

Livestock Environmental Quality Assurance Program

Executive Summary Report

Using a Shared Governance Model
to Certify
Minnesota's "Clean Water Legacy" Farms



This report was provided to the Minnesota Department of Agriculture by Tim Gieseke, Ag Resource Strategies, LLC, New Ulm, MN under Contract # B43266 for the On-Farm Livestock Assessment and Assurance Program.

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Executive Summary

The 2009 Minnesota state legislative directive to develop an on-farm “reasonable assurance” process ushered in a new era of water quality governance by focusing on water quality outcomes. This new focus embraces the traditional government conservation programs but within the context of the producers’ management plans and the state’s TMDL watershed goals. Simply put, a “Clean Water Legacy” Farm is one that meets water quality scores for farm water bodies, farmstead, livestock facilities and fields. What was learned was that some farms already meet these goals, many are close and conservation funds can be targeted for those in the greatest need for improvement.

The LEQA uses a shared-governance model to deliver performance-based outcomes that relies on the breadth of expertise of local, state and federal agencies, non-profits, and agriculture professionals and producers. This process uses a water quality “market signal” that aligns stakeholders’ interest toward a common outcome and reduces the overall complexity for the individual participants, farmers and organizations. The result is a user-friendly data base for farmers and watershed managers.

Beginning in February 2010, 105 livestock producers voluntarily registered for the LEQA II program assessment. The 105 farms contained 47,529 acres, 55,215 animal units, and 506 environmentally sensitive areas. These assessments led to the identification of 728 resource concerns and approximately \$2 million of federal and state conservation program applications. Conservation activities were applied toward 474 (65%) of those 728 concerns and included petroleum and pesticide management issues, wellhead management, manure storage and management, stream buffer strips and soil quality improvements. Eight of the 105 farms reached the “Clean Water Legacy” goal with an additional 86 producers receiving assistance toward the certification goal. The whole farm assessments costs averaged \$4.20/acre or about \$2000 per farm. Certification Assistance funds (\$84,000) were used to assist the producers in reaching the water quality goals.

The success of this shared-governance approach is, in part, due to its recognition that government, agricultural producers, non-profits and the agribusiness community can not meet the state’s water quality goals individually, but collectively it is possible. Producers are allowed to anonymously engage in the process while they are improving their water quality scores. The assessment gives the producers a much needed “starting line” and “finish line” for the state’s clean water goals. Using numerical scoring methods, a producer can understand where their farm ranks and conservation agencies can target financial and technical resources. By aggregating the farm acreage scores, government agencies can track the progress at county, watershed or state-level scales. This collective effort also provides the framework for full-circle government-to-government accountability that includes annual confirmations, an auditing process and a first-of-its-kind watershed intelligence system.

This collective effort is also based on the common concepts found in the University of Minnesota’s *Minnesota Water Sustainability Framework*, Citizens Leagues’ *To the Source: Moving Water Governance Upstream*, and the MPCA’s *TWAIM: A Systems Thinking Approach to watersheds*. Each of these reports described the need for greater inter-relationships and an interconnecting process.

It is through this integrated approach; one that begins on the farm and ends at the watershed scale, that is the basis for the conclusion that the LEQA program met the legislative intent to provide agriculture producers with an adequate means to provide the state with “reasonable assurance” that their farm operations meet the water quality goals and the intention of TMDL Plans.

I. Introduction

The 2010-2011 LEQA program is based on the Environmental Quality Assurance program developed by the Minnesota Milk Producers Association in 2001 and adopted by the Livestock Environmental Assurance Consortium (LEAC) in 2007.

The stakeholders included:

Minnesota Farm Bureau Federation	Natural Resources Conservation Services
Minnesota Farmers Union	Minnesota State Cattlemen’s Association
Minnesota Milk Producers Association	Minnesota Turkey Growers Association
Broiler and Egg Association of Minnesota	Minnesota Pork Producers Association
Minnesota Crop Production Retailers	Minnesota Agri-Growth Council
Minnesota Ag Water Resource Coalition	Board of Water & Soil Resources
Pollution Control Agency	Department of Natural Resource
MN Association of SWCD	Minnesota Citizens League
Minnesota Department of Agriculture	

In 2009, Minnesota Legislation allocated \$300,000 to the MDAG from Clean Water Legacy Funds to implement an environmental quality assurance program to:

- Assess 100 livestock operations
- Develop resource management plans,
- Provide resource management analysis and assistance,
- Provide an implementation plan, and
- Provide for annual reporting on water quality assessment and “reasonable assurance” of the water quality effects for the purposes of TMDL plans, including an assurance walk-through for farms enrolled in the program.

This LEQA Executive Summary Report is laid out in a manner first describes the challenges of implementing a “reasonable assurance” process in Section II and discusses, “how do we measure the immeasurable?” Section III briefly describes the format used to track LEQA activities and how Water Quality Assurance is presented. Section IV describes the Shared Governance structure in narrative, schematic and table formats. In other words, who does what in the process of assessing and improving on-farm water quality management? Section V contains the bulk of the summarized data and how the various tasks associated with that data are completed and accounted for. Section VI describes practice-based and outcome-based accounting systems and how individual farm improvements are tracked to support a reasonable assurance designation. Section VII explains how water quality data from individual farms is compiled to generate watershed “intelligence” to support stakeholders’ decision making. Section VIII provides brief discussion points and recommendations for the next steps.

