

ACPF in Big Creek Watershed

1. Using the ACPF, can fields with significant biophysical vulnerabilities be identified, spatially prioritized, and treated with conservation practices to meet the Iowa Nutrient Reduction Strategy goal of 41% reduction of nonpoint source nitrogen pollution in surface waters?
2. What are the economic costs of installing recommended conservation practices, and where do opportunities and tradeoffs in vulnerability and cost exist in the watershed?

Upper Big Creek Watershed

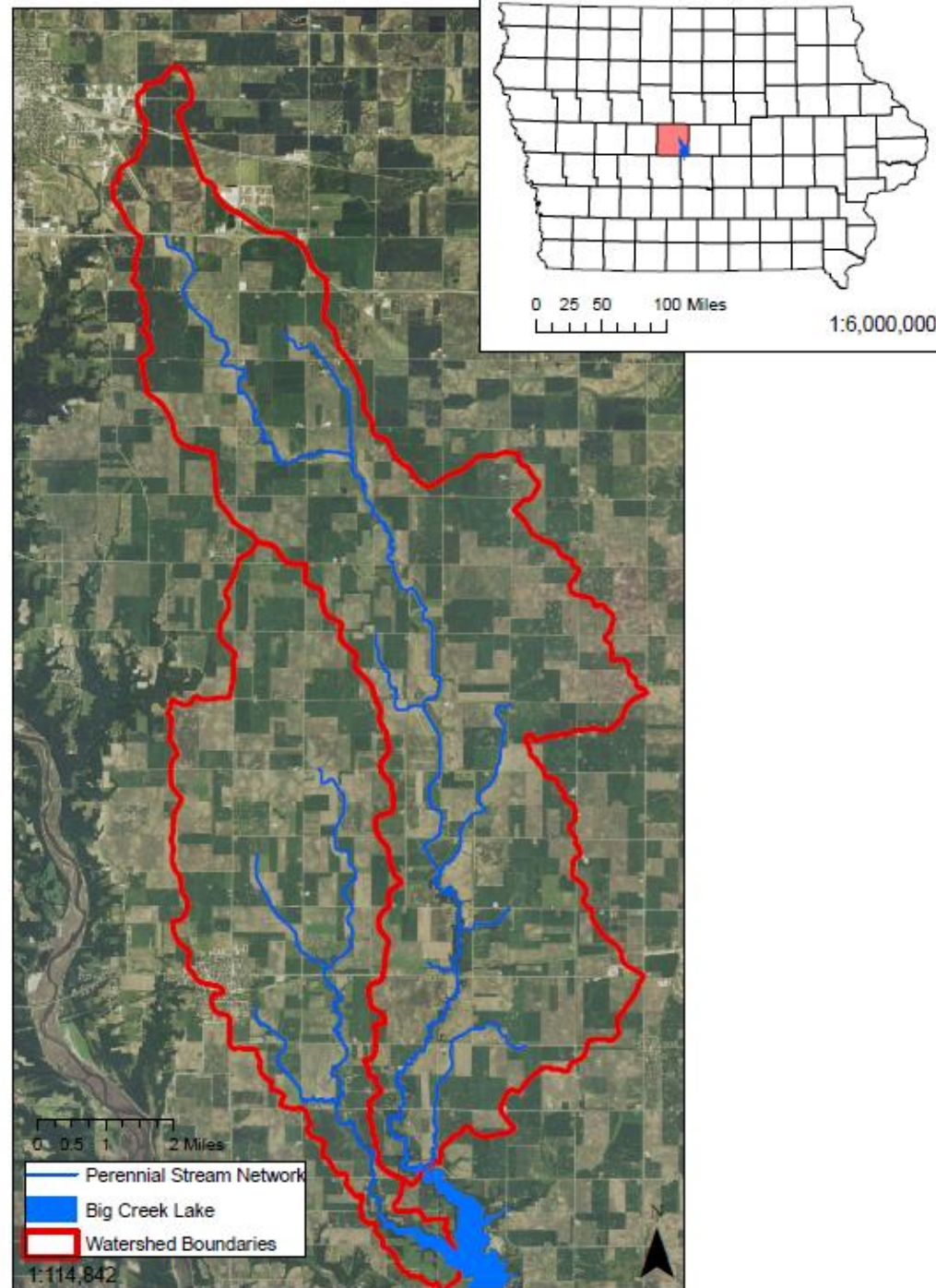
Size: 48,000 acres

Dominant land use: +80% row-crop corn and soybeans

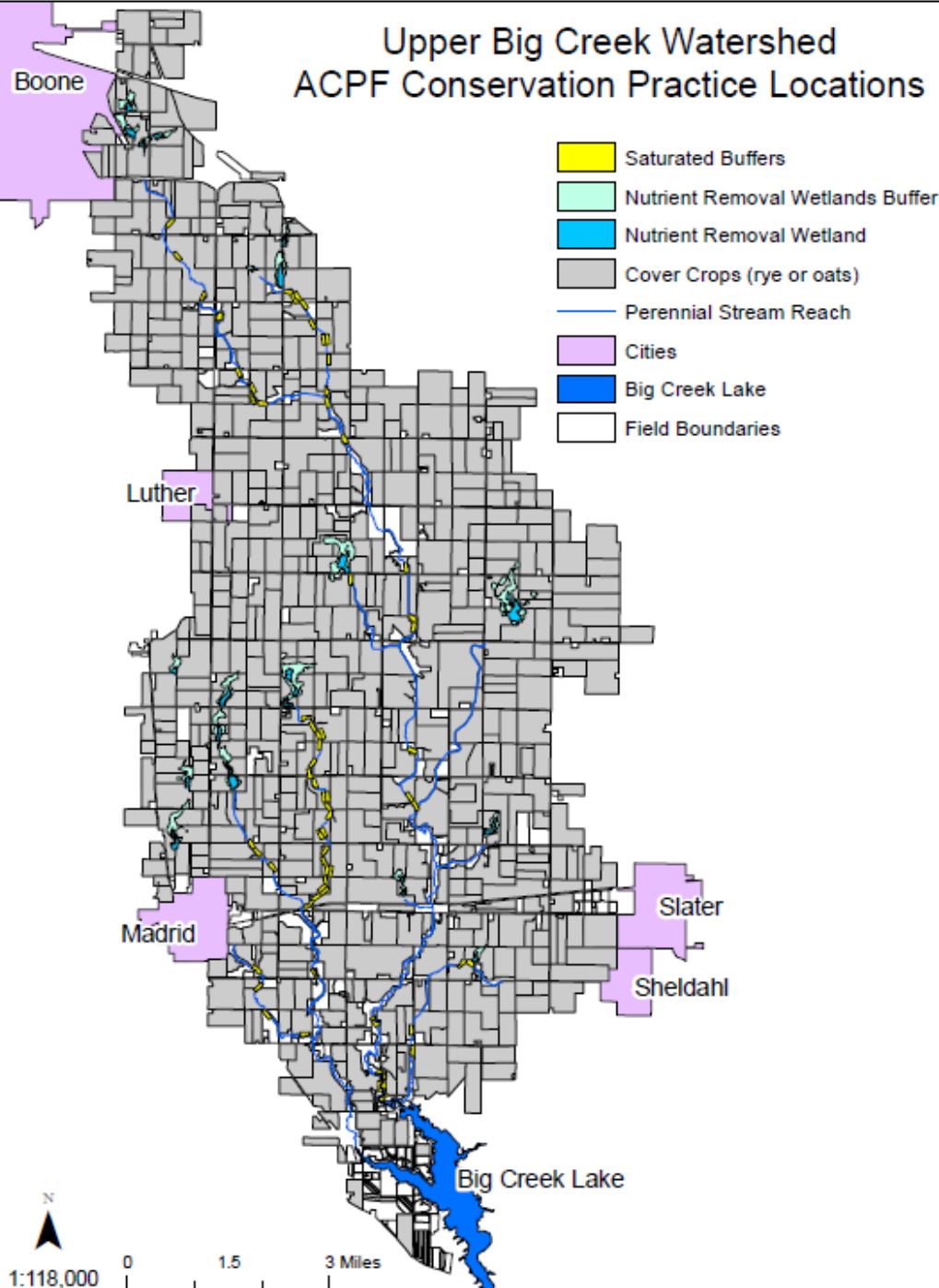
Outlet: Big Creek Lake (Big Creek Lake State Park)

Big Creek Lake: 730,000 visitors per year (Otto et al. 2012).

Listed on the U.S. EPA 303(d) list due to water quality impairments (i.e., nonpoint source nutrient, sediment, & *E. coli*) that originate in upper watersheds.



