

Final Report

Rathbun Lake Special Project:
BMPs for Priority Land in
Targeted Sub-Watersheds 2009
9018-011

2010 - 2014

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FINANCIAL ACCOUNTABILITY

Expenditure of watershed improvement funds and total project funds

Iowa Watershed Improvement Review Board (WIRB) financial support enabled the Rathbun Land and Water Alliance to make significant progress toward accomplishment of planned goals for the *Rathbun Lake Special Project: BMPs for Priority Land in Targeted Sub-Watersheds 2009*. Specifically, WIRB funding helped the Alliance and its partners, including cooperating landowners, install best management practices (BMPs) in the Lower Chariton Creek, Chariton River #3, Sandy Branch, Hamilton Creek, and Goodwater Creek targeted sub-watersheds of the Rathbun Lake watershed that will achieve 87% of the project's priority land treatment goal. Even more importantly, these BMPs will result in a substantial reduction in the estimated annual sediment and phosphorus delivery from this land to Rathbun Lake and the lake's tributaries (98% and 130% of project objectives respectively).

The Alliance expended Watershed Improvement Funds for project activities in accordance with the grant agreement as amended. Please refer to the Summary of Watershed Improvement Funds Approved, Expended, and Balance in Table 1. A complete financial ledger for the term of the grant agreement accompanies this report.

Grant Agreement Budget Line Item	Total Funds Approved (\$)	Total Funds Approved - Amended (\$)	Total Funds Expended (\$)	Available Funds (\$) ^a
Technical Assistance	23,400.00	580.00	573.80	6.20
Terraces	129,000.00	219,185.75	176,276.28	42,909.47
Structures (debris basins)	250,000.00	123,706.00	74,183.33	49,522.67
Grade Stabilization Structures	51,200.00	51,200.00	47,542.41	3,657.59
Water and Sediment Control Basins	29,250.00	57,600.00	28,654.60	28,945.40
Grassed Waterways	2,950.00	3,714.00	3,714.30	(0.30)
Priority Land Conversion	6,000.00	6,000.00	0.00	6,000.00
Totals	491,800.00	461,985.75	330,944.72	131,041.03
Difference				131,041.03

^a The Alliance, partners, and landowners expend close to 72% of the available Watershed Improvement Funds. Factors which led to the expenditure of less funds than available were the need for a longer project period which would allow landowners more time to complete the installation of planned practices and the relatively low percentage contribution (18%) of Watershed Improvement Funds proposed in the original application and budget.

ENVIRONMENTAL ACCOUNTABILITY

Water quality improvement practices applied and results achieved

The Alliance and its partners, with financial support from the Iowa WIRB, assisted landowners to apply BMPs for priority land in the Lower Chariton Creek, Chariton River #3, Sandy Branch, Hamilton Creek, and Goodwater Creek targeted sub-watersheds of the Rathbun Lake watershed. The original project goal was to assist landowners to apply BMPs for 4,000 acres, at least 2,000 acres of which would be priority land. These BMPs applied would reduce the annual amounts of sediment and phosphorus that are carried in runoff from priority land and impair water quality in the lake and its tributaries by 6,000 tons and 20,000 pounds respectively. Table 3 presents a summary of the BMPs planned and applied.

Practice or Activity and Units	Approved Application Goal	Amended Application Goal	Planned Practices and Activities	Percent Planned	Completed Practices and Activities	Percent Completion
Terraces (ft.)	190,270	227,150	231,220	102	154,500	68
Structure – Debris Basin (no.)	10	4	5	125	2	50
Grade Stabilization Structures (no.)	35	35	16	46	15	43
Water and Sediment Control Basins (no.)	130	160	122	76	122	76
Grassed Waterways (ac.)	10	10	5	50	4	40
Priority Land Conversaion (ac.)	80	80	113	141	0	0
Technical Assistance (hr.) ^b	1,560	38	38	100	38	100

^a The need for a longer project period for landowners to complete BMP application and landowner preference for in-field practices to support row crop production were the primary factors that resulted in fewer units of practices being installed than planned. As mentioned, partners will continue to assist landowners to apply BMPs in the targeted sub-watersheds beyond the end of this agreement's project period.

^b Technical assistance in addition to that provided by project partners was not required to the extent originally planned.

ENVIRONMENTAL ACCOUNTABILITY contd.

