IOWA'S LOW HANGING FRUIT

STREAM BUFFER RULE = CLEANER WATER, LITTLE COST

ENVIRONMENTAL WORKING GROUP

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The Environmental Working Group is the nation's most effective environmental health research and advocacy organization. Our mission is to conduct original, game-changing research that inspires people, businesses and governments to take action to protect human health and the environment. With your help – and with the help of hundreds of organizations with whom we partner – we are creating a healthier and cleaner environment for the next generation and beyond.

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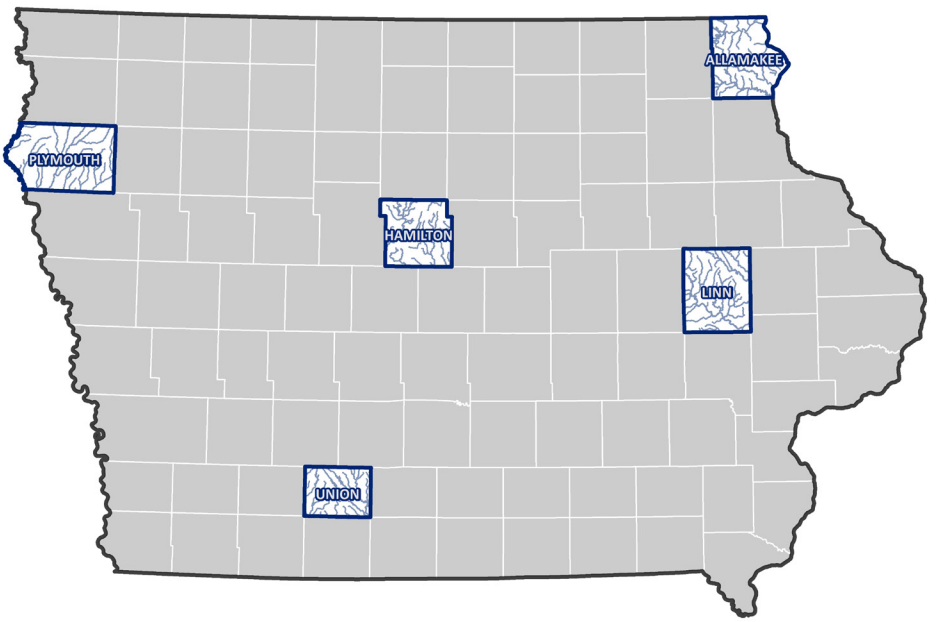
EXECUTIVE SUMMARY

A study of five representative Iowa counties shows that requiring simple buffer zones between crop fields and streams could get two-thirds of the way to the state's goal for reducing phosphorus pollution and one-fifth of the way to the nitrogen pollution target, while affecting only a tiny proportion of landowners and a vanishingly small percentage of row-crop acreage.

The 2013 Iowa Nutrient Reduction Strategy committed the state to an ambitious goal of reducing phosphorus pollution from so-called nonpoint sources – mostly farm operations – by 29 percent, and nitrogen pollution by 41 percent. The science assessment that accompanied the strategy concluded that the simple step of putting 35-foot-wide grass strips between waterways and adjacent cropland could cut phosphorus runoff by 18 percent and nitrogen pollution by 7 percent.

Environmental Working Group used high-resolution aerial photography to assess the impact on Iowa's farms of implementing streamside buffer standards of varying widths – 35 feet, 50 feet or 75 feet. EWG picked five counties – Allamakee, Hamilton, Linn, Plymouth and Union – that represent Iowa's major landscape regions and reflect the wide county-to-county range in how much land is devoted to row crops.

The analysis showed that requiring a 50-foot buffer would affect only 11 percent of the landowners in those five counties – ranging from 8 percent in Linn County to 15 percent in Plymouth County. Moreover, only 0.12 percent of the corn and soybean row crop acreage would have to be replaced by permanent



See what we found on our interactive county map

vegetation to meet a 50-foot requirement. Fully 71 percent of the affected landowners would only have to convert an acre or less to meet that standard.

