A REPORT FROM OHIO'S FARM COMMUNITY

PROGRESS ON THE REQUIREMENTS OF OHIO SENATE BILL 1





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EXECUTIVE SUMMARY



BACKGROUND

To ensure a vibrant future for Ohio agriculture, farmers are committed to working collectively with environmental advocates, researchers, businesses, community leaders and policy makers to find solutions that transform farming practices and improve water quality. Following significant public dialogue and with a meaningful commitment to addressing water quality challenges in Ohio's Western Lake Erie Basin (WLEB), the 131st General Assembly passed Senate Bill 1 (SB 1) – a significant measure to address the loss of phosphorus and nitrogen into the waters of the WLEB.

The provisions of SB 1, as well as the changes taking place before and since its adoption, have made demonstrated improvements to the state's water quality and have placed Ohio in a strong position to transform the WLEB.

SB 1 requires the General Assembly to issue a report by July 3, 2018, about the implementation of the legislation's fertilizer and manure prohibitions. The Ohio Livestock Coalition (OLC) collected and analyzed research from respected and leading organizations, including The Ohio State University, as well as interviewed Ohio farmers who are the "boots on the ground" implementing SB 1, to educate members of the Ohio Legislature and Governor John Kasich and his Administration about the important advances and practices that have been deployed in the fields and on the farms of Ohio.

The reforms of SB 1, and the many voluntary initiatives undertaken by farmers, have made a difference. The U.S. Department of Agriculture, Natural Resources Conservation Service, released a report in March 2016 that found "voluntary conservation is making significant headway in reducing nutrient and sediment losses from farm fields." Compared to a scenario simulating the removal of all conservation practices in WLEB, conservation practices in use in 2012 reduce total phosphorus losses by 75 percent (11.4 million pounds per year).

ABOUT THE OHIO LIVESTOCK COALITION

OLC represents the state's livestock farming community, working with farmers, allied members, and livestock and grain farm organizations to educate, advocate and promote issues relevant to animal agriculture and food production. OLC's focus is to engage with a diverse group of stakeholders to share fact-based information about topics including environmental responsibility, animal health and well-being, food safety and community involvement. As a voice for livestock agriculture, OLC represents the interests of the farm community and works to demonstrate the critical social and economic benefits of having a strong agriculture industry in Ohio.

Members include leaders from all major commodities representing Ohio agriculture and some of the leading names in Ohio agribusiness and research.

ABOUT OHIO AGRICULTURE

Agriculture is the backbone of Ohio's economy. That's why the industry is always first in line to take on tough issues, such as water quality, animal care standards and food safety. It is the No. 1 contributor (\$124 billion) to Ohio's economy.

OHIO HAS MORE THAN 74,500 FARMS





FOOD AND AGRICULTURE PROVIDE NEARLY 1 MILLION JOBS – OR **ONE OUT OF EVERY** EIGHT JOBS IN OHIO

Ohio has more than 74,500 farms, about half of which have livestock. Food and agriculture provide nearly 1 million jobs – or one out of every eight jobs in Ohio – and the state remains a leader in producing both livestock and crops. The full impact of the state's agriculture community includes:

- There are more than **2,200 dairy farms in Ohio with 263,000 cows**, which produce more than 5.5 billion pounds, or 650 million gallons, of milk each year. Ohio ranks first in Swiss cheese production, fifth in the number of processing plants and 11th in milk production.
- Ohio is seventh in pork production.
- Ohio turkey production ranks ninth nationally and is 16th for broiler chickens.
- Ohio is one of the top egg farming states in the nation, producing 9 billion eggs a year, and all birds grown and eggs produced in Ohio are processed in-state.
- There is at least **one sheep farm and one beef farm in every Ohio county.**
- Ohio has **17,000 beef farms with 296,000 beef cows** and 140,000 head of cattle on feed.
- Ohio's ethanol industry increased the state's corn producers' capacity to produce up to 550 million gallons of fuel from corn.
- Ohio is the **sixth-largest soybean producing state** in the country with 4.2 million harvested acres in 2017 by 22,000 Ohio soybean farmers.
- Ohio is **one of the largest producers of soft red winter wheat in the U.S.,** producing more than 32 million bushels in 2017.

Ohio farmers need fresh air and water to grow healthy food on their land, and they embrace their responsibility to help preserve the state's land, air and water. It's why environmental stewardship is a top priority. They have voluntarily stepped up to ensure Ohio farmers are national models in how to be a good neighbor. They are proud of their work.

KEY FINDINGS OF OLC'S REVIEW OF SENATE BILL 1 IMPLEMENTATION

The Ohio agricultural community has been working for years to reduce nutrient loads in the WLEB, in close cooperation with federal, state and local agencies, and others committed to improving Ohio's water quality.