II. Key Challenges of Providing “Reasonable Assurance”

There are significant challenges for the state’s governmental units to improve the quality of its water within the traditional conservation delivery system. Declining budgets, limited staff, access to land management information, elusive traits of non-point source pollution and political boundaries misaligned with watershed boundaries each poses significant challenges in their own right (Gieseke 2011,90). Even the National Association of State Conservation Agencies determined that the current conservation delivery system is limiting their ability to reach natural resource goals. In their 2007 Report “Evaluating the Nation’s Conservation Delivery System (NASCA 2007) it was recommended to reverse the current trend of “program-driven” conservation, toward more flexible “resource-driven” conservation.

In addition to the human resource limitations and a program-focused delivery system, non-point source pollution is directly immeasurable, for all practical purposes, as it relates to the landscape at-large. Horan and Ribaubo (1999) state that non-point source pollution from agriculture landscapes is impossible to measure with existing technologies. Numerous other sources, including a Cooperative Extension reference (Robb 1998), a water supply business (Perrot-Maitre 2006) and an EPA (2010) document, state that non-point source pollution is immeasurable as it pertains to source and quantity.

Other key challenges include the inability of the current governance model to account for conservation practices that are applied to farms not associated with government programs (Batiuk 2011). The Citizens League report, *To the Source, Moving Minnesota’s Water Governance Upstream* concluded that Minnesota’s system of water governance is fragmented, incoherent, and poorly coordinated to the extent that it is failing on all five principles that they used to evaluate the system (Citizen League, 2009). Joe Mager (2011) of the Minnesota Pollution Control Agency stated in an article that effective best management practice implementation occurs with those that manage the land because there is no “one size fits all” due to the complexity of the landscape and how it is managed. The University of Minnesota Water Resource Center’s Water Sustainability Framework recommended the state reform its water policy using a farmer-led, performance-based strategy that was based on HUC-8 watersheds (WRC 2011).

Each of these challenges and recommendations identified by these institutions are related to the relationships that need to be developed between farmers, agencies, academic, industry and citizens. The LEQA, using a shared governance model, has the capacity to address these issues and apply these strategies to develop a “reasonable assurance” process within the financial, human and technical resources available today.

III. On-Farm Assessments and Water Quality Assurance

The On-Farm Assessments, in totality, consists of the five categories of farm waterbodies, farmstead, livestock facilities, fields and forests with a total of about 100 questions. The entire assessment template is available at www.agresourcestrategies.com. The Water Quality Assurance section (Table 3.1) consists of Farm Data and WQA scores:

A. LEQA Farm Data:

- Technical Activity – denotes the LEQA Technician activity on the farm
 - o IA – Initial On-Farm Assessment
 - o CA – Certification Assistance to implement conservation plans
 - o CW – Certification Walkthrough to ensure goals are met
 - o AnCf – Annual Confirmation to keep records updated
 - o Aud – Audit on 10% of the farms meeting WQA

- Farm Characteristics – denotes the farm’s “demographics”
 - o AUs – Animal Units
 - o Acres – Acres of cropland, pasture, woods, wetlands, etc.
 - o Watershed – the HUC-8# of the watershed

B. **Water Quality Assurance** – The WQA process uses certain water quality scores from the LEQA assessment’s four major categories; farm, farmstead, feedlots and fields. Table 3.1 shows how activities and progress are tracked as the producer improves their resource management.

- F-WB [Farm Waterbodies]: This score is based upon a LEQA-developed scoring system with a range from 1-4. A score of 3.5 is needed for WQA.
- FS-SG [Farmstead Surface and Groundwater]: It is based upon a LEQA-developed scoring system with a range from 1-4. A score of 3.5 is needed for WQA.
- Fdlt Y/N [Feedlot]: It is based on scores generated by the MinnFarm software and approved NRCS practices. Feedlot Officers provide the assurance by either Yes or No.
- FP-SWETw [Fields and Pastures-Soil & Water Eligibility Tool (water)]: It is a USDA NRCS spreadsheet scoring system with a range from 0- 130. A score of 72 is needed for WQA.

LEQA Farm Data							AUs	Acres	Watershed	Water Quality Assurance			
ID	IA	CA	CW	AnCf	Aud	Date			HUC-8 #	F-WB	FS-SG	Fdlt Y/N	FP-SWETw
3190	x					9/14/2009	455	750	7010104	2.0	3.1	N	54
3190		x				2/15/2010	455	750	7010104	2.5	3.1	N	64
3190		x				5/18/2010	455	750	7010104	2.5	3.1	N	78
3190		x				7/25/2010	455	750	7010104	3.5	3.8	Y	78
3190			x			11/4/2010	455	750	7010104	3.5	3.9	Y	78
3190				x		4/11/2011	455	850	7010104	3.5	3.9	Y	78
3190					x	6/20/2011	455	850	7010104	3.5	3.9	Y	78

IV. LEQA’s “Shared Governance” Model

The LEQA’s shared-governance model uses three major components as illustrated in Figure 4.1; 1) the traditional conservation delivery system depicted in the center of the diagram in light green, 2) the LEQA Assessment and Assurance templates to provide the starting and finish lines, and 3) Clean Water Legacy goals to guide the LEQA Assessment and Assurance data into watershed intelligence noted in light blue. The addition of #2 broadens the governance of water quality to include meaningful roles for agriculture producers and professionals; the two groups responsible for the majority of land management decisions in the state. The addition of #3 allows non-profits, legislative committees, and citizens to provide input into the processes upfront and obtain watershed information related to the progress. The flow of information through this process provides a government-to-government full-circle accounting system beginning with monies from the Clean Water Legacy Fund to support the assessment component onto local government review and audits when producers achieve water quality assurance. Table 4.1 provides details on which entity the LEQA program relied on for program participation, what their contribution was and what were their direct benefits of the shared governance model. The areas in light green denote those components are not yet official.