To EWG, that sounds like very low hanging fruit. Planting narrow strips of grass between cropland and waterways – without compensation – doesn't seem too much to ask of landowners, given the substantial public support they receive. Neighboring Minnesota already has a progressive zoning ordinance requiring 50-foot streamside buffers between crop fields and public waterways.

Can't Iowa do as well?

The prospect of enacting a streamside buffer standard raises the most important policy issue facing Iowans tired of dirty water: What's fair to expect landowners to do at their own cost as part of the responsibilities that come with the rights of ownership?

Landowners are expected to be good citizens – to fence their cattle out of their neighbors' land, control noxious weeds before they spread to others' fields and make sure that their herbicide sprays don't damage nearby crops. Why shouldn't there be a similar standard of care to protect those who live downstream? It is unfair and bad policy to expect taxpayers to foot the bill for everything that farm operations need to do to clean up Iowa's streams and rivers.

It is time to define a basic standard of care that agricultural landowners should be expected to meet. It should focus on those activities, such as planting crops too close to waterways, that cause a disproportionate share of the region's water pollution and for which simple and effective solutions are readily available.

A streamside buffer standard fits those criteria perfectly. If Iowa is serious about cleaning up its waterways, a streamside buffer standard of at least 50 feet would be an excellent way to start. Counties could take the initiative even in the absence of state action.

HOW BROWN COUNTY, WISC. TOOK THE INITIATIVE

In the mid- to late 1980s, it became apparent that livestock were polluting waterways and destroying rivers and streams in Brown County, Wisc. In response, the county took the initiative to require landowners to manage their livestock's access to streams. Landowners were required to maintain a fenced, 16.5 feet-wide (one rod) streamside buffer zone. Livestock were allowed to enter streams to cross or drink, but only if adequate conservation measures were taken to harden stream banks and bottoms in order to limit the damage.

In addition, the county inventoried and assessed streamside buffers along its navigable waters, which created a solid baseline of conditions across the county.

In 1991, in response to the inventory, the county revised its Shoreland and Floodplain ordinance to require a permanent 35-foot vegetative buffer (grass or hay) on all agricultural land adjacent to navigable waters. Since the ordinance went into effect, about 300 miles of permanent vegetation have been established.

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INTRODUCTION

Water quality in Iowa is notoriously poor and is not getting any cleaner. The primary cause is fertilizer and manure that runs off farm operations. This polluted runoff overloads waterways with nitrogen and phosphorus and sets off a cascade of harms that threaten human health and often make fishing, swimming or paddling in streams and rivers a very unpleasant experience, especially in summer.

Moreover, the polluted runoff from farm operations in Iowa and other farm belt states eventually reaches the Gulf of Mexico, where every summer it helps to trigger the infamous Dead Zone where marine life cannot survive.

In 2008, a consortium of federal and state agencies produced the Gulf Hypoxia Action Plan that called on the 12 states bordering the Mississippi River to develop strategies to reduce nutrient pollution in order to shrink the size of the Dead Zone. In May 2013, Iowa responded with its Nutrient Reduction Strategy, which seeks to cut nitrogen pollution from nonpoint sources – mostly farm operations – by 41 percent and phosphorus pollution by 29 percent. The accompanying science assessment evaluated the effectiveness of various measures that could stem polluted runoff.

