ILLINOIS
NUTRIENT LOSS
REDUCTION STRATEGY

Nutrient loss reduction:

Using science to find the right practices for your field

IWRC ILLINOIS WATER RESOURCES CENTER

UNIVERSITY OF ILLINOIS EXTENSION

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

Illinois Department of Agriculture

Nutrient loss and water quality

Every year, more than 400 million pounds of nitrate-nitrogen and around 38 million pounds of total phosphorus from Illinois fields, city streets, factories, and wastewater treatment plants flow into the Mississippi River. When these nutrients reach the Gulf of Mexico, they jump-start algal growth, creating massive blooms that consume oxygen when they decompose each summer. The result is a hypoxic zone roughly the size of Connecticut that is all but devoid of aquatic life. Illinois is one of the largest contributors to this "dead zone."

Algal blooms and high nutrient concentrations here at home also lower property values, hinder recreation, threaten public health, and require utilities to install costly drinking water treatment technologies.

While no single practice will be suitable for every acre in Illinois, every single acre needs at least one new practice.

Illinois' strategy

The Illinois Nutrient Loss Reduction Strategy outlines a suite of required and recommended practices for sewage districts and municipalities and recommended practices for the agricultural industry. Finalized in 2015, the strategy builds on existing state and industry programs and aligns with the results of a comprehensive science assessment of current nutrient loads and cost-effective nutrient loss reduction options. Combined practices are expected to cut phosphorus and nitrogen loading to rivers by 45 percent. Illinois is one of 12 states in the Mississippi River Basin implementing nutrient loss reduction plans.

Agricultural practices

The challenge for those working in agriculture is to adopt the nutrient loss reduction practices appropriate to their operations and to demonstrate that strategy goals can be met with voluntary action without regulation. Fortunately, the science assessment at the heart of the Illinois Nutrient Loss Reduction Strategy provides guidance on where and when practices will yield the highest cost efficiencies.

Practice effectiveness and cost

In–field management practices **Edge–of–field structural practices** **Land use changes**

Nitrogen loss reduction practices	Reduction	Cost per acre	Cost efficiency in $ per lb N saved
Reducing N application rate from the background rate to the rate giving the Maximum Return to Nitrogen on 10% of acres	10%	–$8*	–$4.25
Nitrification inhibitor for all fall-applied fertilizer on tile-drained corn acres	10%	$7	$2.30
Split N application to 50% fall and 50% spring on tile-drained corn acres	7.5–10%	$17	$6.20
Split N application to 40% fall, 10% pre-plant, and 50% side dress	15–20%	$17	—
Spring only N application on tile-drained corn acres	15–20%	$18	$3.20
Cover crops on all corn/soybean tile-drained acres	30%	$29	$3.20
Cover crops on all corn/soybean non-tiled acres	30%	$29	$11.00
Bioreactors on 50% of tile-drained acres	25%	$17	$2.20
Wetlands on 35% of tile-drained acres	50%	$61	$4.00
Buffers on all applicable cropland	90%	$294	$1.60
Perennial/energy crops equal to pasture/hay acreage from 1987 (tiled and non-tiled acres)	90%	$86	$9.30
Perennial/energy crops on 10% of tile-drained acres	90%	$86	$3.20

**Cost savings*

Phosphorus loss reduction practices	Reduction	Cost per acre	Cost efficiency in $ per lb P saved
Change conventional tillage to conservation tillage or no-till on 1.8 million acres eroding at greater than the soil T value	50%	–$17*	–$16.60
P application rate reduction on fields with soil test P levels above the recommended maintenance level	7%	–$8*	–$48.80
Cover crops on all corn/soybean tile-drained acres	30%	$29	$130
Cover crops on 1.6 million acres eroding at greater than the soil T value and currently in conservation tillage or no-till	50%	$29	$24.50
Wetlands on 25% of tile-drained acres	0%	—	—
Buffers on all applicable cropland	25–50%	$294	$12.00
Perennial/energy crops equal to pasture/hay acreage from 1987 (tiled and non-tiled acres)	90%	$86	$102
Perennial/energy crops on 1.6 million acres eroding at greater than the soil T value and currently in conservation tillage or no-till	90%	$86	$40.40
Perennial/energy crops on 10% of tile-drained acres	50%	$86	$250

**Cost savings*

What may be right for your farm?

Combining multiple practices can provide extra benefit

Do you have tile-drained land?

Yes

Nitrogen loss in tile drainage water is likely the bigger priority.

Are you interested in changing how you do things in-field?

Yes

TRY

- A **new nitrogen application strategy** like a nitrification inhibitor, moving fall applications to spring, or side-dressing nitrogen.
- Planting **cover crops** in the fall to retain nitrogen in your field over the winter.
- Growing a **perennial or energy crop** to take up nitrogen during times of the year when annuals cannot.

No

TRY

- Installing a **woodchip bioreactor** at the edge of your field to convert nitrogen in tile water to benign nitrogen gas.
- Constructing a **wetland**, which not only removes nitrogen from drainage water but also provides flood retention and wildlife habitat.

No

Phosphorus loss from soil erosion is likely the bigger priority.

Are you interested in changing how you do things in-field?

Yes

TRY

- **Conservation tillage or no-till**, which helps keep the soil protected so erosion, and thus phosphorus loss from your field, is reduced.
- Planting a **cover crop** in the fall to hold soil in place over the winter, thus reducing erosion and phosphorus loss.
- Reducing your **phosphorus application rate** when a soil test indicates you're above the recommended maintenance level.
- Growing a **perennial or energy crop** to protect the soil and reduce erosion and phosphorus losses during times of the year when annuals cannot.

No

TRY

- Planting **buffers** to help catch sediment and sediment-bound nitrogen and phosphorus before water runoff reaches streams.

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