Figure 4.1 Shared Governance Schematic

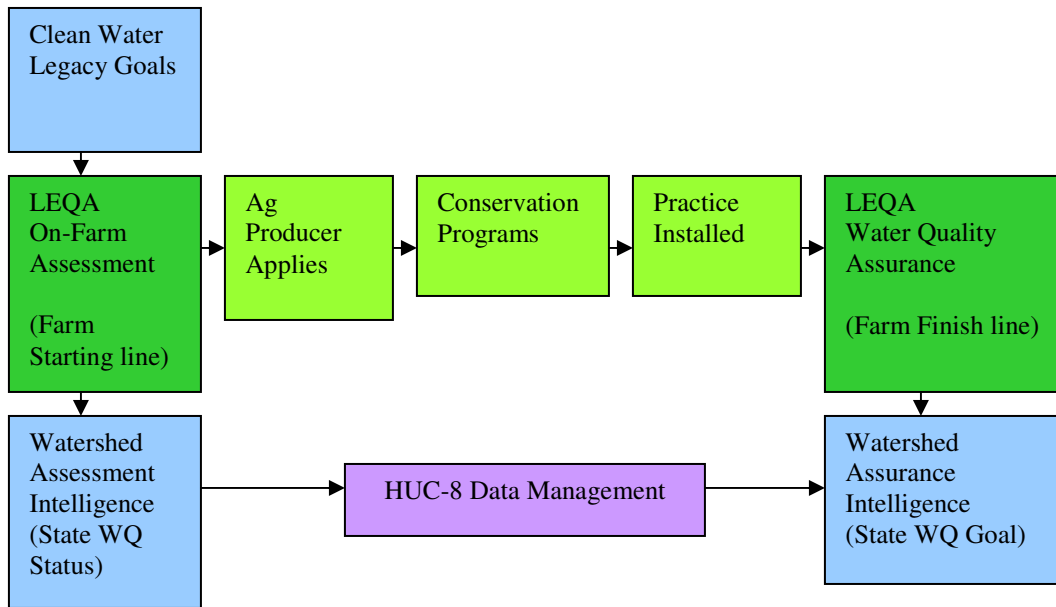


Table 4.1 Stakeholder Contributions and Benefits of Shared Governance Model			
Shared Governance Components	Stakeholders	Contributions	Direct Benefits
Assessment Template	LEAC	Approve assessment template	Coordinated Asm't with Stakeholder's interests
Registration	Ag Producers	Registration Fee	Farm Asm't & Plan
On-Farm Assessment	LEQA technicians	Conduct On-Farm Asm'ts	Monetary Payment
Assessment Data	Farmer/Agronomist SWCD,NRCS		Base resource mangmt "Starting line"
Watershed Data	County, Districts TMDL Planners	Assessment and Assurance Acceptance	Land management data on watershed basis
Certification Assistance	Agronomists Conservations	Implement Plan	Monetary Payment
Conservation Programs	SWCD/BWSR NRCS	Program App, Tech Asst and Implementation	Generate Contracts
Certification Walkthrough	LEQA Technicians	Conduct Walk-through	Monetary Payment
Regulatory Programs	MDH,DNR MDAg,MPCA	Assurance Acceptance	Greater Compliance Rate
WQA Assurance	Ag Producers MPCA	Assurance Acceptance	Confirmation that TMDL goals are met
Assurance – Farm level data	Ag Producers MPCA,Legislators	Assurance Acceptance	"Reasonable Assurance" for TMDL
Assurance – Watershed level data	County, Districts TMDL Plan, Legislators	Assurance Acceptance	Watershed-base progress reporting
Annual Confirmation	Ag Producer Regulatory Agencies	Sign Appropriate Papers	On-going assurance and data update
On-Farm Audit	Ag Producer LEQA Tech, LGU	Data and Time	Monetary Payment
Audit Data	MPCA	Assurance Acceptance	Program Assurance

