COVER CROP FARMERS OF SOUTHWEST OHIO

Improving Soil Health • *Enhancing Farm Productivity* • *Protecting Water Resources*

THE COVER CROP RESURGENCE

Cover Crops Can Help Address Farming Challenges

The use of cover crops in farming systems is a long-established practice that has seen a resurgence in recent years due to the many economic and environmental benefits the practice provides. Once replaced with the widespread use of fertilizers and herbicides, cover crops are now being incorporated into modern farming as a means to improve soil structure and productivity. Planted between the rotation of a farm's cash crop, cover crops are not typically harvested or sold. Some of the benefits cover crops provide include: Erosion Control, Soil Quality Improvements, Soil Fertility, Weed Suppression, Pest Control, Improved Water Quality and Livestock Grazing.

- **Erosion Control**: Cover crops can be used to reduce wind and water erosion. Maintaining ground cover through the seasons drastically reduces soil loss.
- **Soil Quality**: Cover crops enhance soil structure while increasing soil biota activity—they provide habitat and a food source for important soil organisms. Their roots break up compacted soil layers and help dry out wet soils. Cover crops help soils maintain a higher organic matter level; they also improve soil aggregation, infiltration and bulk density.
- **Weed Suppression**: Cover crops help to manage weeds by shading and interfering with weed germination/establishment (e.g. cereal rye produces alleopathic chemicals which suppress weeds.)
- **Insect Management**: Cover crops will play an important role in future biological insect control.
- **Fertility Improvements:** Cover crops catch nutrients before they can leach out of the soil profile. Leguminous cover crops produce nitrogen for the subsequent crop; their roots can help unlock some nutrients, converting them to more available forms.
- **Water Quality:** By reducing erosion, cover crops help hold nutrients and sediment on the field, thereby improving the quality of local waters.
- **Livestock Grazing:** Some cover crops can be grazed by livestock, thereby extending the grazing season, reducing the need for stored forages and potentially extending pasture "rest" periods.

Soils in Southwest Ohio

The soils in southwest Ohio have a very high silt content, which is packed tightly with little structure, allowing very little water infiltration; these soils are referred to as hydric soils because they are waterlogged. Hydric soils are problematic, particularly in flatter areas. Without good infiltration, water moves off the fields, picks up speed over long distances and causes problems with gully erosion. Cover crops can help address the challenges of hydric soils by improving infiltration and slowing water runoff and reducing soil erosion. Improved infiltration will allow water into the soil subsurface so it's available to the next growing crop in the summer months. Cover crops are not only for Highly Erodible Land, but can benefit land with any soil type and condition. Management of these soils is critical to successful farming; it is also important for protecting local streams and lakes from sediment and nutrient pollution.

Photos taken at various cover crop field days and workshops in Clermont and Brown counties

* For More Information on Planting and Managing Cover Crops, reference the following—***Cover Crops for Southwest Ohio*** (Clermont SWCD)

NUTRIENT POLLUTION AND WATER QUALITY DECLINE

Over the last 50 years, the amount of nitrogen (N) and phosphorus (P) entering our nation's waters has increased significantly. This type of pollution, referred to as nutrient pollution, has become one of the most widespread and challenging environmental issues communities face. It's estimated that **48% of Ohio's watersheds are in decline** because too much N and P are flowing into local lakes, rivers and streams. The primary sources of nutrient pollution include fertilizer runoff, effluent from wastewater treatment plants, failing home septic systems, animal manure and car/power plant emissions.