The BMPs installed and supporting activities completed resulted in the treatment of more than 2,950 acres, of which close to 1,740 acres were priority land. The practices will reduce the delivery of sediment and phosphorus to Rathbun Lake and tributaries in the lake's watershed by an estimated 5,890 tons and 25,900 pounds per year respectively. Table 4 presents a summary of planned and achieved land treatment and water quality benefits.

Table 4 Summary of Land Treatment and Water Quality Benefits						
Land Treatment, Water Quality Benefit, and Units	Approved Application Goal	Amended Application Goal	Based on Planned Practices	Percent Based on Planned	Based on Completed Practices	Percent Based on Completed
Total Land Treated with BMPs (ac.)	4,000	4,000	4,250	106	2,950	74
Priority Land Treated with BMPs (ac.)	2,000	2,000	2,510	126	1,740	87
Reduced Annual Sediment Delivery (tn.)	6,000	6,000	6,375	106	5,890	98
Reduced Annual Phosphorus Delivery (lb.)	20,000	20,000	21,250	106	25,900	130

Mention should be made of the following factors that influenced the implementation of project activities and the achievement of project goals:

Effective Targeting of BMPs: As indicated, the Alliance and its partners, including cooperating landowners, made significant progress toward the accomplishment of project goals for land treatment and water quality benefits. Noteworthy is the substantial reduction in sediment and phosphorus delivery achieved with less than anticipated BMP application in terms of practice units installed and acres treated. These levels of water quality benefits realized reflect the impact of project activities carried out by staff and landowners which targeted the installation of BMPs for areas of priority land with relatively high rates of annual sediment and phosphorus delivery to Rathbun Lake and the lake's tributaries.

Impact of Project Length: The Alliance and partners found that proposed goals for BMP installation and land treatment were aggressive for the five-year project period. As mentioned, the Alliance and its other partners will continue to work with landowners on the planned application of BMPs for priority land in the five targeted sub-watersheds beyond the end of this grant agreement's project period. The Alliance will also continue to track and report progress in applying BMPs and the associated reduction in sediment and phosphorus delivery to Rathbun Lake. The Alliance can make these reports of future project accomplishments available to the Iowa WIRB.

ENVIRONMENTAL ACCOUNTABILITY contd.

Landowner BMP Preference: Relatively high prices for corn and soybeans in recent years have influenced BMP decisions by landowners in the Rathbun Lake watershed. Landowners have demonstrated a strong preference for in-field BMPs that support row crop production, i.e., terraces, as opposed to practices that may reduce row crop acres or support alternative land uses, i.e., debris basins, grade stabilization structures, and priority land conversion. As such, landowners in the targeted sub-watersheds worked primarily with project staff to apply BMPs such as terraces and were less interested in other practices that they did not consider directly supportive of row crop production.

Increased Costs of BMPs: The cost of constructing structural practices such as terraces, grade stabilization structures, and water and sediment control basins increased significantly during the five-year project period. As an example, the construction cost for terraces, the BMP most commonly applied by landowners, increased by more than 30% during this period from an average of \$5.50 per foot to as much as \$7.25 per foot. Increased costs can limit landowners' ability to finance their portion of BMP installation and result in fewer practices that can be applied with a given amount of financial support from other project partners.

Geographic information system (GIS) generated maps of the Lower Chariton Creek, Chariton River #3, Sandy Branch, Hamilton Creek, and Goodwater Creek targeted sub-watersheds accompany this report. These maps present the results of GIS analysis performed to identify priority land. The maps also illustrate the locations of BMPs that have been planned and applied for priority land. In addition, the maps present the results of GIS analysis that evaluated the water quality benefits associated with BMPs applied in each of the targeted sub-watersheds, that is, the estimated reductions in annual sediment and phosphorus delivery to Rathbun Lake and its tributaries.

The Alliance and partners carried out water quality monitoring activities in Rathbun Lake and the lake's tributaries as planned during the project period. The program consisted of monthly and event sample collection from as many as 20 sites and analyses for sediment, nutrients, bacteria, and pesticides. Monitoring results are used to help identify water bodies in the Rathbun Lake watershed on Iowa's Section 303(d) List of Impaired Waters and to assess water bodies in the watershed as part of Iowa's 305(b) Water Quality Report. The monitoring program is an ongoing effort that will continue after the end of the project period. The Alliance and partners will continue to use monitoring results to assess water quality conditions in Rathbun Lake and its tributaries as well as to plan BMP application and evaluate, to the extent possible, the effectiveness of practices to protect and improve water quality.