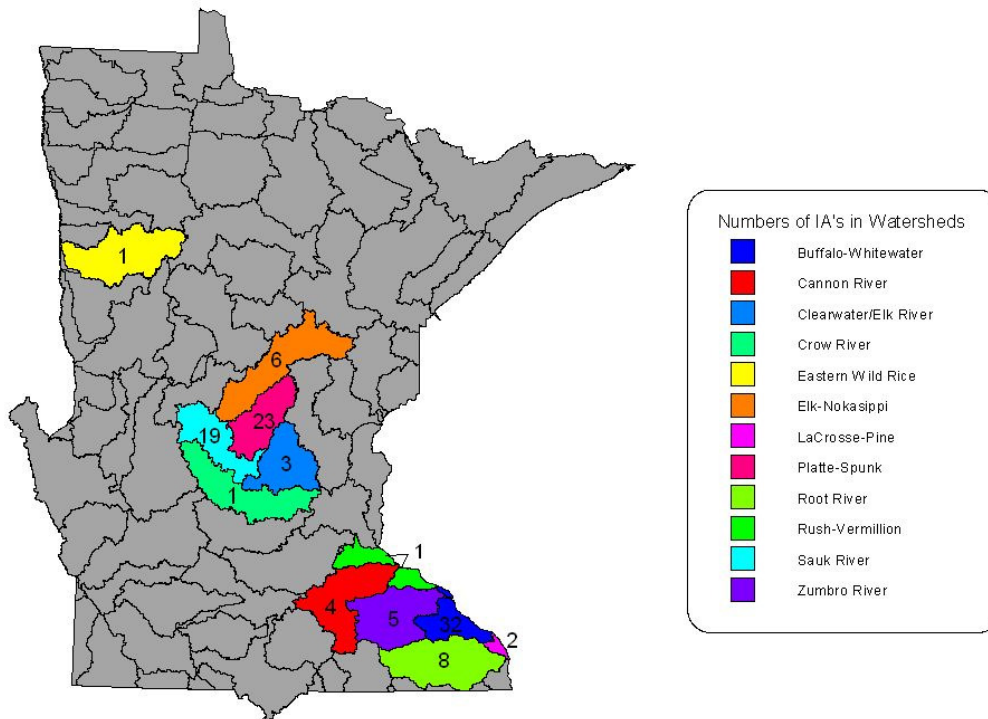
V. LEQA Program Outcomes and Findings

This section lists the type of farms, watershed locations, findings of the assessments, how certification assistance was applied and the resulting water quality improvements.

A. Watersheds and ESAs

Figure 5.1 is a map showing the twelve watersheds the 105 farms are located in and the number of farms in each watershed.

Figure 5.1: Initial Assessments by HUC-8 Watershed



The types of ESAs (environmentally sensitive areas) are identified in the MPCA’s Applying Manure in Sensitive Areas – State Requirements and Recommended Practices to Protect Water Quality. Table 5.1 lists these ESA’s, the number of each ESA identified on the 105 farms, the percentage of farms that contained that specific ESA and the percentage that each of those ESA’s in relation to the other ESA’s identified. A total of 506 ESA’s were identified on the 105 farms for an average of just under five (4.8) ESAs per farm.

Ecologically Sensitive Areas	Abbrev.	# of each ESA	% of Farms	% of Total ESAs
Perennial and Intermittent Streams	P&I	47	45%	9%
Lakes and Wetlands	L&W	30	29%	6%
Drainage Ditch	DD	29	28%	6%
Open Tile Intakes	OpT	22	21%	4%
Steeply Sloping Land	SSL	53	50%	10%
Road Ditches	RD	75	71%	15%
Annually Flooded Soils	ANS	7	7%	1%
Frozen Soils	FrS	82	78%	16%
High Water Table Soils	HWT	34	32%	7%
High Phosphorus Soils	HPS	34	32%	7%
Wells and Wellhead Protection Areas	WhP	51	49%	10%
Sinkholes	SkH	7	7%	1%
Coarse Textured Soils	CTS	26	25%	5%
Shallow Soils over Bedrock	ShS	9	9%	2%
Mines and Quarries	M&Q	0	0%	0%
Totals		506		
Farm Operations with ESAs			105	

B. Total Acres and Land Use Types

Initial Assessments were conducted on 105 livestock farms with a total of 47,529 acres. The acreage was categorized by land use type as noted in Table 5.2. Croplands made up the majority of the land use with 78% followed by woodland and grasslands with about 7% each and wetlands at 3% of the farm lands. The largest farm operation assessed was 4401 acres and the smallest was 5 acres with a median of 263 acres and an average of 453 acres.

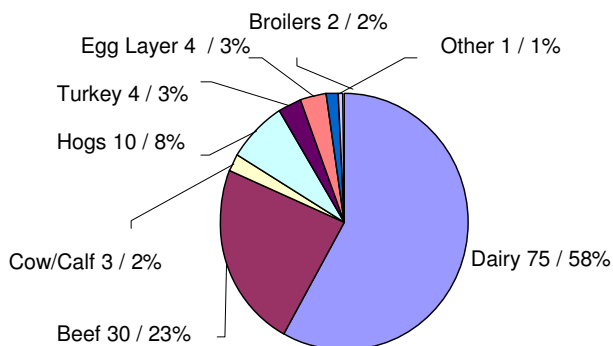
	Acres	Farmstead	Crop lands	Shelter belt	Wind break	Grass lands	Conifer Woodland	Decid. Woodland	Wetland Herbacious	Wetland Wooded
Total	47529	1315	37441	90	51	3670	412	3134	1040	456
Percentage of Total	100.0%	2.8%	78.8%	0.2%	0.1%	7.7%	0.9%	6.6%	2.2%	1.0%
Median	263	8	200	2	2	30	34	21	15	15
Average	453	13	382	3	3	46	41	51	36	35
Maximum	4401	80	3800	15	10	420	100	246	440	215
Minimum	5	1	17	0	0	1	0	1	0	0

C. Total Animal Units and Types

The farms were also categorized by livestock types and number of animal units. Seven different types of livestock operations were identified with a total of 129 livestock operations being assessed on the 105 farms for a total of 55,215 animal units included in the assessments. The total of 129 the total number of farms assessed due to some farms having more than one type of livestock operation on their farm. Figure 5.2 illustrates the number and percentages of each livestock operation type.

Table 5.3 displays the data in a little more detail by the type of livestock operations. The operations ranged in size from 20 AU to 6000 total AUs. The average size was 526 AUs and the median was 271 AUs.