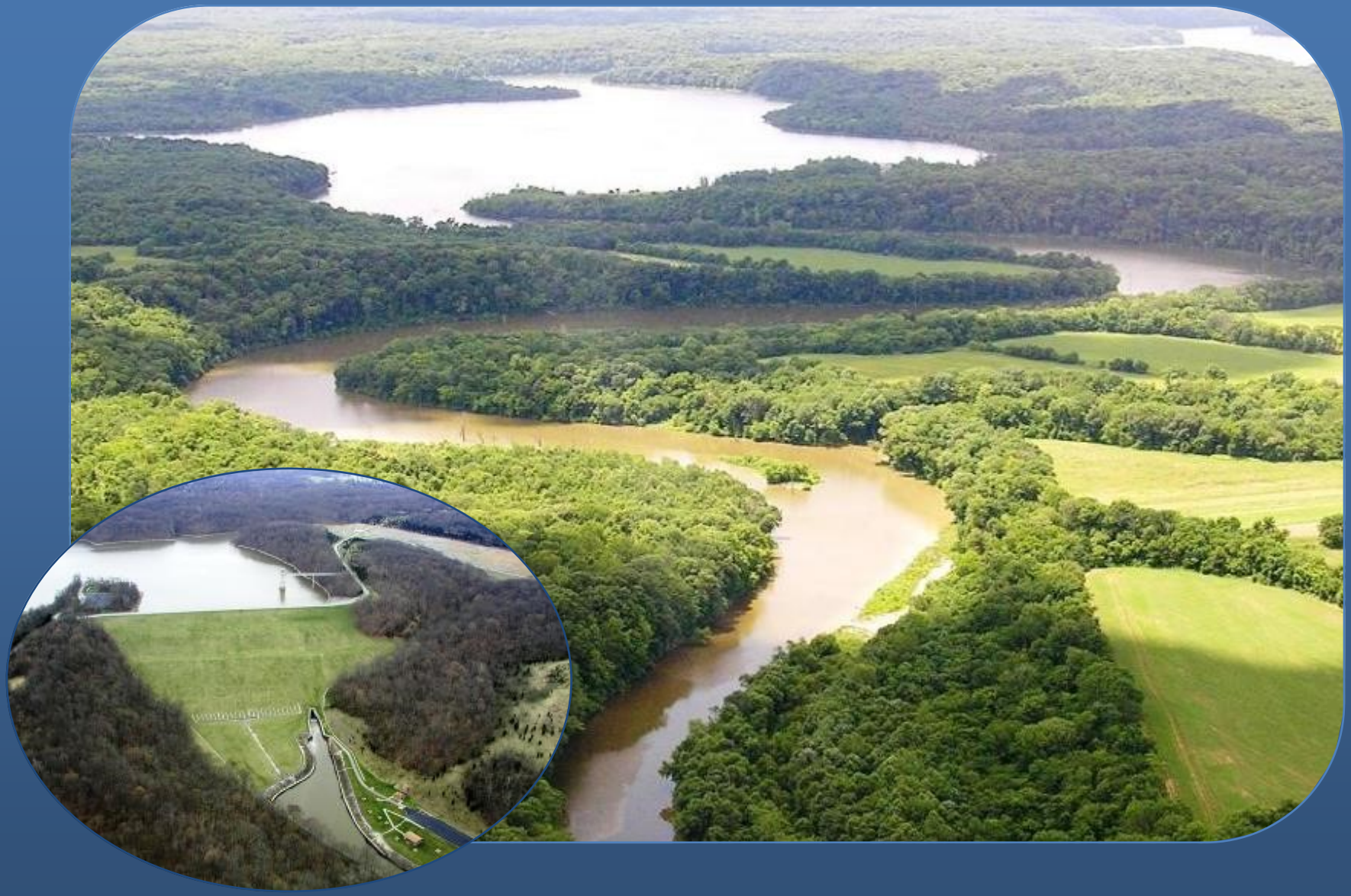
When excess nutrients enter our waters, algal blooms may occur. Although algae are a natural component of the food chain and are not typically harmful, some algal species, known as **Harmful Algal Blooms (HABs)** may cause harm through the production of toxins (e.g. microcystins). Most HABs are caused by planktonic bacteria called cyanobacteria, which are commonly known as "blue-green algae." Cyanobacteria often float to form scums on or near the surface, forming colonies that often look like bright green paint. These blooms can potentially produce toxins capable of causing irritation/illness -- sometimes even death -- in pets, livestock, and humans.

Photo of cyanobacteria, or HAB

In addition to producing toxins, HABs pose treatment challenges for public water systems including taste and odor and shortened filter run times. HABs have occurred in the southwest Ohio region at Harsha Lake (East Fork Lake) and Stonelick Lake. Drinking water drawn from Harsha Lake is treated at the Bob McEwen Water Treatment Plant using Granulated Activated Carbon method, which is one of the best available technologies to remove microcystins. Although drinking water is currently safeguarded at Harsha Lake, the conditions in Ohio's surface waters have reached a critical situation because of nutrient pollution and it's assumed that HAB issues will continue to escalate.