Numerous farmer-driven policies and programs are significantly moving the needle, as reported by Ohio-based researchers (see Figure 1), water quality experts and farmers.

- Much of the phosphorus and nitrogen that is being reduced in the WLEB has been done through voluntary measures deployed through years of education, best management practices, and a concerted effort by Ohio's farmers, farm organizations, and allied partnerships.
- Farmers are expanding their manure application windows through the use of newly-planted cover-crops. This strategy, along with 4R practices – the right source at the right rate at the right time in the right place – has improved weather-appropriate nutrient application.
- Manure storage has been added by farmers who qualify and receive federal EQIP dollars in recent years. However, there are insufficient funds to meet all livestock farmers' needs.
- Complaint-driven enforcement, as initiated in SB 1, is serving as an effective approach.
- Farmers spend significant personal capital to meet manure storage, application and conservation practices.

These above findings are driven by:

- A new livestock farm siting assessment that ensures environmental concerns are being addressed at the start of the process.
- More than \$3 million from the Ohio agricultural community has been directed to address nutrient management and water quality challenges, in addition to the expense livestock producers have voluntarily spent upgrading their systems.
- In the WLEB, 99 percent of cropland acres are now managed with at least one conservation practice, according to USDA.
- To date, nearly 19,000 farmers have taken one of about 200 classes offered through Ohio State University Extension to obtain a fertilizer certification.
- Ohio farmers in the 24-county WLEB have been developing Nutrient Management Plans, which exceed state legal requirements, with the help of four Ohio State University Extension offices and the Ohio Farm Bureau Federation.
- Approximately 2.7 million acres, of which 1.9 million are in the WLEB, and more than 5,900 grower customers are serviced by the 39 facilities in Ohio that have earned 4R Nutrient Stewardship Certification.

FIGURE 1

STATUS OF MEDIAN OHIO SOIL TEST PHOSPHORUS (STP) LEVELS

Study:

Survey of Ohio soil test laboratories > 2 million STP (Mehlich3) data points at zip code resolution, courtesy of: A&L Great Lakes Laboratories, Brookside Laboratories and Spectrum Analytic. 25th through 90th percentiles also evaluated, but only 50th percentile (median) highlighted here.

Findings:

Median STP levels are either staying steady or trending down in > 85% of Ohio counties. In 2015, median STP levels were within the appropriate agronomic range in all but one county (98.8%) in Ohio.

Table 1. Percent of Ohio counties with median STP levels significantly trending. Percent of Ohio counties with median 2015 STP (Mehlich3) levels within the agronomic range (buildup, maintenance and drawdown) based on Tri-State Fertility Guidelines for corn/bean rotation (97.8%)

Trend in Median STP Levels 1993 through 2015	% of Counties
Significant Decrease	62.5
Significant Increase	14.8
Not Significant or NA	22.7

2015 Median (Corn/Soybean/Wheat Rotation)	% of Counties
Buildup ≤ 36 ppm	75.0
Maintenance > 36 ≤ 57 ppm	22.7
Drawdown > 57 ≤ 71 ppm	1.14
Stop Applying > 71 ppm	1.14

*The Ohio State University, College of Food, Agricultural and Environmental Sciences

INTRODUCTION



The 131st Ohio General Assembly passed SB 1 – a significant measure to address the loss of phosphorus and nitrogen into the waters in the WLEB. Effective July 3, 2015, SB 1 was developed through significant public dialogue and a meaningful commitment to address water quality impacts in the WLEB. These laws and the changes taking place since its adoption are improving water quality and putting Ohio in a position to transform the WLEB.

SB 1 includes restrictions on: manure and fertilizer application, dredging and disposal of dredged material in Lake Erie, and wastewater treatment plants. As it relates to agriculture, the law prohibits, with certain exceptions, the application of fertilizer consisting of nitrogen or phosphorous and the application of manure in the WLEB on frozen ground, saturated soil, and during certain weather conditions. SB 1 requires the General Assembly to issue a report about the implementation of the act's fertilizer and manure prohibitions by July 3, 2018. As part of that process, the Ohio Livestock Coalition collected and analyzed research from respected and leading organizations, including The Ohio State University, as well as interviewed Ohio farmers who are the "boots about the ground" implementing SB 1, in order to educate members of the Ohio Legislature and the Kasich Administration on the important advances and practices that are at work in the fields and on the farms of Ohio.

Ohio's agricultural community has been working together to reduce phosphorus and nitrogen from entering Ohio's waters and have taken aggressive voluntary measures, in addition to SB 1 requirements, that have been nationally recognized as effective and innovative.