Figure 5.2 Types, Number and % of Livestock Operations



Farm Statistics	Dairy	Beef	Cow/Calf	Hogs	Turkey	Egg Layers	Broilers	Total
# of Operations	75	30	3	10	4	4	2	129
Median	222	79	10	720	1547	855	271	271
Ave	362	158	42	847	1501	2041	271	526
Max	1500	700	110	2500	2160	6000	282	6000
Min	14	10	6	4	750	453	260	20

D. Initial Assessment – Resource Findings

The intention of the assessment is to **1)** identify resource conditions for each of the farm management units, **2)** to provide an action plan on how to address or maintain the resource condition and **3)** to identify potential sources for technical and financial assistance. Table 5.4 describes the summary of the findings by LEQA Assessment Categories. The total number of resource concerns identified was 728 with the highest percentage of those concerns pertaining to the *Fields and Pasture* category (264) and the lowest with *Forests and Wooded Areas* (17). The *Technical and Financial Support Sources* lists the most probable source of assistance as identified by the LEQA technician. A total number of 954 support sources were identified for the 728 concerns. The *Percentage* line calculates the potential technical and financial support identified by the LEQA technician from each source. These are estimations of probable support and it illustrates the wide range of support that agricultural producers rely on from off the farm. It also depicts that approximately 32% of the technical and financial assistance they obtain to improve the resource is provided by the farmer, themselves.

LEQA Assessment Categories	# of Resource Concerns	% of Resource Concerns	Technical & Financial Support Sources					Totals
			Fed	State	Local	Private	Operator	
Farm and Community	164	23%	23	18	28	47	74	190
Farmstead	168	23%	10	16	33	48	65	172
Livestock Facilities	115	16%	42	44	44	38	52	220
Fields and Pasture	264	36%	57	26	50	76	90	299
Forests and Wooded Areas	17	2%	13	11	11	17	21	73
Total	728		145	115	166	226	302	954
Percentage			15%	12%	17%	24%	32%	

E. Certification Assistance

Certification Assistance is provided by the LEQA technicians for the agricultural producers that have an Initial Assessment and Action Plan completed. Of the 105 assessed, 94 were given assistance to improve the water quality management of their farms. The intent is to give the producers direction and support as they implement a farm management strategy to improve their water quality scores and eventually meet the WQA standards. To assist the producers in meeting the WQA, up to 20 hours of technical assistance is provided to the producers through the LEQA technician and funded by the LEQA program. Using the Initial Assessment and Action Plan, the producer and technician decide what resource of concerns should be addressed. Table 5.5 lists the LEQA Farm Unit Assessment Categories, the number of resource concerns identified in each and the number of activities applied to address those concerns. For example, in the *Livestock Facilities* category, 115 resource concerns were identified and 74 activities were applied by the LEQA technician to address it. In some cases, the % Addressed is greater than the # of Resource Concerns. This occurs when two or more activities occur to address a singular concern. For example, with the *Fuel Storage Tanks*, a LEQA technician may have searched for technical and financial assistance for the producer and recorded that activity. At a later date, the LEQA technician may have developed plans for the location of a new fuel storage containment area. In this case, two activities were applied toward the one resource concern. Regardless of how many activities are applied to the concern, the producer is not credited with the improvement until the farm operation meets the Water Quality Assurance scores. The intentions of tracking this data are to determine if progress is being made toward the WQA and to account for the LEQA Certification Assistance funds.

F. Federal and State Funding Sources for LEQA

A major benefit of the LEQA program is to identifying resources of concern that may be addressed with federal and state conservation programs. Table 5.6 lists eight types of activities and practices that cost-sharing programs were applied for, the quantity of each that were requested, the source of the funds whether they are federal and/or state, the average cost of the practice and the total request. As noted, \$2.25 million of applications were submitted for the 105 farms that were assessed. Of the \$2.25 million in requests, approximately 80% was for the federal EQIP program. These 98 conservation practices and the subsequent applications were generated from the list of 728 resource concerns summarized by category in Table 5.4.

Table 5.5 Summary of Resource Concerns and Improvement Activities Applied			
Farm and Community	Resource Concerns	# of Activities	% Addressed
Waterbodies	14	3	21%
Complaint Management	55	37	67%
Habitat Suitability	21	12	57%
Community Image	16	16	100%
Community Involvement	20	7	35%
Good Neighbor Policy	38	21	55%
Subtotal	164	96	59%
Farmstead	Resource Concerns	# of Activities	% Addressed
Petroleum Management	63	32	51%
Pesticide Management	37	24	65%
Well and Wellhead	24	21	88%
Fuel Storage Tanks	7	8	114%
Hazardous Materials	10	12	120%
Materials Recycling	27	20	74%
Subtotal	168	117	70%
Livestock Facilities	Resource Concerns	# of Activities	% Addressed
Manure Handling	14	5	36%
Manure Storage	30	28	93%
Feed Storage Areas	5	5	100%
Air and Odor	4	4	100%
Wastewater/Milkhouse	9	5	56%
Water Diversions	13	7	54%
Mortality Management	6	6	100%
Open Lot Run-off	34	14	41%
Subtotal	115	74	64%
Field and Pastures	Resource Concerns	# of Activities	% Addressed
Soil Management	67	29	43%
Pasture	15	12	80%
Nutrient Management	78	74	95%
Land Application	16	10	63%
Record Keeping	64	42	66%
Pest Management	1	2	200%
Surface Water	20	9	45%
Ground Water	1	0	0%
Air and Odor	2	0	0%
Subtotal	264	178	67%
Forests and Wooded Areas	Resource Concerns	# of Activities	% Addressed
Shelterbelt Management	2	1	50%
Livestock	9	5	56%
Fencing	2	2	100%
Stewardship Plans	4	1	25%
Subtotal	17	9	53%
All LEQA Farm Units	Resource Concerns	# of Activities	% Addressed
Total	728	474	65%