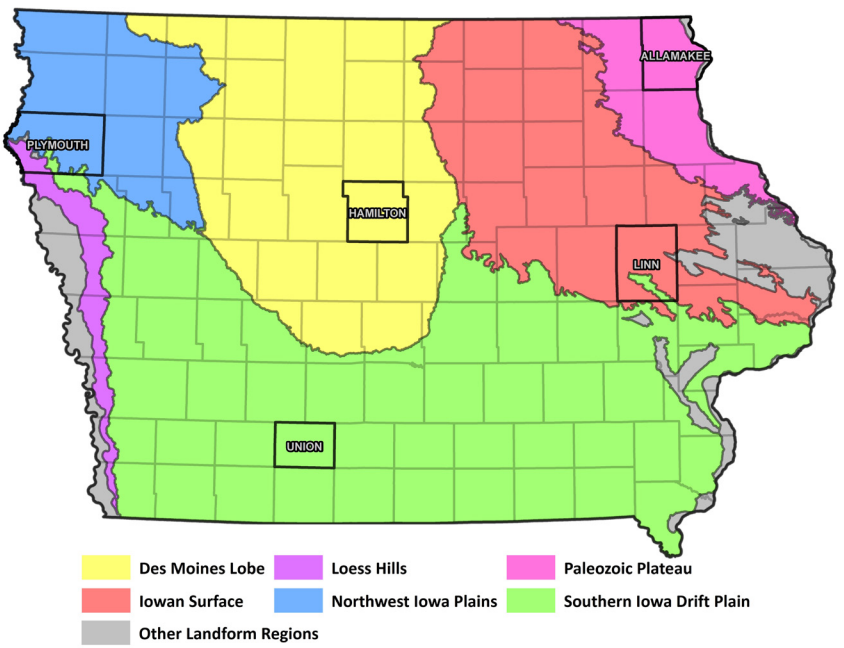
The science assessment reported that putting 35-foot wide grass strips between Iowa's waterways and adjacent cropland could cut phosphorus runoff by 18 percent and nitrogen pollution by 7 percent. By itself, this simple practice – called streamside buffers – would get the state almost two-thirds of the way toward the goal for cutting phosphorus pollution. It would also get nearly a fifth of the way toward the nitrogen pollution goal. Streamside buffers would also reduce the sediment that clogs Iowa's waterways as well as create new wildlife habitat.

EWG analyzed five Iowa counties – using high-resolution aerial photography and geographic information systems – to see just how many landowners would be affected by a streamside buffer standard and how many acres of grass strips would be needed to create buffers 35-, 50- or 75-feet wide.

THE FIVE COUNTIES

Rather than take on the task of assessing every waterway in Iowa, EWG picked five counties – Allamakee, Hamilton, Linn, Plymouth and Union – chosen to reflect each of Iowa's five major landscape regions (Figure 1).

FIGURE 1
THE FIVE COUNTIES ARE IN EACH OF IOWA'S MAJOR LANDSCAPE REGIONS.



We also selected these counties so as to reflect the wide county-to-county range in the percentage of land devoted to row crops (Table 1). For example, Hamilton County, in the center of the Des Moines Lobe landform, is almost entirely cultivated, while farming is far less prevalent in Allamakee County in northeast Iowa's Paleozoic Plateau because of the region's karst topography.

EWG limited its assessment to named waterways in the US Geological Survey's National Hydrography Dataset (NHD) in order to focus as much as possible on perennial waterways. Of the total of 1,742 stream miles across the five counties (Table 1), 81 percent are perennial, 15 percent are intermittent and 4 percent are ditches. For intermittent streams and ditches, we limited our assessment to those segments that have defined beds and banks.

STREAMSIDE BUFFERS

The five counties vary greatly in the acreage of streamside buffers currently in place along the waterways EWG assessed. In Allamakee County, 90 percent of the streamside buffer acreage needed to meet a 35-foot standard is already in place. Those acres represent 72 percent of the area needed to meet even a 75-foot standard. At the other end of the spectrum, in Plymouth County only 52 percent of the buffering acres needed to meet a 35-foot standard are present; they amount to just 34 percent the acreage needed to meet a 75-foot standard (Figure 2).

Interestingly, Hamilton County has the greatest concentration of cropland yet is in nearly as good shape as Allamakee County, which has the lowest. This is good news. Large amounts of cropland don't necessarily mean poor streamside buffering.