THE AGRICULTURE TRADITION IN OHIO

Throughout history, agriculture has been a major component of Ohio's economy. Native Americans sustained themselves by growing corn, beans, squash and pumpkins, while early European settlers relied on agriculture to survive the Ohio frontier during the 18th century. According to the Ohio History Connection, Ohio produced more corn than any other state and ranked second in wheat production by 1849. During that same time, Cincinnati was known as "Porkopolis" because it was the pork-processing hub of the United States.

More than 150 years later, Ohio agriculture continues to drive the state's economy and help feed the world. The full impact of the state's agriculture community is detailed below:

- Ohio ranks **first in Swiss cheese production**, fifth in the number of processing plants and **11th in milk production**.
- Ohio ranks seventh in pork production.
- Ohio turkey production ranks ninth nationally and 16th for broiler chickens.
- Ohio is one of the top egg farming states in the nation, producing **9 billion eggs a year**, and all birds grown and eggs produced in Ohio are processed in-state.
- There is one sheep farm and one beef farm in every Ohio county.
- Ohio has **17,000 beef farms with 296,000 beef cows** and 140,000 head of cattle on feed.
- Ohio's ethanol industry increased the state's corn producers' capacity to produce up to 550 million gallons of fuel from corn.
- Ohio is the **sixth-largest soybean producing state** in the country with 4.2 million harvested acres in 2017 by 22,000 Ohio soybean farmers.
- Ohio is **one of the largest producers of soft red winter wheat in the U.S.**, producing more than 32 million bushels in 2017. Additionally, Ohio is home to 11 flour mills that supply product to Ohio and the nation.

Agriculture is the backbone of Ohio's economy. That's why the industry is always at the table to take on tough issues, such as water quality, animal care standards and food safety.

Agriculture is the No. 1 contributor (\$124 billion annually) to Ohio's economy. The state has more than 74,500 farms, about half of which have livestock. Food and agriculture provide nearly 1 million jobs — or one out of every eight jobs in Ohio.

Despite its contributions to the state's economy and families' dinner tables, a recent study by George Mason University listed food manufacturing, animal production and aquaculture and crop production as the second, third and sixth most heavily regulated industries, respectively, by the State of Ohio. Collectively, this would overwhelmingly make agriculture the most regulated industry in Ohio.



AN OVERVIEW OF SENATE BILL 1

SB 1 was signed into law on July 3, 2015, through a collaborative process that engaged the agricultural communities, environmental advocates, regulators, decision makers and other key stakeholders.

The legislation is a significant measure to address the loss of phosphorus and nitrogen into the waters in the WLEB. These laws and the changes taking place since its adoption are improving water quality and putting Ohio in a position to transform the basin and improve water quality in tributaries leading into Lake Erie.

SB 1 includes restrictions on manure and fertilizer application, dredging and disposal of dredged material in Lake Erie, and wastewater treatment plants. As it relates to agriculture, the law prohibits, with certain exceptions, the application of fertilizer consisting of nitrogen or phosphorous and the application of manure in the WLEB (see figure 2) on frozen ground, saturated soil, and during certain weather conditions. The limiting exemptions from this law are for specified circumstances, including injecting into the ground, and incorporating it within 24 hours of surface application.

The law authorizes additional regulatory authority to the director of the Ohio Department of Agriculture to investigate complaints in cases of fertilizer application and manure application. There are clear civil penalties and enforcement guidelines for violations. Additionally, the law allows for small and medium agricultural operations to apply for a temporary extension from the act's manure prohibition.

FIGURE 2

WATERSHEDS AND ASSOCIATED COUNTIES NAMED IN SB 1



SB 1 also requires that a person that applies manure obtained from a concentrated animal feeding facility has a livestock manager certification or has been certified by the director of agriculture to apply manure.



A BREAKDOWN OF SB 1 REGULATIONS



NEW SB 1 RESTRICTIONS ON MANURE IN THE WLEB

Under SB 1, no person in the western basin is permitted to surface apply manure under any of the following circumstances:

- 1. On snow-covered or frozen soil
- 2. When the top two inches of the soil are saturated from precipitation
- 3. When the local weather forecast for the application area contains greater than 50 percent chance of precipitation exceeding one-half inch in a 24-hour period

The above restrictions do not apply if:

- 1. The manure is injected into the ground
- 2. The manure is incorporated within 24 hours of surface application
- 3. The manure is applied onto a growing crop
- 4. In the event of emergency, the Ohio Department of Agriculture provides written consent
- 5. Restrictions do not prohibit on-site stockpiling of solid manure

SB 1 also requires that anyone taking and applying manure from a permitted livestock farm is either a Certified Livestock Manager or Fertilizer Certified.