Upper Big Creek Watershed ACPF Conservation Practice Locations



Design Specifics:

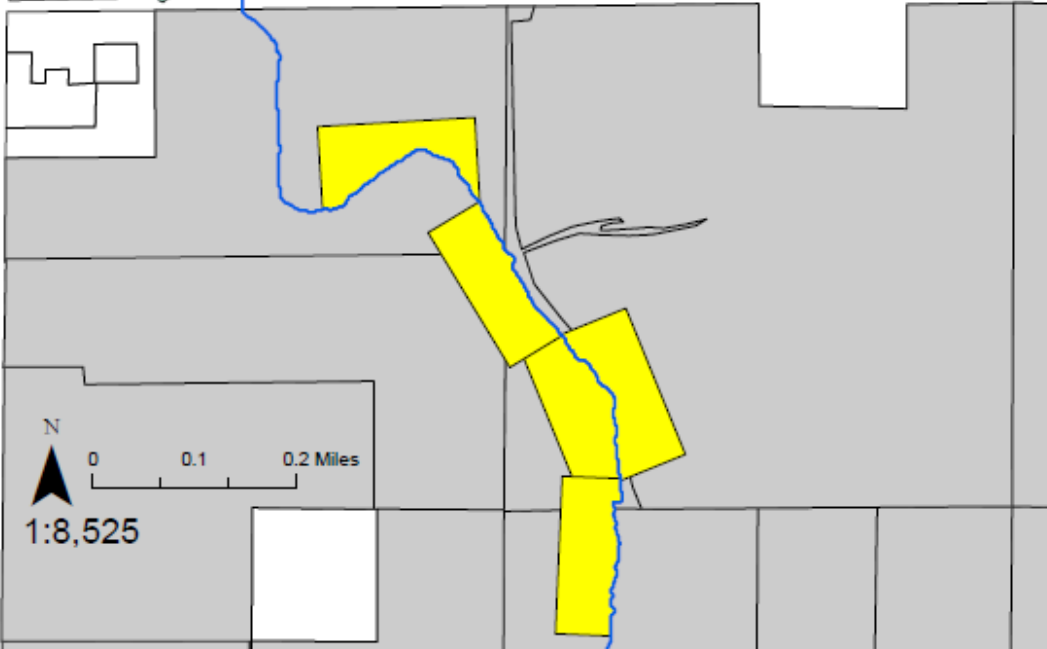
20 wetland complexes, located in upper watershed. Selected specifically for low wetland area to drainage area ratio (LT 3%). Removal of 703 acres (LT 2% of watershed) from cultivation. Treatment of GT 20,000 acres.

45,000 acres cover crops, located on all acres growing corn or soybeans. No land removed from cultivation.

66 saturated buffers, extending 12.9 miles of stream reach. Removal of 256 acres from cultivation (LT 1% of watershed). Treatment of 950+ acres.

Upper Big Creek Watershed ACPF Conservation Practice Locations

-  Saturated Buffers
-  Nutrient Removal Wetlands Buffer
-  Nutrient Removal Wetland
-  Cover Crops (rye or oats)
-  Field Boundaries
-  Perennial Stream Reach



Question 1:

Best Management Practice	Estimated N Reduction Efficiency	Big Creek Watershed
Wetlands	50%	X
Cover Crops	30%	X
Saturated Buffers	90%	X
Land Removed from Cultivation		959 acres (LT 2%)
Estimated N Reduction		48%

Question 2:

Wetlands (20 wetlands, 703 acres) –

- Installation cost: $\$9,963 \times 703 \text{ acres} = \text{\$6.8 million}$
- Annual cost: $\$890 \times 703 = \text{\$625,670}$

Cover Crops (45,000 acres) –

- Annual cost: $\$62/\text{acre} \times 45,000 \text{ acres} = \text{\$2.8 million}$

Saturated Buffers (66 saturated buffers, 256 acres) –

- Installation cost: $\$206/\text{per acre} \times 256 \text{ acres} = \text{\$52,736 (+)}$
- Annual cost: (Riparian buffers), $\$455/\text{per acre} \times 256 \text{ acres} = \text{\$116,480 (+)}$

Installation Costs: \\$6.85 million

Annual Costs: \\$3.54 million

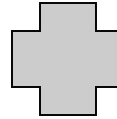
For comparison, in 2014, Iowa spent \$234,947,835 on conservation payments.

Biophysical Vulnerability

Nitrate Leaching Risk

Runoff Risk

	H	M	L
H	High	Medium	Low
M	Medium	Low	Very Low
L	Low	Very Low	Very Low



Opportunity Cost (Rental Rates)

Fields categorized as high, medium, and low cost using CSR ratings from SSURGO data.

Biophysical Vulnerability (Runoff and Nitrate Leaching Risk)

Opportunity Costs
(Rental Rates)

	H	M	L
H	Low	Medium	High
M	Medium	Low	Medium
L	High	Medium	Low

Questions?

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