Kids at Harsha Lake during an algal bloom 2014

In response, state and local government agencies are promoting voluntary implementation of **agricultural** and **urban** best management practices (BMPs) as a means to help reduce nutrient pollution. This booklet highlights the efforts of **local farmers** who are voluntarily planting cover crops and experimenting with different mixes to achieve different environmental and economic goals. Each farmer shares information related to their reasons for starting cover crops, management strategies and a few suggestions for other farmers who may have interest in the practice. The use of cover crops as a best management tool is a win –win scenario, as the practice helps each farmer reach their individual goals for their operations, while also providing a collective good for the community by reducing nutrient pollution in our local waters.



Aerial view of the East Fork of the Little Miami River and William H. Harsha Lake (East Fork Lake) Reservoir

BROWN COUNTY, OHIO

BRAD BARBER

Mr. Brad Barber resides in Mt. Orab, Ohio and has been farming since 1976. Brad has been planting cover crops since 1990. In recent years, Brad has graciously volunteered his time at many field days and workshops to share his knowledge and experience using cover crops as a best management tool.

Brad at a field day in Brown Co.

Reason for starting: "My landlord was doing it in the late 1980s. It looked good. He explained it to me and rented me his ground. Early on, I didn't understand half the benefits. I thought I was just putting green manure on. I learned about the other benefits later through the local SWCDs."

Cover Crops Planted: "I started with cereal rye about 20 years ago and I still like it the best. It's easy to use and gives me what I'm looking for." For the past two years, Brad has also planted 35 acres of a winter kill mix including oats, peas, radishes, sun hemp and sunflowers, and had radishes flown on in 2014.

Cover Crop Acres Planted in 2014: 750 acres, plus wheat. "I try to get at least 2/3 of my fields in cover crops"

Brad's Tips:

- Don't aerial seed when there is still a lot of cover.
- Try going with early beans; they can compete with late beans and you get them off and the cover crops on earlier.
- When killing cereal rye, kill the day before you plant. "I never kill without knowing that I'm planting." Or plant through and kill the cereal rye right after. "By planting through, you knock a lot of the rye down and the spray gets to it better."
- It is essential to get the seed in contact with the soil. If you get well into October, get the drill out.

Improvements Seen:

- It takes time, but over the years, it definitely makes a big difference in yields. The cover crops have helped with organic matter and infiltration.
- "The rye really takes the moisture out of the ground. In wet springs, this is some of my driest ground."
- "About 10 years ago, I started noticing weed suppression. This is a big one."
- "Beans look much better. The herbicide works its way into the ground through the cereal rye and doesn't pool in low spots. I don't see the leaf burn on the bottom of the beans."

Future Plans: "I'm hoping to plant some annual rye in 2015. I'd also like to try kale."

Advice for First Timers: Use cereal rye and plan ahead. Talk to someone – other farmers, SWCD and NRCS staff – or check some books. Don't be afraid of cover crops. It works and it's exciting.

Ernie's field planted with wheat and an up close photo of his modified combine.

ERNIE HATFIELD

Mr. Ernie Hatfield has been farming in Felicity, Ohio since the mid 1970s. He first began working with cover crops in the 1970-80s, using strips of wheat to slow down water on his fields. He began planting cover crops more regularly three years ago after he modified a combine for planting cover crop seed. Ernie has generously volunteered his time at local field days and workshop to share his experiences farming and using cover crops.

Ernie at his farm in Felicity.

Reason for starting: Started cover crops as a means to control erosion, but has found other advantages over the years

Cover Crops Planted: Wheat, cereal rye, crimson clover and tillage radish

Acres Planted in 2014: Over 600 acres

Planting Method – Ernie has modified his combine by adding seeder boxes in back of the soybean header and seed tubes. Once the header drops, planting of the cover crop seed starts. The soybean residue provides a nice mulch for the cover crop and aides in germination. The seeder boxes are filled half-way, although up to 1,500 lbs of seed can be loaded without interfering with the header control. The combine can cover about 30 acres before needing to refill the seeder boxes.

Ernie is willing to offer assistance to other area farmers interested in modifying their combine.

Ernie's Tips:

- Plant the early maturing soybean seed. This yields just as well now as the late seed and this helps in planting the cover crop earlier.
- Don't spray in the fall. Volunteer grasses also help.
- Don't be too concerned about cereal rye getting knee high. It's not much of a challenge to plant through this with a no-till drill.