SB 1 allowed for small and medium agricultural operations to apply for a temporary extension from the act's manure prohibition:

- For a medium agricultural operation, for a period not later than July 3, 2016
- For a small agricultural operation, for a period not later than July 3, 2017

FIGURE 3: MEDIUM-SIZED OPERATIONS

Specie Type	Definition of Medium-Sized Operation
Cows	200-699 head
Veal Calves	300-999 head
Swine	750-2,499 head (weighing 55 pounds or more)
Horses	150-499 head
Sheep and Lambs	3,000-9,999
Turkeys	6,500-5,499
Broilers (Chicken)	9,000-29,999 head (with liquid manure handling system)
	37,500-124,999 head (other than laying hens, if the animal feeding facility uses a manure handling system that is not a liquid manure handling system)
Laying Hens (Eggs)	10,000-29,999 head 25,000-81,999 (if the animal feeding facility uses a manure handling system that is not a liquid manure handling system)
Ducks	1,500-4,999 head (if the animal feeding facility uses a liquid manure handling system) 10,000-29,999 head (if the animal feeding facility uses a manure handling system that is not a liquid

Small operations are any farms with less than the medium-sized operation requirements.

NEW SB 1 RESTRICTIONS ON FERTILIZER IN THE WLEB

Under SB 1, no person in the western basin is permitted to surface apply fertilizer under any of the following circumstances:

- 1. On snow-covered or frozen soil
- 2. When the top two inches of the soil are saturated from precipitation

If the fertilizer is in granular form, SB 1 prohibits surface application when the local weather forecast for the application area contains greater than 50 percent chance of precipitation exceeding one inch in a 12-hour period.

These restrictions do not apply if:

- 1. The fertilizer is injected into the ground
- The fertilizer is incorporated within 24 hours of surface application
- 3. The fertilizer is applied onto a growing crop

TEMPORARY EXEMPTIONS

Small and medium agricultural operations could have applied for a temporary exemption from the law's restrictions on fertilizer and manure applications (see chart 1).

CHART 1: TEMPORARY EXEMPTIONS

	Applications		
	Approved	Denied	Total
Medium/1-year Exemptions	6	2	8
Small/2-year Exemptions	78	3	81
	84	5	89

All temporary exemptions have expired and all farms in WLEB must meet SB 1 requirements.



OHIO FARMERS ON SB 1 IMPLEMENTATION

WHERE WE ARE TODAY

A recent study by The Ohio State University found agricultural soil phosphorus levels held steady or trended downward in at least 80 percent of Ohio counties from 1993 through 2015, after review of more than 2 million phosphorus soil tests' (see figure 4). In 2015, the median soil phosphorus level was within the appropriate agronomic range in 87 of 88 Ohio counties.

That information aligns with the U.S. Department of Agriculture, Natural Resources Conservation Service, <u>released report in March 2016</u> that found "voluntary conservation is making significant headway in reducing nutrient and sediment losses from farm fields." Compared to a scenario simulating the removal of all conservation practices in WLEB, conservation practices in use in 2012 reduce total phosphorus losses by 75 percent (11.4 million pounds per year).

Much of the phosphorus and nitrogen level reductions are a result of voluntary measures over years of education, best management practices, and a concerted effort by the state's farmers, farm organizations and allied partnerships. The majority of Ohio farmers report that SB 1 put into law the practices they were already implementing on their farms, but appreciate the regulations to ensure all farmers are using the same rules and actions can be taken against those not in compliance.

FIGURE 4: TREND IN MEDIAN STP LEVELS

Trend in Median STP Levels 1993 through 2015	% of Counties
Significant Decrease	62.5
Significant Increase	14.8
Not Significant or NA	22.7

2015 Median (Corn/Soybean/Wheat Rotation)	% of Counties
Buildup ≤ 36 ppm	75.0
Maintenance > 36 ≤ 57 ppm	22.7
Drawdown > 57 ≤ 71 ppm	1.14
Stop Applying > 71 ppm	1.14

¹ College of Food, Agricultural, and Environmental Sciences at The Ohio State University: <u>https://bit.ly/2wsrCar.</u> Numerous farmer-driven policies and programs are significantly moving the needle, as reported by Ohiobased researchers, water quality experts and farmers.

- Farmers are expanding their manure application windows through the use of newly-planted cover crops. This strategy, along with 4R practices – the right source at the right rate at the right time in the right place – has improved weather-appropriate nutrient application.
- Some manure storage has been added by farmers who qualify and receive federal EQIP dollars in recent years. However, there are insufficient funds to meet all livestock farmers' needs.
- Complaint-driven enforcement, as initiated in SB 1, is serving as an effective approach.
- There is a critical need for more Certified Livestock Managers in Ohio.
- Farmers spend significant personal capital to meet manure storage, application and conservation practices.