Conservation Practice	Quantity	Source		Average Request Cost	Total
		Fed/EQIP	State		
Well Sealing	3		x	2,500	7,500
Pest management plan	11	x		1,933	21,267
Nutrient Management Plan	25	x		1,150	28,750
Comprehensive NMP	12	x		2,775	33,300
Gully/erosion	3		x	7,500	22,500
Manure Storage Facility	22	x	x	89,222	1,962,889
Open Lot Improvements	19		x	7,200	136,800
Milkhouse/Wastewater	3		x	12,000	36,000
Total	98				\$2,249,006

G. Certification Walkthroughs for WQA

Eight of the 105 farms assessed received certification assistance and met the LEQA Water Quality Assurance standards during the 18-month program period. Essentially, the Certification Walkthrough is same process as the Initial Assessment with the confidence and expectations that all the farm management units meet the LEQA WQA standards. The CW is conducted by the LEQA technician on the farm operation with the owner/operator and if necessary, with the County Feedlot Officer. In all cases, the LEQA technician defers to the CFO on the operation meeting state's feedlot regulations. Table 5.7 lists the type of operations (animal AU/type and acres), the watershed location, the number of Environmentally Sensitive Areas and the WQA scores.

Farm ID	Animal Type & AU's			Acres Total	Watershed HUC-8 Name	ESA #	Water Quality Assurance			
	Dairy	Beef	CowC				F-WB	FS-SG	Fdt Y/N	FP-SWETw
3131	116			154	Sauk River	6	3.8	3.9	Y	72
4079	174			320	Cannon River	4	4.0	3.7	Y	98
4091	256			473	Cannon River	9	3.6	3.6	Y	90
4092		86		432	Cannon River	6	4.0	3.8	Y	106
6103	169			274	Cannon River	3	4.0	3.6	Y	75
6104	74		10	374	Zumbro River	2	4.0	3.9	Y	105
6127	752	53		906	Zumbro River	6	3.8	4.0	Y	102
6128	134	24		1026	Zumbro River	5	4.0	4.0	Y	99

H. Annual Confirmation

An annual confirmation process was included in the LEQA program to keep the program "fresh" in the minds of the producer, provide continuity of the farm and watershed data and to maintain the value of the WQA for the producer and stakeholders. Since farm acres, cropping systems, animal units and other aspects are subject to change, the annual confirmation addresses any changes and confirms or adjusts the WQA scores. The same LEQA template (as with all LEQA Activities) is used for the annual confirmation with the activity identified as shown in Table 2.1 Data Tracking Process for WQA.

I. LEQA WQA Audits

The intention of the LEQA program is to audit 10% of those farms each year that achieve or maintain WQA status. Audits were conducted by Ag Resource Strategies, LLC. In future efforts, it is recommended that the local and/or state government conduct the audit to ensure full-circle government-to-government accounting.

VI. Analysis of Water Quality Improvement and Reasonable Assurance

As mentioned in Section II : Key Challenges for Providing “Reasonable Assurance”, non-point source pollution and benefits of on-farm management can not be directly measured due to human, scientific, physical and financial limitations. Due to this, the LEQA program relies on indices, spreadsheets and similar scoring mechanisms to account for improvements. The improvements are tracked at two levels: a practice-based level and at an outcome-based level with each having its unique value to the overall process. This dual accounting package allows the LEQA technician to communicate to producers and others where their efforts are being spent, it lets the producer know how progress is being made toward the Clean Water Legacy goals and it integrates the practice-based approach of government programs with the outcome-based needs of the legislation.

A. Practice-based Accounting

At the practice-based level, activities and their potential water quality improvements are accounted for by recording activities for items within the assessment template and if those activities improved that specific score.

B. Outcome-based Accounting

Applying conservation practices within the context of a unique farm operation generates a specific outcome and a specific water quality score. A SWETw scoring system (USDA Soil & Water Eligibility Tool for water) is one of the four scoring systems used for the LEQA WQA. Table 6.1 lists practices that are credited by the SWETw and the corresponding scores given under Groundwater and Surface Water categories. The scoring range of the *SWETw* system is from 0 ~ 130. As each of the practices or activities are applied the *SWETw* score increases. For example, if and the producer was fall applying nitrogen fertilizer with the *SWETw* score of 61, they could then adopt a split application of nitrogen practice after the crop was planted and receive six additional points (as listed in the *SWETw* Summary Table 6.3) resulting in a score of 67.

C. Water Quality Improvements on LEQA Assessed Farms

Of the 105 farms assessed, 94 received certification assistance to improve the water quality outcomes. Table 6.2 is a partial list (10 of 105) showing the individual farms scores, if any improvements occurred and the farm management unit that those improvements were made. The table is divided into 4 sections (Waterbodies, Farmstead, Livestock Facility and Fields & Pasture) and each of these sections includes the Initial Assessment (IA) score, the score resulting from the application of Certification Assistance (CA) and the change in the score (if applicable). The bottom two lines of the table show the aggregate improvements of those ten farms. This table could also be constructed on a watershed basis, by farm type or numerous other variations to determine progress.