Improvements Seen:

- "A yield advantage in corn. I was unlucky with rain this year and still had a good yield."
- "I'm always looking at streams after a rain. I see a big change here. The water coming off my fields doesn't look muddy at all." Erosion ditches are starting to heal themselves. "Don't till your erosion ditches. They wash out again quick and just become a soil delivery system to the Gulf of Mexico."

Future Plans: Ernie is interested in planting into cereal rye and spraying after.

Advice for First Timers: "Start slow. Plan ahead and be ready. Get it into your mind that you are going to do this."

CLERMONT COUNTY, OHIO

Greg and Jodi Nause, along with their children, at their farm in Blanchester, OH.

Greg Nause

Mr. Greg Nause resides in Blanchester, OH and has been farming for 6 years. He recently began using cover crops to improve the health of the soils on his fields. Since 2012, Greg has experimented with test plots using various cover crop mixes. Greg has also volunteered much time to host cover crop field days at his family farm.

Greg at his farm in Blanchester, OH during a cover crop field day

Reason for starting: "I have 5-6 different soils on my farm and soil tests revealed that more organic matter would be beneficial. A couple of friends told me about cover crops and it all made sense. The benefits will outweigh any sacrifices."

Cover Crops Planted: Greg has planted annual rye and clover each year. He has used aerial seeding (2012-13) and also drilled after wheat in 2014. In 2014, Greg added radishes to the cover crop mix. He also experimented with different cover crop mixes and planted 10 test plots; mixes included radishes, oats, clover, kale, Cahaba vetch, cereal rye by both broadcasting and drilling.

Acres Planted in 2014: 126 acres

Greg's Tips:

- Be patient but prepared when killing annual rye. It has to be growing.
- Above ground annual rye will be dormant on cool, cloudy days. Spray it on warm, sunny days.
- "I've had a lot more success flying over beans than corn, but have had success with both. You need to watch your planting dates. With beans, you want at least 30% leaf drop before flying. Leaf drop is very important for getting the seed to the ground."

Improvements Seen: Greg says he sees improved soil condition, moisture retention during dryer weather and percolation. "There's no doubt the soil is working different. The water coming off my fields with cover crops after a rain is clearer than the creek water."

Future Plans: "In 2015, I might try planting through annual rye and killing it after. I'd also like to try more kale. It's got a great root system, it's winter kill, and you can plant it later than radishes."

Advice for First Timers: "Planning is the most important thing. Don't be in a hurry. Don't short cut it. Be ready and do it right. Also, listen to people with experience, including seed dealers. There are a lot of articles and discussions online. I find it to be educating and exciting to talk with and read about other farmers' experiences with cover crops.

Warren County, Ohio

BRUCE GOODWIN

Bruce Goodwin resides in Pleasant Plain, Ohio. Bruce first started planting cover crops in the 1980s. Dave Brandt (an Ohio farmer and proponent of cover crops) and his daughter, who happened to live next door, were helpful as he started out.

Bruce at his farm in Pleasant Plain, Ohio

Reason for starting: Early grants were helpful for starting out. Also, the advice and experience shared by the neighbors/Brandt family was helpful.

Cover Crops Planted: Bruce started with Austrian peas. Has also used oats and radishes, crimson clover and cereal rye. In 2014, he planted annual rye for the first time.

Acres Planted in 2014: 600 acres, including 200 in Clermont County and 400 in Warren County.

Bruce's Tips:

- Peas and radishes don't like wet ground. Oats are better for this.
- If you have a lot of acres to deal with, aerial seeding is the only way to get it done. It's best to do this on open ground.
- Before choosing your cover crop, carefully consider what herbicides you have previously applied.
- Get your seed locally. You don't want to introduce anything from the outside that could become a noxious weed.
- It's best to kill and plant at about the same time to keep the beneficial organisms in the soil alive, although in reality this can be hard to do. Being prepared helps a lot.

Improvements Seen:

- "It takes a number of years to see improvements, but over time, the entire system benefits. My organic content and percolation rate has improved over the years. This occurred to me when I found oat roots in old tile five feet down and thought, Wow!"

Advice for First Timers: "Don't be afraid to get started. Realize you are going to make mistakes and learn from them."

Clermont County, Ohio

ERIC WOLFER

Mr. Eric Wolfer resides in Jackson Township (Clermont County, OH) and farms quite a bit of land in Clermont, Brown and Highland counties.