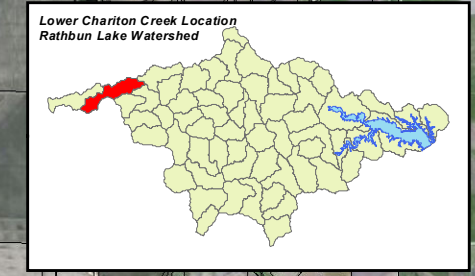
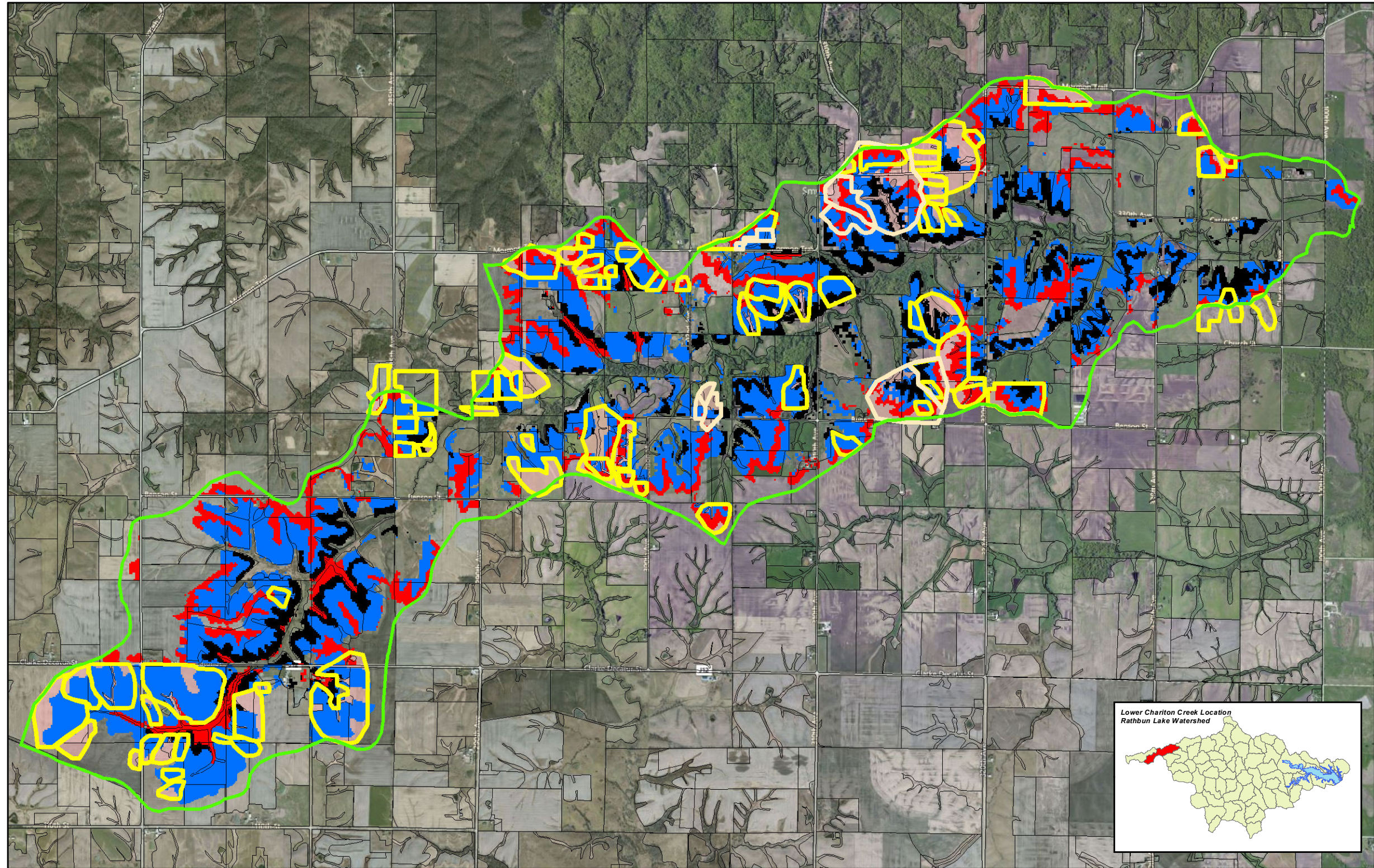
PROGRAM ACCOUNTABILITY

Activities to support the application of water quality improvement practices

Alliance members and partners completed the following activities in support of the application of BMPs for priority land in the Lower Chariton Creek, Chariton River #3, Sandy Branch, Hamilton Creek, and Goodwater Creek targeted sub-watersheds and the achievement of associated reductions in annual sediment and phosphorus delivery to Rathbun Lake and the lake's tributaries:

- Assembled a team of expert advisors and field staff with Alliance members and partner organizations who were responsible for planning, implementing, and assessing the completion and impact of project activities;
- Developed and utilized a GIS-based methodology to identify the location of priority land in the targeted sub-watersheds, plan and track the application of BMPs, and estimate the water quality benefits associated with these practices;
- Provided one-on-one, on-farm, technical assistance to landowners who own and/or farm priority land in the targeted sub-watersheds which helped them evaluate, plan, and apply BMPs for this land;
- Completed activities of the *Rathbun Lake Protectors* watershed outreach program which included: (a) recognized landowners for their BMP application efforts as *Rathbun Lake Protectors* at the Alliance's annual *Protect Rathbun Lake* meetings; (b) coordinated interviews with landowners recognized as *Rathbun Lake Protectors* on WHO radio's daily farm show; (c) wrote feature articles that were published in *Wallaces Farmer* about landowners selected as *Rathbun Lake Protectors*; (d) installed and maintained *Rathbun Lake Protectors* on-farm signs and *Protect Rathbun Lake* roadside signs; (e) developed, exhibited, and presented project related displays and information at local and state events; (f) prepared and distributed a quarterly newsletter to Alliance members and partners; and (g) maintained the Alliance's Internet site at <http://www.rlwa.org/> .
- Alliance's board of directors, partner representatives, and project team members regularly reviewed progress in the implementation of project activities and accomplishment of project goals. The Alliance prepared and submitted the required project plan of work, narrative reports, and financial ledgers.

Lower Chariton Creek Sub-Watershed Priority Land Work



Legend	
	Watershed Boundary
Project Work Areas	
Status	
	Completed
	Planned
	Field Boundaries
Priority	
	No Priority
	Priority
	High Priority
	Highest Priority
	Associate Priority

	Applied CY14	Applied Cumulative (FFY04-14)
Gross Erosion Before	646.0	4898.3 Tons/yr.
Gross Erosion After	299.0	3140.0 Tons/yr.
Gross Erosion Reduction	347.0	1758.3 Tons/yr.
Sediment Delivery Before	272.0	2261.0 Tons/yr.
Sediment Delivery After	14.0	142.0 Tons/yr.
Sediment Delivery Reduction	258.0	2119.0 Tons/yr.
Phosphorus Delivery Before	1496.0	12429.1 lbs/year
Phosphorus Delivery After	77.0	779.4 lbs/year
Phosphorus Delivery Reduction	1419.0	11649.7 lbs/year
Total Acres Benefitted	141.0	1102.1 acres
Priority Acres Benefitted	70	709 acres

Watershed Statistics (Completed + Planned)

Size: 7,150 Acres

Priority Acres: 2,020 Acres

Acres Benefiting: 1,372 Acres

Priority Acres Benefiting: 883 Acres

Approx. Sediment Del. Before Projects (Watershed): 8,938 Tons

Approx. Sediment Del. After Projects (Watershed): 7,077 Tons

Approx. Sediment Del. Reduction (Watershed): 2,738 Tons

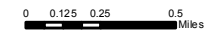
Average Sediment Del. Reduction Per Acre: 2.00 T/Acre/Year

Approximate Phosphorus Del. Before Projects (Watershed): 49,186 Lbs.

Approximate Phosphorus Del. After Projects (Watershed): 34,119 Lbs.

Approximate Phosphorus Del. Reduction (Watershed): 15,067 Lbs.