Table 6.1 Summary of SWETw Scoring Potential by Practice and Activities							
Activity or Practice	Water Resource Improvement						
	Groundwater			Surface Water			
	Pesticide	Nitrogen	Phosphorus	Pesticides	Nitrogen	Phosphorus	Sediment
Control Sheet Erosion				1	1	1	3
Apply structural practices				2	1	3	3
Grass Buffer > 20 feet		1		3	2	2	3
Crop Input set-back > 33 feet	1	1	2	2	1	2	
Low-level IPM	1			1			
Mid-level IPM	2			3			
High-level IPM	3			3			
Soil Testing < 3 years		2	2		2	2	
Manure/Fert App with yld goals		3			3		
P & N credits		3	2		3	1	
No P applications on high tests			2			3	
Incorporate P w/in 24 hrs						2	
N App w/in 30 days of planting		1			1		
N App after planting		2			2		
N App – split applications		3			3		

Table 6.2 Water Quality Rating Improvement on Individual Farm Operations													
ID	Waterbodies			Farmstead			Feedlot			Fields and Pasture			
	IA	CA	^	IA	CA	^	IA	CA	^	IA	CA	^	% ^
3190	2.0	2.5	0.5	3.1	3.1	0.0	N	N		65	65	0.0	0%
3192	3.0	3.0	0.0	3.2	3.2	0.0	Y	Y		53	65	12.0	23%
3203	3.8	3.8	0.0	3.4	3.4	0.0	N	Y	Y	83	83	0.0	0%
3204	3.6	3.6	0.0	3.5	3.5	0.0	N	N		42	72	30.0	71%
6103	3.0	4.0	1.0	3.5	3.5	0.0	Y	Y		99	99	0.0	0%
6104	3.5	4.0	0.5	3.3	3.9	0.6	Y	Y		85	105.4	20.4	24%
6105	3.0	3.0	0.0	3.8	3.8	0.0	Y	Y		59	75	16.0	27%
6127	3.8	3.8	0.0	3.7	3.8	0.1	Y	Y		102	102	0.0	0%
6128	4.0	4.0	0.0	3.8	4.0	0.2	Y	Y		99	99	0.0	0%
6129	4.0	4.0	0.0	3.6	3.6	0.0	Y	Y		60	68	8.0	13%
Ave	3.4	3.6	0.1	3.5	3.6	0.1				74.7	83.3	8.6	16%
Totals							7	8	1				

D. Water Quality Assurance on the LEQA-Certified Farms

Of the 105 farms assessed, eight received the Water Quality Assurance rating. Water Quality Assurance is earned when the producer meets the LEQA WQA standards in each of the four farm management areas related to water quality. The WQA continues each year under an Annual Confirmation process that is subject to an audit and recorded using the format described in Table 2.1.

E. Analysis on the Ability to Provide Reasonable Assurance

Determining the means to provide “reasonable assurance” that a unique area of land with countless of diffuse sources of pollution and clean water meets the broad water goals of a watershed or state is open to much interpretation. In addition to determining the means, some of the process and procedures are also subject to professional judgments. This is a dynamic scenario that presumably will always exist within the context of non-point source pollution and agriculture activity.

It is only through appreciation of this scenario and the broad spectrum of stakeholder capacity that a positive report on developing “reasonable assurance” can be made. It is in the opinion of the report’s author that the legislative directive to develop a process that provides livestock producers a means to provide “reasonable assurance” was accomplished through the combination of a thorough on-farm assessment, a numerical scoring system and a shared governance model. In this light, reasonable assurance is constructed with management-based measurement systems that are supported by conservation and agricultural professionals with oversight by private and public stakeholders.

VII. Watershed-based Assessments and Intelligence

Since the LEQA assessments include farm acres and the USGS HUC-8 watershed, the data can be compiled by watershed and analyzed from several perspectives. Table 7.1 places the LEQA assessments within the context of the watershed characteristics of farms, acres and animal units. Watershed data was collected from the USDA NRCS Rapid Watershed Assessment websites and compared to LEQA assessment data. Using this format, progress can be tracked by how many farms are assessed and the water quality improvements.

Table 7.1 LEQA Water Quality Assessment Data by HUC-8 Watershed

Watershed Stats*				LEQA Farm Assessments*						Assessment Findings				
*Data from NRCS Rapid Watershed Assmt				*Data collected by LEQA Technicians						Water body	Farmstead	Feedlot Pass	WQ score	WQ range
HUC-8 Name	# Farms	# Acres	#AUs	# Farms	Acres	AU	% Farms	% Acres	% AU					
Buffalo-Whitewater	2430	886,448	89,201	32	14,123	11,293	1.3%	1.6%	12.7%	3.1	3.8	90%	55	36-94
Platte-Spunk	1919	652,677	99,405	23	10,290	21,227	1.2%	1.6%	21.4%	3.1	3.4	83%	66	60-98
Sauk	2164	667,214	86,157	19	4,827	3,794	0.9%	0.7%	4.4%	3.5	3.6	37%	62	43-84
Root	3027	1,064,961	134,717	8	3,299	4,864	0.3%	0.3%	3.6%	1.1	3.8	100%	64	49-94
Elk-Nokasippi	1455	1,079,950	49,810	6	3,314	8,136	0.4%	0.3%	16.3%	3.2	3.1	83%	73	68-89
Zumbro	2730	910,468	101,013	5	3,369	1,583	0.2%	0.4%	1.6%	2.8	3.6	100%	94	75-102
Cannon	3172	941,143	327,675	4	1,499	719	0.1%	0.2%	0.2%	3.7	3.4	75%	99	90-106
Clearwater-Elk	2250	717,785	53,288	3	5,841	1,548	0.1%	0.8%	2.9%	3.2	3.3	100%	79	61-93
Rush-Vermillion	2421	709,411	53,587	1	215	222	0.0%	0.0%	0.4%	3.0	3.5	100%	62	62
LaCrosse	1343	439,597	48,222	2	470	649	0.1%	0.1%	1.3%	4.0	3.8	100%	64	57-70
Eastern Wild Rice	1168	1,042,078	86,150	1	80	1,222	0.1%	0.0%	1.4%	N/A	3.7	100%	N/A	N/A
Crow - North Fork	2864	949,107	96,452	1	22	137	0.0%	0.0%	0.1%	N/A	3.5	0%	47	47
Totals	26,943	10,060,839	1,225,677	105	47529	55213	0.4%	0.5%	4.5%					