First planted cover crops: 2010

Reason for starting: Possible benefits. I began reading *Agriculture for Beginners,* a book published at turn of 20th Century. Cowpeas and clover were the thing in 1903. As the book says "You can now see their importance, for by their active aid you can constantly add plant food to the soil."

Cover Crops Planted: "I started with drilling in 18 acres of tillage radishes. I've also used annual rye and wheat. I'm still exploring options to find out what might be the best mix."

Acres Planted in 2014: Total of 280 acres.

Eric's Tips:

- Rain is needed within 24-48 hours of planting, especially when flying the seed on.
- Cereal rye has great benefits when used with limited rotations, heavy bean production
- Annual rye helps control nematodes, but it can be hard to control. The rye needs to be killed before it joints. It can be hard to spray with a conventional sprayer—use a floater sprayer to get in early.
- Be ready to accept that improving the soil is a long process, and it will take time to see the benefits.

Improvements Seen: Cover crops have loosened the soil. Radishes have been great at breaking up the compacted layer. "I've seen some improvements in infiltration and recognize the true benefits will come further down the road.

In the Future? "I think a big future benefit of cover crops will be their effectiveness in reducing pests, such as nematodes, to break the bug cycles."

Eric Wolfer at his farm in Jackson Township

Advice for First Timers: Cover crops are not new. They do good and there are lots of options. Do your research – check the Internet and talk to others. You need to experiment to find out what works best for your operation.

THE BENEFITS OF COVER CROP MIXES

Cover Crop Mixes—The More, The Better

No single species can deliver what multiple cover crops can deliver in combination. Different cover crops perform different jobs—some fix nitrogen, some scavenge leftover nitrogen in the soil, others control certain weeds or attract beneficial insects, and some extend roots, water and air deeper into the soil profile. Below are suggestions that may help address specific challenges or goals in your farming system:

- **Increase Organic Matter**: Sorghum Sudangrass, cereal rye, annual ryegrass, triticale, oats, wheat, spelt and barley.
- **Increase Nitrogen**: cowpea, winter pea, red clover, sweet clover, crimson clover, berseem clover, hairy vetch, alfalfa, soybeans and mung beans.
- **Reduce Compaction**: Sorghum Sundangrass, annual ryegrass, oilseed or tillage radish, sweet clover (deep taproot), red clover, cereal rye and oats.
- **Prevent Soil Erosion**: cereal rye, annual ryegrass, oats, wheat, barley, hairy vetch and winter pea.
- **Recapture Excess Nutrients**: oilseed or tillage radish (if planted in a mix), turnips, annual ryegrass, cereal rye, oats, wheat, Sorghum Sudan grass, buckwheat, sweet clover, winter pea, cowpea, red clover or hairy vetch.
- **Suppress Weeds**: cereal rye, annual ryegrass, oilseed or tillage radish, mustard, oats, barley, buckwheat, Sorghum Sudangrass.
- **Enhance or Begin No-Till**: oilseed or tillage radish, turnips, Sorghum Sudangrass.
- **Tolerate Heat and Drought**: cowpea, hairy vetch, mung beans, sweet clover, Sorghum Sudangrass, buckwheat, barley, teff.
- **Requires No Herbicide**: oats, cowpea, winter pea (if planted early), crotalaria, sorghum Sudangrass, and oilseed or tillage radishes

Popular Crop Mixes for Southwest Ohio

It's generally recommended to plant 3 cover crop species in combination, including a brassica (eg. radish/turnip), a legume for added nitrogen, and a grass (eg. ryegrass). If just starting out, it may be best to begin with one species, such as cereal rye, or a mix that winter kills. Examples of cover crop mixes that are manageable and cost effective.

- **Oilseed Radish/Australian Winter Pea: provides nitrogen, reduces compaction, winter kills, easy to manage.**
- **Cereal Rye Grass/Crimson Clover/Radish: provides nitrogen, erosion and weed control, reduces compaction.**
- **Oats/Austrian Winter Pea/Radish: Winter kills and is easy to manage.**

Cover Crops for Southwest Ohio

Annual Ryegrass

Cereal Rye

Sorghum- Sudangrass

Oats

Oilseed Radish

Barley

Buckwheat

Winter Wheat & Clover

Austrian Winter Pea

Crimson Clover

Red Clover

Berseem Clover

* For More Information on Planting and Managing Cover Crops, reference the following—***Cover Crops for Southwest Ohio*** (Clermont SWCD)

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