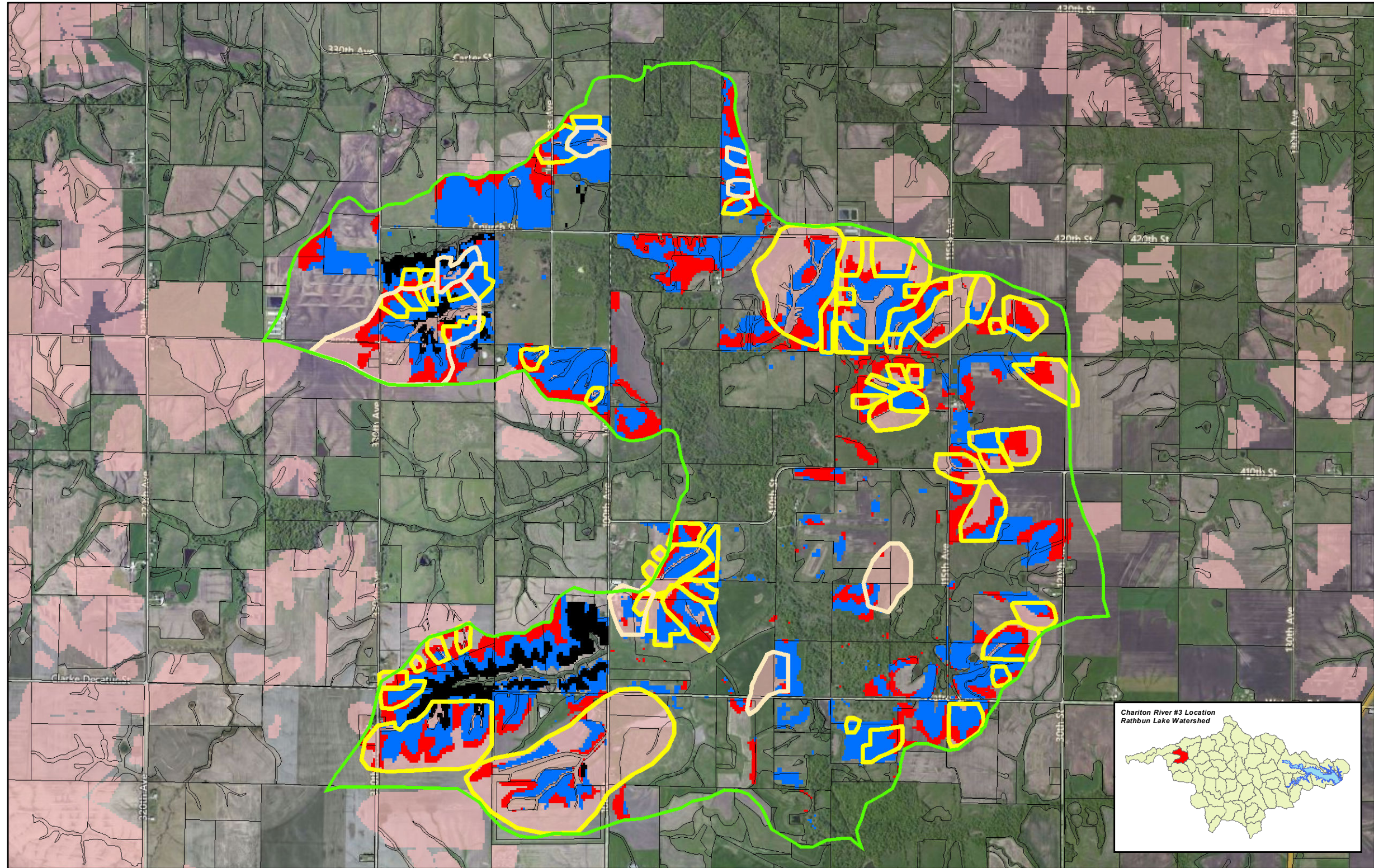
Average Phosphorus Del. Reduction Per Acre: 10.98 Lbs./Acre



Source: Rathbun Land and Water Alliance
IDALS DSC
Bing Maps
USDA FSA

Prepared By: Tyler J. Jacobsen, Rathbun Regional Water Association

Chariton River #3 Sub-Watershed Priority Land Work



Legend	
—	Watershed Boundary
Project Work Areas	
	Completed
	Planned
Status	
	Field Boundaries
	No Priority
	Priority
	High Priority
	Highest Priority
	Associate Priority

Gross Erosion Before	110.0	3275.2 Tons/yr.
Gross Erosion After	40.0	2101.2 Tons/yr.
Gross Erosion Reduction	70.0	1174.0 Tons/yr.
Sediment Delivery Before	51.0	1605.0 Tons/yr.
Sediment Delivery After	1.0	159.0 Tons/yr.
Sediment Delivery Reduction	50.0	1446.0 Tons/yr.
Phosphorus Delivery Before	280.5	6131.1 lbs/year
Phosphorus Delivery After	5.5	601.5 lbs/year
Phosphorus Delivery Reduction	275.0	5529.6 lbs/year
Total Acres Benefited	20.0	910.1 acres
Priority Acres Benefited	19	466 acres

Watershed Statistics (Completed + Planned)

Size: 4,473 Acres

Priority Acres: 1,104 Acres

Acres Benefiting: 1,050 Acres

Priority Acres Benefiting: 502 Acres

Approx. Sediment Del. Before Projects (Watershed): 6,218 Tons

Approx. Sediment Del. After Projects (Watershed): 4,483 Tons

Approx. Sediment Del. Reduction (Watershed): 1,735 Tons

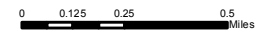
Average Sediment Del. Reduction Per Acre: 1.65 T/Acre/Year

Approximate Phosphorus Del. Before Projects (Watershed): 23,392 Lbs.