Merely measuring the percentage of streamside acres in place for each possible buffer standard, however, obscures the huge differences among stream segments. Even in Allamakee County, for example, several stream segments do not currently meet the 35-foot standard. The situation in Plymouth County is especially grave. There existing streamside buffers don't meet the 35-foot standard at any point along the stream segments EWG assessed. Overall, along the 160 unique streams and river segments EWG analyzed, 13 percent of the adjacent agricultural land had an adequate vegetative buffer strip of 35 feet, 8 percent had 50 feet completely buffered and 6 percent had 75-foot buffers (Table 2). On the flip side, 1 percent of streams and rivers fell more than 75 percent short of the acreage needed to meet a 35-foot standard, 4 percent were that far short of meeting a 50-foot requirement and 11 percent were that far from meeting a 75-foot standard.

Even between adjacent fields there are big differences in how well streams are protected. Often streamside buffers appear and disappear at property lines (Figure 3).

TABLE 1: COUNTY CHARACTERISTICS

County	Percent of Land in Row Crops	Stream Miles Assessed	Number of Streams Assessed
Hamilton	>80%	280	30
Plymouth	>70%	400	28
Union	>60%	270	24
Linn	>50%	430	40
Allamakee	>20%	362	38

FIGURE 2: COUNTIES VARIED IN THE AMOUNT OF STREAMSIDE BUFFER ACRES ALREADY IN PLACE

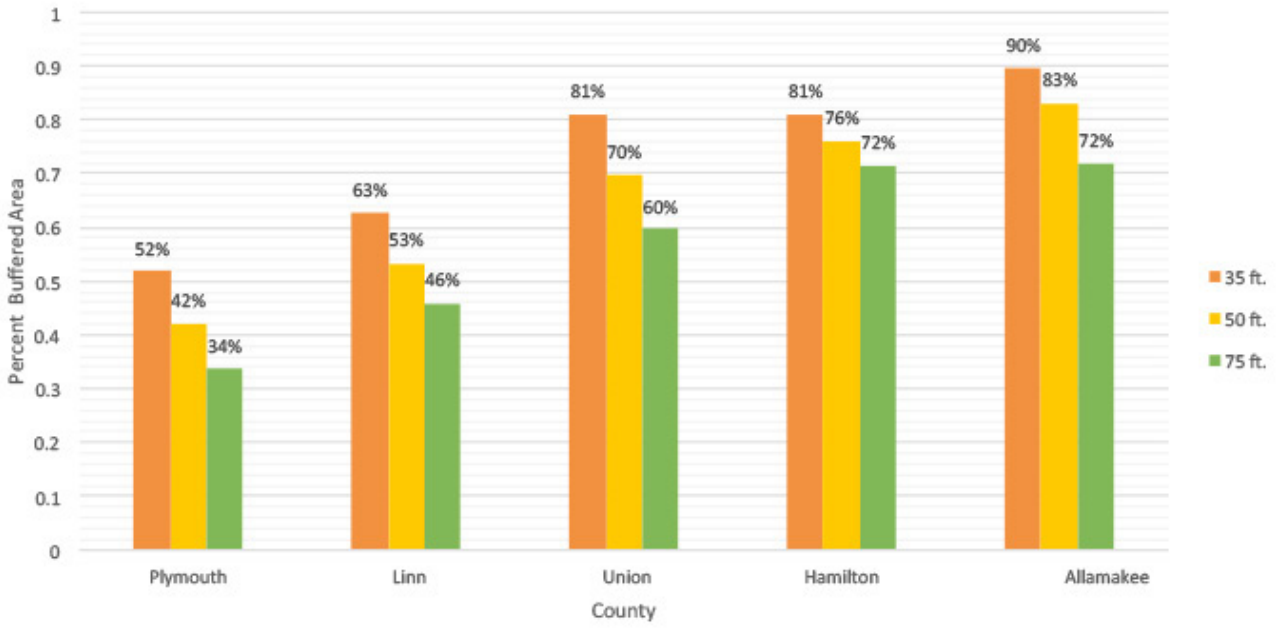


TABLE 2. PERCENT OF RIVER/STREAM SEGMENTS MEETING STANDARDS*

Segment	35 ft.	50 ft.	75 ft.
Completely Buffered	13%	8%	6%
75-99% buffered	46%	36%	26%
50-74% buffered	23%	31%	30%
25-49% buffered	17%	22%	28%
1-25% buffered	1%	4%	11%

* Columns don't add up to 100 percent because of rounding.

FIGURE 3: BIG DIFFERENCES BETWEEN STREAMSIDE BUFFERS ON ADJACENT FIELDS.

Visit the sites below to see for yourself by county below.

Allamakee County (tinyurl.com/q6hq3ny)
Hamilton County (tinyurl.com/pdjxf8m)
Linn County (tinyurl.com/pq7bzfw)
Plymouth County (tinyurl.com/pq4nxrt)
Union County (tinyurl.com/omy38eu)

CONVERTING A TINY FRACTION OF CROP ACRES WOULD MEET STANDARDS