The Ohio agricultural community has been working for years to reduce nutrient loads in the WLEB, in close cooperation with other stakeholders including, state agencies, the Ohio legislature, and others committed to improving Ohio's water quality. Among those efforts include:

- Directed investment of more than \$3 million from the Ohio agricultural community to address nutrient management and water quality challenges, in addition to the expense livestock producers have voluntarily spent upgrading their systems.
- Conducted hundreds of hours of trainings on new nutrient application laws and regulations.
- Worked with the Ohio Environmental Protection Agency, the Ohio Department of Agriculture, the Ohio Department of Natural Resources and other stakeholders to update the Livestock Environmental Assurance Program.
- Implemented a livestock farm siting assessment to ensure environmental concerns are being addressed at the start of the process.
- Worked with Ohio State University Extension to develop new nutrient application equipment to ensure applications of manure are in the right place at the right time.
- Proposed the creation of the Ohio Water Trust and capitalization of funds through the Healthy Water Ohio recommendation to support future efforts to reduce nutrient loads.
- Increased technical assistance to farmers in the basin on conservation and nutrient management best practices.
- Created a common program with consistent application criteria for farmers throughout the basin, promoting the 4R Nutrient Stewardship program.
- Worked to pass and enact Senate Bill 150 that requires all farmers who apply fertilizer on more than 50 acres to be certified by the Ohio Department of Agriculture.
- Worked to pass and enact SB 1 that placed restrictions on when fertilizer and manure is applied in the WLEB.

OHIO IS A LEADER IN NUTRIENT MANAGEMENT POLICIES

The WLEB manure application rules include many restrictions. Ohio limits manure application rates in the basin to the water holding capacity of the soil. Ohio's permitted farms are also inspected every year, as are Certified Livestock Managers.

The Certified Livestock Managers program is also a point of pride for Ohio agriculture. Ohio law mandates that anyone who buys or sells land and applies more than 4,500 dry tons or 25 million gallons of liquid manure each year become a Certified Livestock Manager. These certified Livestock Managers are required 10 hours of continuing education every three years to maintain their certification.

AGRICULTURE LEADS BEFORE, DURING AND AFTER SENATE BILL 1

Recognizing its unique obligation to protect the land for future generations, as well as ensure safe water for our farms and communities, some of the most effective initiatives that have moved the needle in the WLEB originated from the agriculture community. Though voluntary, the proactive programs acknowledged agriculture's role in finding solutions while ensuring Ohio farmers continue to lead the industry in food production.

Prior to the passage of SB 1, a number of voluntary solutions were implemented by Ohio's farming community, which are included on the following page.



- The statewide purchase of phosphorus continues to trend downward.
- Ten years ago, nobody heard of dissolved phosphorus. The farm community has been working to educate farmers on what it is and how to reduce it.
- Compared to 50 years ago, the number of livestock in the WLEB have been reduced by half and the manure produced is more carefully applied than ever before.
- Both ODA and EPA estimate livestock phosphorus production in the WLEB accounts for less than 25 percent of the needed phosphorus to grow crops.
- Fertilizer Applicator Certification Training (FACT) just completed its three-year phase training nearly19,000 farmers.
- Working with farmers and industry to meet the requirements and expectations of the new law.

One of the most successful, industry-led initiatives has been the 4R Program.²

In March 2014, agriculture communities throughout the WLEB, including Indiana, Michigan and Ohio, joined with The Nature Conservancy to launch a proactive, responsible, science-based commitment aimed at the long-term improvement of Lake Erie's water quality.

The 4R Nutrient Stewardship Certification Program encourages agricultural retailers, nutrient service providers and other certified professionals to adopt proven best practices through the 4Rs - the Right Source of Nutrients at the Right Rate and Right Time in the Right Place plant nutrition management and sustained crop production, while considering specific individual farms' needs. This voluntary, third-party auditor verified program provides a consistent, recognized standard for agricultural retailers and nutrient service providers.

Since the program's implementation, 45 facilities have achieved 4R certified status, 37 of those facilities located in the WLEB.

Additionally, the Ohio Farm Bureau Federation, all statewide commodity organizations, and the Ohio Agribusiness Association unveiled a new program to help farmers utilize soil testing and write nutrient management plans (NMPs) for their farms. Partnering with Ohio's Certified Crop Advisors, the Ohio Federation of Soil and Water Conservation Districts, and Ohio State University Extension, these organizations will help host a series of workshops in which soil testing will be utilized and NMPs will be written using a tool developed by the Ohio Department of Agriculture.

Similarly, an initiative has been in place for over 20 years to help Ohio livestock farms of all sizes and all species voluntarily prevent or minimize agricultural pollution risks. The Ohio Livestock Environmental Assurance Program (LEAP) is an innovative and proactive program that teaches farmers how to identify and prevent environmental risks through best management practices and work to comply with state and federal environmental regulations.

The program helps livestock and poultry farmers manage environmental challenges and effectively assess how farm management practices affect water quality. By participating in LEAP, farmers learn how to operate and grow their livestock operation with environmental assurance, confidence and security. By increasing confidence, improving profits, reducing problems, enhancing relationships and enriching an image, LEAP accomplishes its primary objective – to promote sustainability by seeking profitable environmental solutions.