Approximate Phosphorus Del. After Projects (Watershed): 16,865 Lbs.

Approximate Phosphorus Del. Reduction (Watershed): 6,527 Lbs.

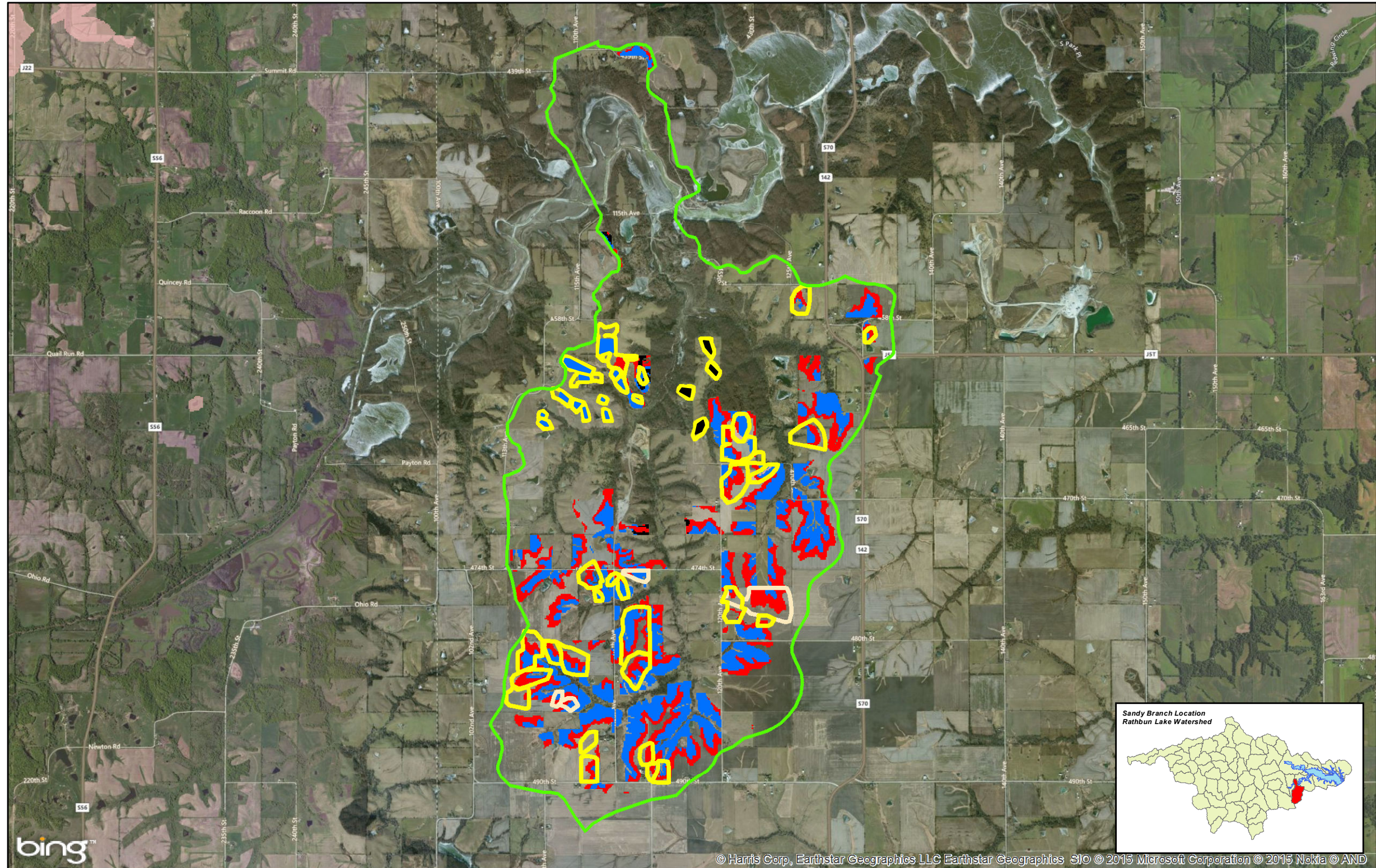
Average Phosphorus Del. Reduction Per Acre: 6.22 Lbs./Acre



