and pastures to decrease nonpoint pollution including sediment and nutrients.

Task 5- Develop an upland management plan.

Task 6- Implement upland management plan.

Goal #4: Monitor water quality and evaluate conditions of natural resources with the aim of providing useable data for public education.

Objective 1: Monitor water quality and evaluate conditions of natural resources with the aim of providing useable data for public education.

Task 7- Sample water in East Canyon Creek above and below the dairy according to the DWQ SAP.

Task 8- Monitor and evaluate natural resources in critical areas, especially the riparian corridor, affecting water quality.

Objective 2: Share general and technical information with local producers and others in the watershed and statewide.

Task 9- Develop fact sheets and newspaper articles.

Task 10- Conduct tours to acquaint the general public and agricultural sector with the results of the project and the possibilities in this and other watersheds.

Task 11- Ensure that monitoring and other project results and data are available to appropriate agencies through quarterly and final reports.

2.1 Planned and Actual Milestones, Products, and Completion

Task 1. The CNMP was completed and the compost facility design has been completed in 2004.

Task 2. Construction of the compost facility has been completed in 2005.

Task 3. NRCS completed the stream bank protection plans for the reach of the stream where livestock were grazing. However, the property within this reach was sold in 2004 and the new owners do not own livestock, thus there are no livestock grazing issues within the associated riparian zone.

Tasks 4 thru 6. A severe drought during the contract period made planning difficult, but with the assistance of NRCS a plan was developed and is currently being followed by the land owner.

Task 7. Water quality sampling was conducted and the data has been compiled. In addition to the water quality monitoring a UAFRRI model was completed for Dees Dairy. Detailed results are under Section 5 of this report.

Task 8 thru 11. Several tours of the facility were held in 2005 and 2006. Participants included representatives from Australia, EPA, State Departments of Agriculture and Environmental Quality, Utah Association of Conservation Districts and local Conservation Districts. Reporting to GRTS was done on a semiannual basis.

Completion Date of Project

Original completion date of the project was scheduled for December of 2003, however actual completion date was June of 2005. Delays were due to changes in staff, funding approvals, planning and design delays and changes in land ownership.

2.2 Evaluation of Goal Achievement

The completion of this project has allowed the owner/operator to compost and store the manure. The compost is land applied which has resulted in documented higher crop yields and improved soils. Water quality is improved as a result of manure management. There have been many tours involving many individuals, including federal, state, and local agency people, along with farmers and ranchers within the watershed area. Numerous personal inquiries from neighboring associates have been made to the owner/operator regarding the success of the project. The project has and continues to function as designed.

3.0 LONG TERM RESULTS IN TERMS OF BEHAVIOR MODIFICATION, STREAM/LAKE WATER QUALITY PROTECTION CHANGES, AND/OR WATERSHED PROTECTION CHANGES.

Water quality and UAFRRI data indicate that East Canyon Creek within the project area has reduced nutrient loadings. The completion of this project will have an impact on long-term water quality changes in East Canyon Creek. The objective of this project is a demonstration of how animal waste management systems involving composting can function. If these systems are functioning properly, then animal waste runoff is minimized. This project is effective as an information/education tool to showcase animal waste composting. This tool is being used to demonstrate to others with similar type operations within the watershed and state, the benefits of animal waste compost. If interested individuals elect to implement the same or similar BMPs, then collectively, this would have a greater potential to improve long term water quality conditions within Utah. Greater awareness of water quality conditions within the watershed has occurred as a result of this project. Owner/operators of similar operations have expressed greater interest in composting.

4.0 BEST MANAGEMENT PRACTICES (BMPS) DEVELOPED AND/OR REVISED

The Best Management Practices used on this project were selected from the USDA Field Office Technical Guide (FOTG) which includes the following practices: Composting Facility (317), Filter Strip (393), Manure Transfer (634), Restoration & Management of Declining Habitats (643), Roof Runoff Management (558), Stream Habitat Improvement & Management (395), Use (Livestock) Exclusion (472), Waste Utilization (633), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Streambank Protection (580), Waste Storage Facility (313), Runoff Management (570), Conservation Cover (327), Critical Area Planting (342), Irrigation Water Management (449), Range Planting (550), Riparian Forest Buffer (391), Water and Sediment Control Basin (638), Conservation Crop Rotation (328), Field Border (386), Prescribed Grazing (528), Residue Management (329), Tree/Shrub Establishment (612) and Off-Site Livestock Water (614). No new or revised BMPs were used.

5.0 MONITORING RESULTS FOR DEMONSTRATION PROJECTS

NRCS, UACD and the local CD monitored this project during the construction phase. Inspections indicated that the project was constructed as planned and BMPs were installed according to design.

5.1 BMP Effectiveness Evaluations

Owner has a signed agreement, as part of his Farm Plan, to a regular schedule of maintenance. These maintenance agreements are detailed in his Farm Plan.

5.2 Results of BMP Operation and Maintenance Reviews

NRCS personnel have inspected the installed BMPs and have indicated that the BMPs are in a proper functioning condition, and are being maintained by the owner as agreed.

5.3 Results of Monitoring.

Water Quality

Table 1. East Canyon Creek at the Waldron project site
STORET # 4925091

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	% Dissolved Oxygen Saturation	Total Phosphorus (mg/L)	Dissolved Phosphorus (mg/L)	Ammonia (mg/L)	TSS (mg/L)	Flow (cfs)	Spec Conduc (µmho)
10/11/2005	8.76	7.0	11.7		0.034	0.035	Non-detect	Non-detect	32.4	786
<i>duplicate</i>	8.2									770
10/24/2008	8.49	3.28	11.29	100.6	Non-detect	0.021	Non-detect	93.2	18.71	587
<i>duplicate</i>	8.01									703

UAFRRI (Data in Pounds and Before and After Implementation) T.N. = Total Nitrogen, T.P. = Total Phosphate and BOD = Biochemical Oxygen Demand.

<u>Before T.N.</u>	<u>After T.N.</u>	<u>Before T.P.</u>	<u>After T.P.</u>	<u>Before BOD</u>	<u>After BOD</u>
73	0	35	0	321	0

6.0 PUBLIC INVOLVEMENT AND COORDINATION

The local CD has been involved and supportive since the beginning of the project. They have approved funding requests, design criteria, design changes, and tour coordination.

6.1 State Agencies

Utah Department of Agriculture and Food (UDAF) - Contracting, project management, planning, information and education and funding.

Utah Division of Water Quality/Utah Department of Environmental Quality (UDWQ/DEQ) - Statewide section 319 program management including oversight of local 319 planning and expenditures and water quality monitoring on East Canyon Creek River.

6.2 Federal Agencies

Natural Resources Conservation Service (NRCS) - Provided technical assistance to plan, design, implement BMPs, and evaluate BMP effectiveness and funding through EQIP.

Environmental Protection Agency (EPA) – Financial assistance and NPS 319 Grant oversight

6.3 Local Governments and Others

Utah Association of Conservation Districts (UACD) – Approval of funding requests, match documentation, financial assistance, information and education, technical assistance.

6.4 Other Sources of Funds

Match for this project was provided by owner, UACD, and UDAF.

7.0 ASPECTS OF THE PROJECT THAT DID NOT WORK WELL

There is not an indication of any aspects of this project that did not work well. Currently, the project is functioning as designed and the owner/operator is satisfied.

8.0 FUTURE ACTIVITY RECOMMENDATIONS

No recommendations.

9.0 Appendix – Selected photos of Waldron animal waste composting project



Site view before construction



Complete animal holding and feeding corral



Far view of completed project area



Manure composte pile



Manure composte holding structures in winter