LEAP is coordinated by the Ohio Livestock Coalition (OLC) in cooperation with The Ohio State University (OSU) Extension, the Ohio Department of Agriculture, United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS), and various commodity and farm organizations.



²4R Nutrient Stewardship Certification: https://4rcertified.org/about/.



IMPLEMENTATION OF SENATE BILL 1

Ohio farmers need fresh air and water to grow healthy food on their land, and they embrace their responsibility to help protect the state's land, air and water. It's why environmental stewardship is a top priority. They have voluntarily stepped up to ensure Ohio farmers are leading the way.

Farmers are taking on a wide range of strategies to implement SB 1 that include traditional agricultural practices to higher-tech solutions. As mentioned, more farmers are planting cover crops to widen the manure application process. This frees up storage issues as well as allowing a natural fertilizer to be applied to growing crops. Cover crops recapture the ammonium nitrogen from the manure and convert this into plant growthleaves and roots. This improves the soil and reduces nitrogen losses, which protect streams and ditches.

Weather-appropriate nutrient application is also working, although it can still be a challenge in terms of best predicting Mother Nature. Farmers are reliant on the weather for their livelihoods – from the productivity of a crop to how and when to add nutrients to their soil. When wet weather delays fall harvest, it also delays the fall manure application window.

Leveraging new technologies extends from machinery to manure transformation. Precision application technology is coming to market, as well as manure that could be manufactured into a pellet or granular format to improve the transportation and application of the valuable nutrients in manure. However, these evolving technologies are extremely expensive and the cost cannot be afforded by the livestock farmers alone. These tools will help farmers continue to use the best practices of 4Rs, but make the targeting all that more impactful.

For more than a decade, The Ohio State University has been conducting manure research to learn how to better use available nutrients. Two agriculture experts at OSU have redesigned a metal manure sidedress^a toolbar to allow farmers to apply manure on a field while crops are emerging. Incorporating manure into growing corn can improve crop yields, reduce nutrient losses, and give farmers or manure applicators another window of time to apply manure to fields. This manure application method will be more broadly adapted in the coming years. In 2018, OSU has three 12-row manure toolbars available for use in the WLEB.

STORAGE REMAINS A CHALLENGE

The lack of the number of days to apply nutrients due to weather has been a burden for many small- and medium-sized operations.

Swine farmers who are building facilities typically have storage for a full year, while smaller beef and other operations with solid manure still have the option to stockpile manure until weather permits land application. However, many smaller producers, such as dairy farmers, are not adding storage because of the cost. Storage is a significant capital investment in a farm, many of which are operating within the margins.

ENFORCEMENT OF SB 1

Based on information from the Division of Soil and Water Conservation at the Ohio Department of Agriculture, there have been 25 complaints for spreading manure on frozen/snow covered/saturated ground from December 2017 to present. It is understood from the agriculture community that the complaint-driven system is working.



MARK DREWES DREWES FARM



Mark Drewes and his son, Tyler, grow corn, soybeans, wheat, and alfalfa on their farm in Custar, Ohio, located between Bowling Green and Findlay, Ohio.

The Drewes do not own livestock, however they contract manure from two dairy operations and apply commercial fertilizer and manure, according to current recommendations and regulations.

Tyler Drewes spends 25 percent of his time on nutrient management. He does grid sampling, testing, and works with the custom applicator to apply nutrients at appropriate agronomic rates.

Technology in the agriculture sector is ever changing, and Drewes Farms is on the cutting edge. Their tractors and combines utilize RTK "Sometimes it takes something like SB 1 to help with a structural change," said Drewes. "I feel strongly that it has opened a lot of eyes and helped educate. It really helped us become environmentalists. We won't change this overnight. It takes science, proof to farmer, and this is a step in the right direction. SB 1 was much needed."

"We are a part of the Edge-of-Field study," said Drewes. "It felt so good that we were able to learn that we are one of the better farms. The 40 percent reduction – we are

> well under the threshold of the allowed loading of DRP (dissolved reactive phosphorus). We abide by SB 1 and try to do the right thing.

Because they accept manure from a permitted dairy, they were already following the SB 1 requirements, but the law has created a structural change in how people are thinking about nutrient management. Even prior to SB 1, Drewes never applied on frozen or snow-covered ground. However, they now have more of a focus on rain for both manure and commercial fertilizer. The Drewes print the weather reports each morning and review multiple sources. If there are conflicting

weather reports, they err on the conservative side to not apply either manure or commercial fertilizer.

technology, which allows them to have sub-inch accuracy while operating in the fields, cutting down on soil compaction and overlapping. They purchased a "Rowgater" from Ag Chem to allow for commercial fertilizer to be applied to a growing row crop, which will dramatically retain phosphorus and other nutrients.