Source: Rathbun Land and Water Alliance
IDALS DSC
Bing Maps
USDA FSA

Prepared By: Tyler J. Jacobsen, Rathbun Regional Water Association

Sandy Branch Sub-Watershed Priority Land Work



Legend

- Watershed Boundary
- Project Work Areas Status**
 - Completed
 - Planned
 - No Priority
 - Priority
 - High Priority
 - Highest Priority
 - Associate Priority

	Applied CY14	Applied Cumulative (FFY04-14)
Gross Erosion Before	218.0	2086.4 Tons/yr.
Gross Erosion After	107.0	1060.0 Tons/yr.
Gross Erosion Reduction	111.0	1026.4 Tons/yr.
Sediment Delivery Before	90.0	961.0 Tons/yr.
Sediment Delivery After	4.0	48.0 Tons/yr.
Sediment Delivery Reduction	86.0	913.0 Tons/yr.
Phosphorus Delivery Before	314.1	3338.9 lbs/year
Phosphorus Delivery After	13.9	166.5 lbs/year
Phosphorus Delivery Reduction	300.2	3172.4 lbs/year
Total Acres Benefited	47.7	453.3 acres
Priority Acres Benefited	21	221 acres

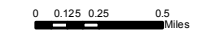
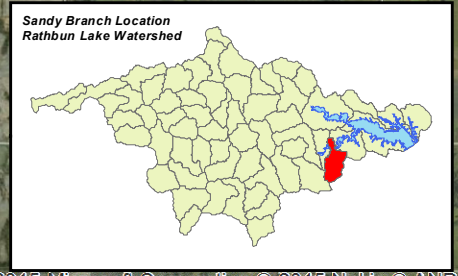
Watershed Statistics (Completed + Planned)

Size: 5,722 Acres
Priority Acres: 778 Acres
Acres Benefiting: 510 Acres
Priority Acres Benefiting: 246 Acres

Approx. Sediment Del. Before Projects (Watershed): 5,607 Tons
Approx. Sediment Del. After Projects (Watershed): 4,608 Tons

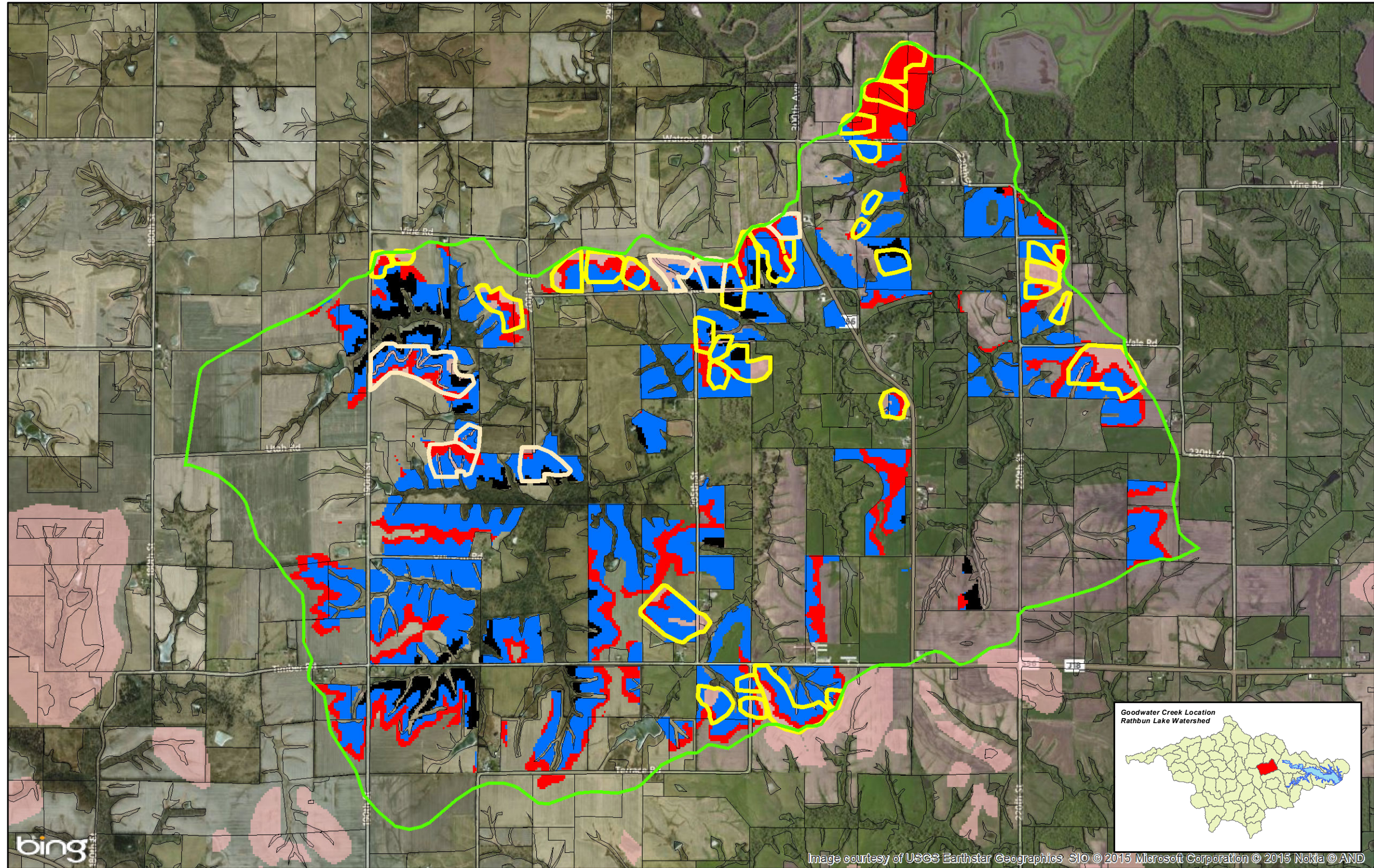
Approx. Sediment Del. Reduction (Watershed): 999 Tons
Average Sediment Del. Reduction Per Acre: 1.96 T/Acre/Year