For example, HUC-8 watershed, Platte-Spunk contains 1919 farms, 652,677 acres and 99,405 animal units with small percentages addressed by the LEQA program to date (1.2% farms, 1.6% acres and 21.4% animal units). Taking this data analysis one step further, one could calculate that of the 10,290 acres assessed, 6700 acres (65%) of those acres meet the WQA standards. If this concept and process is applied beyond the current LEQA program limitations, one can calculate that a shared governance approach could assess a significant percentage of farms, acres and animal units. For example, 105 farm containing ~ 48,000 acres were assessed for \$200,000, or about \$2000 each and just a little more than \$4/acre. If an investment of \$1 million were made one could extrapolate that 500 farms and 250,000 acres could be assessed. A magnitude higher and the costs go up to \$10 million, 5,000 farms and 2.5 million acres. At this higher level, statistically significant areas of land could be assessed and land management data and water monitoring data could be correlated. This so-called “watershed intelligence” is a new concept and application for agriculture and the state of Minnesota.

VIII. Discussion and Recommendations

The LEQA II program adopted several of the recommendations from the LEQA I program (2007-09) report with success. The rearrangement of the LEQA I assessment toward farm management units rather than natural resource components helped the producer integrate natural resource management with their livestock operation production activities. This rearrangement created a land-use and acre-based assessment with data that can be compiled at the farm and watershed scale. The adoption of management indices and similar measurement methods for the Water Quality Assurance portion reduced the data management complexity and burden. These changes addressed the major logistical issues of the LEQA I program related to data collection and management.

These adjustments presented the opportunity to apply a shared governance model to expand and shift the center of governance to include a broader stakeholder group. Expanding the pool of governance stakeholders allows agriculture to carry a more meaningful role in water quality issues, but does not diminish the roles of the traditional governance stakeholders. It does allow government organizations to refocus their efforts to address the stress of reduced budgets and staff. It also provides a new avenue for agricultural producers, industry and non-profits to apply their expertise where warranted.

The following recommendations are made within the context of implementing a LEQA III program that would be based on the findings that the LEQA II project met the legislative intentions to develop a process to provide “reasonable assurance” through a shared governance model.

A. Showcase the Shared Governance Model

Apply the LEQA shared governance model so a closer analysis from a broader stakeholder groups such as the state’s interagency group, Clean Water Council, and Environmental Initiative’s collaboration of agriculture, environmental and government entities.

B. Coordinate Assessment and Assurance Tools with the Discovery Farms

The Discovery Farms in Minnesota and the Midwest are implementing land management strategies and discovering the potential effects. Of course, the challenges of “measuring” non-point water quality, whether that water quality is polluted or clean, will remain a variable in all research. It is recommended that a closer partnership with Discovery Farms in Minnesota and other states is developed so that a greater understanding of how farm management strategies improve water quality coincides with the LEQA-approved standards and protocols.

C. Increase Value of Assessment Component

The whole farm assessment process was a valuable component in the earlier days of the conservation delivery system because it helped organize the producers, USDA and SWCD efforts. Today the direct benefits of the assessment lie with the USDA NRCS, SWCD, agriculture producer, agronomist and watershed managers. In a shared government approach, each of these benefactors would contribute as well as receive assessment data to advance their efforts. By sharing assessment data in a way that does not increase the risk or discomfort of the producer, but adds value to all stakeholders, the costs to conduct the assessments can be shared as well.

D. Maintain Certification Assistance

The Certification Assistance component consists of providing the producer with up to 20 hours of technical assistance to begin implementing the resource management plan. Supporting these first steps for the producer and providing the guidance toward implementing the plan is an effective catalyst to improve the operation's water quality management and get the producer on track to meet the state's water quality goals.

E. Increase the Value of "Clean Water Legacy" Assurance Component

While many stakeholders have specific tasks and responsibilities, the ultimate goal of all stakeholders that participate in Minnesota's effort to improve the state's agricultural derived waters is for all farms in Minnesota to be managed in manner that shed clean water. By applying value to this ultimate outcome, stakeholders can adjust and align their activities to be rewarded for their efforts that assist producers to obtain "Clean Water Legacy" assurance. Essentially, placing value on the outcome is equivalent to creating a clean water "market signal", a precursor to a market-based system.

F. Discuss the Connection between Shared Value and Shared Governance

Much like the government sector, the corporate sector is also moving toward "sustainability" goals and seeking a means to define it. The corporate strategy is to apply surrogate measurements, such as management indices and similar scoring mechanisms as the LEQA program. Since Minnesota is home to several major food processors that are progressively moving toward defining sustainable outcomes, it would not be premature to discuss the feasibility to integrate shared governance and shared value efforts.

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