KENT STUCKEY PFIEFER DAIRY FARMS



Kent Stuckey has been a dairy farmer for 25 years, where he and his three sons farm and manage a dairy production operation of more than 600 cows, row crops, and a farmer's market and events facility in Bucyrus, Ohio. The family also grows strawberries and sweet corn.

Kent has made a lot of changes in the past eight years, including switching to no-till and 100 percent cover crops, which helped to alleviate manure storage issues. The Stuckey's use the cover crops, like rye, for feed and plant corn silage right behind it.

"The cover crop exemption has been huge, especially for dairies," said Stuckey.

They grid sample every five acres, and have done so for the past 20 years, and they have had a Certified Nutrient Management Plan for the past 15 years.

Years ago, they moved away from winter application of manure. The Stuckey's apply nutrients using agronomically acceptable rates, in addition to SB 1 regulations. "People are calling to file complaints," said Stuckey. "I had someone call on us when I was at a no-till conference. We were operating within the law, but people are paying attention now."

The Stuckey's added storage capacity while they were growing, having about 13 months of storage.

One significant change they made to their operations was in manure application. While they never applied to snow covered or heavily saturated grounds, they used to apply right up until it rained, which

has now changed with SB 1.

He also certifies that complaint-driven enforcement is making a difference.

Kent Stuckey is the past president of the Ohio Federation of Soil and Water Association, as well as serving for 20 years on the Crawford County Soil and Water Conservation District Board.

Though he has adjusted to SB 1, he

continues to have concerns about calls for increased regulations for Ohio's agricultural industry.

"We can handle the restrictions right now," said Stuckey. "But if there are any new restrictions on hauling manure, we will be hurting. This would be very onerous on us. We are at capacity."

ERIN LIMES-STICKEL FAMILY BEEF FARMER AND ORGANIC SPECIALTY FEED AND FOOD ACCOUNTS MANAGER AT THE ANDERSONS



The Stickel family grain and livestock operation is located in Wood County – right in the WLEB. The family farms a crop mixture of corn, soybeans, wheat, alfalfa and processing tomatoes, in addition a hay and straw business, a commercial cow/calf herd and a feedlot of approximately 400 head a year.

The fourth-generation family farm includes daily management by brothers, Andy and Brian, with active involvement from parents, Dale and Elyse, and Andy's wife, Erin, who also works for an agribusiness.

They have been implementing practices such as extensive use of cover crops for at least four years now, and they have a nutrient management plan, which was fully paid for by EQIP. They have also implemented composting (instead of "We're out here doing the right thing and feel bombarded by the public that do not understand production agriculture and the practices that must be implemented for soil health and productive growing crops," said Stickel. "That being said, we are aware of our role and visibility to the general public and feel it is important to be open about our practices and procedures for the good of the order and the longevity of our business for future generations."

and organic matter, and they help their farms alleviate the need for some commercial fertilizers. It also allows them to cover more acres with nutrients.

"We have used cover crops for years because we believe in

the soil health benefits of the practice," said Stickel. "Additionally, we are strip banding our commercial fertilizer. We chose to do this for the following reasons: It is below the ground, which equates to no surface runoff (2-3 inches below the surface) and it is in a concentrated, band which leaves less soil tie-up and aides in plant uptake. Furthermore, this equates to a cost savings because we are not using/ wasting as much commercial fertilizer as it is readily available to the crop."

However, this has been a cost savings in relation to total volume

spreading immediately), which incurs costs in trucking to the compost site and the stone pad that holds the compost.

Erin Stickel is an advocate of cover crops as a means of "...working for us by keeping a growing crop yearround." The farm's use of cover crops increases soil structure, water infiltration, nutrient sequestering, of commercial fertilizer that is purchased, though they do offset some nutrients to cover all their acres.

The Stickel family is committed to running an effective, efficient and environmentally-friendly farm. However, they feel that agriculture has borne the brunt of public frustration in the WLEB.

JEFF DULING, CERTIFIED LIVESTOCK MANAGER



Farming for Jeff Duling, much like the majority of farmers in Ohio, is a family business. His father started Duling Farms in the 1960s, and his parents still help out on the farm today. Their farms feed out 250 Holsteins, raise 4,000 head of contract hogs and grow corn, beans, wheat, and red clover on farms in Putnam, Hancock and Van Wert counties. Duling has a wide range of experience in agriculture, before farming full time, he worked for 20 years at a fertilizer and custom application company.