In all five counties, the number of acres that would have to be planted with grass to comply with a streamside buffer standard is a vanishingly small percentage of the acreage currently planted with corn and soybeans (Table 3). The percent of corn and soybean acres needed to meet the 35-foot standard ranges from 0.03 percent in Allamakee, Hamilton, Linn and Union counties to 0.08 percent in Plymouth County. That amounts to a miniscule 565 acres of row crops that would need to be planted with grass across all five counties – 0.05 percent of all corn and soybean acres. Remarkably, even a 50-foot buffer standard would require less than 1,500 acres in total across all five counties – 0.12 percent of the land planted with row crops.

In Hamilton County, meeting even the 75-foot streamside buffer standard would require converting only 0.15 percent of corn and soybean acres to grass. Meeting that standard in Plymouth County – the county that lacks the most streamside buffers – would take out only 0.45 percent of row crop acres. Meeting the 75-foot standard in all five counties would require 3,522 acres – 0.29 percent of the total corn and soybean acreage.

MOST LANDOWNERS WOULD NOT BE AFFECTED

Meeting streamside buffer standards for all the waterways EWG assessed would affect only a small percentage of landowners in the five counties. Even implementing a 75-foot standard would affect only 13 percent of landowners (Table 4). Meeting a 35-foot standard would affect only 8 percent.

Of course, a buffer standard would affect a larger percentage of those landowners who actually own cropland adjacent to streams and rivers, ranging from 34 percent to meet a 35-foot standard to 56 percent

TABLE 3: VERY FEW ACRES OF CORN & SOY WOULD NEED TO BE PLANTED WITH GRASS.

County	2013 corn and soy acres*	Acres Needed to Meet Standard			Percent of Total Corn and Soy Acres Needed to Meet Standard		
		35-foot	50-foot	75-foot	35-foot	50-foot	75-foot
Allamakee	89,502	23	79	288	0.03%	0.09%	0.32%
Hamilton	301,683	81	164	457	0.03%	0.05%	0.15%
Linn	245,438	72	183	455	0.03%	0.07%	0.19%
Plymouth	402,304	338	793	1,813	0.08%	0.20%	0.45%
Union	179,103	51	212	509	0.03%	0.12%	0.28%
Grand Total	1,218,028	565	1,430	3,522	0.05%	0.12%	0.29%

*Corn and Soy totals derived from the USDA 2013 cropland data layer

to meet a 75-foot standard. Far more Plymouth County streamside landowners would be affected, reflecting the poor state of current streamside buffers in that county.

Even more striking, fully 85 percent of all affected landowners across all five counties would need to convert only an acre or less of cropland to meet the 35-foot standard (Table 5). Converting a single acre or less would enable 71 percent of landowners to meet a 50-foot standard and 54 percent to meet a 75-foot requirement. The average landowner in EWG's analysis controlled more than 125 acres.