Approximate Phosphorus Del. Before Projects (Watershed): 19,580 Lbs.
Approximate Phosphorus Del. After Projects (Watershed): 16,091 Lbs.
Approximate Phosphorus Del. Reduction (Watershed): 3,489 Lbs.
Average Phosphorus Del. Reduction Per Acre: 6.84 Lbs./Acre



Source: Rathbun Land and Water Alliance
 IDALS DSC
 Bing Maps
 USDA FSA
 Prepared By: Tyler J. Jacobsen, Rathbun Regional Water Association

Goodwater Creek Sub-Watershed Priority Land Work



Legend	
	Watershed Boundary
Project Work Areas	
Status	
	Completed
	Planned
	Field Boundaries
	No Priority
	Priority
	High Priority
	Highest Priority
	Associate Priority

	Applied CY14	Applied Cumulative (FFY04-14)
Gross Erosion Before	0.0	1696.4 Tons/yr.
Gross Erosion After	0.0	1002.0 Tons/yr.
Gross Erosion Reduction	0.0	694.4 Tons/yr.
Sediment Delivery Before	0.0	823.0 Tons/yr.
Sediment Delivery After	0.0	48.0 Tons/yr.
Sediment Delivery Reduction	0.0	775.0 Tons/yr.
Phosphorus Delivery Before	0.0	3621.2 lbs/year
Phosphorus Delivery After	0.0	211.2 lbs/year
Phosphorus Delivery Reduction	0.0	3410.0 lbs/year
Total Acres Benefited	0.0	340.4 acres
Priority Acres Benefited	0	256 acres

Watershed Statistics (Completed + Planned)

Size: 6,160 Acres

Priority Acres: 1,644 Acres

Acres Benefiting: 457 Acres

Priority Acres Benefiting: 345 Acres

Approx. Sediment Del. Before Projects (Watershed): 7,515 Tons

Approx. Sediment Del. After Projects (Watershed): 6,566 Tons

Approx. Sediment Del. Reduction (Watershed): 949 Tons

Average Sediment Del. Reduction Per Acre: 2.07 T/Acre/Year

Approximate Phosphorus Del. Before Projects (Watershed): 33,376 Lbs.

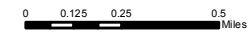
Approximate Phosphorus Del. After Projects (Watershed): 29,161 Lbs.

Approximate Phosphorus Del. Reduction (Watershed): 4,215 Lbs.

Average Phosphorus Del. Reduction Per Acre: 9.22 Lbs./Acre



Image courtesy of USGS Earthstar Geographics SIO © 2015 Microsoft Corporation © 2015 Nokia © AND



Source: Rathbun Land and Water Alliance
IDALS DSC
Bing Maps
USDA FSA

Prepared By: Tyler J. Jacobsen, Rathbun Regional Water Association