Duling farms using "no till" practices and has been planting cover crops prior to SB 1. Duling does not use much commercial fertilizer, as he is able to use beef and hog manure. Duling has a nutrient management plan, takes soil samples, and has filter strips. While

already implementing many best practices, Duling does report some changes to his operation since SB 1. He does not apply any manure before a rain event, even if it is a "beautiful, dry day to be applying." In fact, he prints the weather forecast on the days when manure is applied and maintains the record with

"I drive a commercial semi two to three days a week to supplement my income and cover health insurance."

his field application slip. He has altered his setback for applying manure and tillage – going from 1.5 inches to work in beef manure to now 3-4 inches.

Duling takes his responsibility to community and environmental sustainability seriously, serving as a supervisor for the Putnam County Soil and Water Conservation District for 12 years and as the director for the Area 1 Ohio Federation of Soil and Water Conservation Districts.

> The prohibition on applying manure to frozen ground has changed some of his practices, and he faces an operational hardship of storage. Stockpiling beef manure and trucking hog manure up to four to five miles away has a cost.

"...there is not a lot of money in this

operation, so having to spend \$100,000 to add a (beef manure containment pad) roof would not do anything for my bottom line and is cost prohibitive," said Duling.



MOVING FORWARD

Overall, feedback from Ohio's agriculture community on SB 1 includes:

- Implementation of the 4R program and SB 1 have seen a reduction in phosphorus. A USDA 2016 report on the effectiveness of voluntary conservation measures shows that in the WLEB, average annual phosphorus application rates decreased from 21.5 pounds per acre in 2003-06 to 18.7 pounds in 2012 (13 percent).
- Complaint-driven enforcement is working.
- The need for more Certified Livestock Managers is critical.
- Cover crops are important for soil health and reducing loss of phosphorus and nitrogen.
- Farmers are spending significant personal capital on water quality efforts, though it is a financial hardship for many.
- While farmers are committed to doing the right thing, adhering to SB 1 has been challenging for many livestock farmers and the full impact of the financial stress is difficult to measure and publish.

This report from Ohio's farm community was developed by the following organizations:

Ohio Agribusiness Association Ohio Cattlemen's Association Ohio Dairy Producers Association Ohio Farm Bureau Federation Ohio Pork Council Ohio Poultry Association Ohio Sheep Improvement Association Ohio Corn and Wheat Growers Association Ohio Soybean Association United Producers Inc.

GLOSSARY OF TERMS

Best management practice (BMP) – A cultural or engineering technique, management strategy, practice or combination of practices that have been determined and accepted to be the most effective and practical technological, economic and institutional controls as a means of preventing or reducing non-point source pollution in a local area. May include, but not limited to, structural and non-structural practices, conservation practices, operation and maintenance procedures.

Buffer strip – Setback of an area of permanent vegetation, often planted along the edge or contour of a land application site usually for management practices, including practices to slow the flow of water or the velocity of wind, capture sediment and other minerals before they leave the farm and become pollutants. Types of buffers include filter strips, field borders, grassed waterways, field windbreaks, shelterbelts, contour grass strips, vegetated cover and riparian buffers.

Comprehensive Nutrient Management Plan (CNMP) -

A planning tool for livestock operations that addresses production and natural resource goals. It combines conservation practices and management to create a workable system to balance nutrient input and utilization. While Ohio livestock producers have successfully used manure management planning for decades, the CNMP concept was created to address the growing national water quality concerns from animal feeding operations. The six components of a CNMP include manure and wastewater handling and storage, feed management, land treatment practices, nutrient management, record keeping and other utilization options.

Controlled direct discharge – A man-made conveyance, such as a pipe, which carries wastewater. Usually the farmer has the ability to operate and control this system.

Discharge – Not a controlled, directed flow. Could include wash water from a milking parlor, silo drainage, lagoon overflows or manure run-off from a feedlot.

Injection – The placement of manure beneath the surface of the soil in the crop root zone but not extending beyond the boundary of a land application site and using equipment specifically designed for this purpose.

Manure application – The placement of manure within the boundaries of a land application site by spraying or spreading onto the land surface; injection below the land surface in the crop root zone using equipment specifically designed for this purpose; or incorporation into the soil by means of the mixing of manure with the surface soil using standard agriculture practices, such as tillage.

Manure storage or treatment facility – An excavated, diked or walled structure or combination of structures designed for the biological stabilization, holding or storage of manure. These facilities include manure storage ponds, manure treatment lagoons and fabricated structures.

Manure storage pond – A type of manure storage or treatment facility consisting of an earthen impoundment made by constructing an embankment and/or excavating a pit, the purpose of which is to store or settle manure; contains liquid manure.

Manure treatment lagoon – Designed similar to a manure storage pond with the purpose of which to biologically treat manure; contains liquid manure.

Solid manure – Manure containing greater than 20 percent total solids.

Stockpile – Field placement of the amount of manure to be used at a land application site.

Storage period – Length of time anticipated between manure clean-out events.