CONCLUSION

EWG's assessment of streamside buffers in this five-county sample shows that enacting and implementing a streamside buffer standard would be a simple but very effective way to make significant progress toward meeting the goals of the Iowa Nutrient Reduction Strategy. A streamside buffer standard would put Iowa on course to finally clean up its far too dirty rivers and streams.

Moreover, a streamside buffer standard would require converting a vanishingly small number of acres to grass strips in the counties assessed. Individual landowners' investment of land would be very small as well. The vast majority of landowners wouldn't be affected at all.

Enacting a streamside buffer standard poses the most important policy issue facing Iowans who are tired of dirty water – what is fair to expect landowners to do at their own cost as part of the responsibilities that come with ownership.

If Iowa is serious about cleaning up its water, a streamside buffer standard of at least 50 feet would be an excellent place to start. Even in the absence of state action, Iowa counties could take the initiative to protect their waterways on their own (see Executive Summary).

TABLE 4: PERCENT OF LANDOWNERS AFFECTED BY EACH POSSIBLE STANDARD

County	Percent of all landowners affected			Percent of landowners with cropland along streams affected		
	35-foot	50-foot	75-foot	35-foot	50-foot	75-foot
Plymouth	13%	15%	17%	67%	77%	86%
Linn	6%	8%	10%	22%	33%	42%
Hamilton	6%	8%	10%	27%	36%	46%
Union	9%	13%	16%	31%	45%	57%
Allamakee	4%	8%	11%	18%	35%	45%
Total	8%	11%	13%	34%	46%	56%

TABLE 5. PERCENTAGE OF UNIQUE OWNERS WHO COULD MEET EACH STANDARD BY CONVERTING A GIVEN NUMBER OF ACRES

Additional Streamside Buffer Acres Needed to Meet Each Standard	35 ft.	50 ft.	75 ft.
0.01-0.25 acres	56%	43%	27%
0.26-0.5 acres	13%	14%	13%
0.51-1 acres	16%	14%	14%
1.01-2 acres	10%	15%	14%
2.01-3 acres	3%	7%	10%
3.01-4 acres	1%	3%	7%
4.01-5 acres	0%	2%	4%
more than 5 acres	0%	2%	10%

APPENDIX METHODOLOGY

Delineating the Waterway

The USGS National Hydrography Dataset flow lines were used to identify surface water for the five Iowa counties. The data was filtered to show only features with a proper name (GNIS Name) in an effort to reduce the amount of ephemeral waterways assessed. The remaining flow lines were used as a guide for heads-up digitization of the shorelines based on recent (2007, 2009, 2010) high-resolution aerial photography. Computer-modeled identification of the surface water was also deployed using the same imagery. To be considered in the analysis the digitized surface water must have maintained an established bed and bank visible on the 2013 imagery, to filter out all ephemeral waterways.

Agricultural Streamside Buffers

After a representative footprint of all named waterways was defined, streamside buffer zones of 35, 50 and 75 feet were mapped. USDA Common Land Unit data were used to isolate only the buffers on land classified as agricultural. These areas were then assessed for the presence of vegetation using the Normalized Difference Vegetation Index, a product developed from the aerial photography. Every mile of assessed shoreline with a streamside buffer segment that didn't meet the various standards was manually checked against 2013 imagery. Segments with streamside buffers narrower than the standards were also cross-tabulated with trout streams, highly erodible land tracts and impaired waterways to generate summary statistics.

Landowner Assessment

The most recent land ownership GIS data (2014) were purchased from each the five counties. These data were all reclassified to identify parcels classified as "agricultural" and aggregated by unique landowner. Those parcels were then cross-tabulated with the EWG-assessed waterways and buffer areas to provide summary statistics by landowner and land classification.

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