



# Conservation Infrastructure Initiative 2019 Annual Report



*"We need greater private sector engagement in implementing the Iowa NRS. The Conservation Infrastructure initiative is the right vehicle for that."*

Sec. of Agriculture and CI Co-Chair Mike Naig



*"Conservation Infrastructure can continue to be the umbrella for many other organizations to work towards common conservation goals."*

Farmer and CI Co-Chair Ray Gaesser

## Executive Summary

Co-led by the Iowa Department of Agriculture and Land Stewardship (IDALS) and the Iowa Agriculture Water Alliance (IAWA), the Conservation Infrastructure (CI) initiative seeks to increase the investment and strengthen engagement from both public and private sectors in implementing the Iowa Nutrient Reduction Strategy (NRS). This will be achieved by accelerating farmer and landowner demand for conservation practices — through outreach, education, and training — and harnessing economic drivers, innovative market-based solutions, and new revenue streams to improve water quality. The CI initiative provides a means of harnessing the power of the private sector to help implement the Iowa Nutrient Reduction Strategy (NRS). It is all about implementation — tackling projects that lower or eliminate barriers to scaling up conservation practices while creating jobs and economic development opportunities. The efforts of CI are driven by three working groups — Cover Crops, Conservation Drainage, and Strategy. This report provides a summary of recent efforts and next steps.

### Examples of CI-related advances from 2019:

- The cover crops 'boot camp' was held in Ames in December, empowering and encouraging the next generation of farmer experts to be a resource to their neighbors.
- CI participants contributed to the new Conservation Systems Best Management Practices manual and decision trees that address cover crops, conservation drainage, and other key conservation practices.
- Research on drainage water recycling (capture and reuse) is now underway in Iowa.
- Private sector demonstration sites for edge-of-field practices have been established, (e.g., Bill Couser's AGvocacy Farm) and more are being developed.
- Permanent staff positions are being created for some watershed projects.
- The ag retail sector is increasingly engaged in project proposals, training events, and creating staff positions focused on conservation.
- Over \$70M in new Regional Conservation Partnership Program (RCPP) public-private partnership project proposals were submitted to USDA in December.

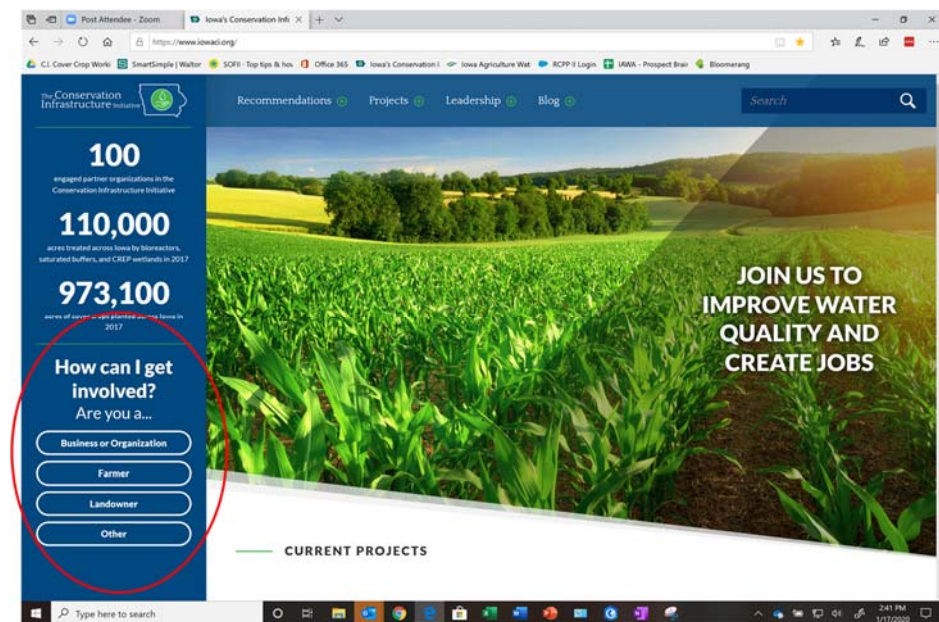
A lot has been accomplished, but the CI initiative is *just at the beginning* of a long-term effort. More help is needed from many participants. This much-needed help may take many different forms, such as providing project information and articles, helping to plan next steps and new projects that address aspects of the CI Action Plan, implementing current CI projects and recruiting new partners. One of the best ways to engage is to help us tell your conservation story. How are you implementing conservation practices that support the Iowa NRS and that help improve Iowa's water quality? Please contact Zita Quade for story ideas at [zquade@iowaagwateralliance.com](mailto:zquade@iowaagwateralliance.com).

Some key areas of focus for the CI initiative in 2020 will include:

- Increased targeting of cover crops outreach to highlight grazing opportunities and the synergies of cover crops with manure application.
- Continuing efforts to speed and streamline the design and delivery of edge-of-field practices.
- Public-facing events to introduce more people to CI, potentially at the Soil and Water Conservation Society national conference, the Soil Health Institute national conferences and the Farm Progress Show.

## How to Engage

If you already have a relationship with one of the working group co-leads (Table 1), feel free to contact them directly for more information. If you do not, the CI website ([www.iowaci.org](http://www.iowaci.org)) provides an easy way to submit your contact information and specific areas of interest, and someone from the CI Leadership Team will follow up with you.



## History of Initiative

The effort was launched at the Farm Progress Show in 2016 with the support of former Iowa Secretary of Agriculture and former CI Co-Chair Bill Northey. The CI initiative was developed to answer two key questions:

- 1) What are the barriers that prevent us from scaling up conservation practices to achieve the goals outlined in the Iowa NRS?

## 2) How do we overcome those barriers?

Many partners helped identify barriers, develop associated solutions and prioritized a set of 47 recommendations in the CI Action Plan. Conservation drainage practices, cover crops, financial assistance, technical assistance, conservation finance, planning and research were identified as key priorities.

The first CI workshop was held in December 2016. Follow up workshops were held in November of 2017 and 2018. The 47 recommendations of the 3 working groups were shared at the November 2017 workshop. Since then, efforts have been focused on implementation of the recommendations. Implementation efforts have included many different types of projects led by many different groups. These efforts have been coordinated through the three working groups described in the following section.

Secretary Mike Naig became co-chair of the CI initiative when Bill Northey was confirmed as Undersecretary for Farm Production and Conservation at USDA in early 2018. Matt Lechtenberg of IDALS replaced Secretary Naig as co-lead of the Strategy Group in 2018. In late 2019, Sean McMahon of IAWA stepped into this role. This report is the first full annual report to participants in the CI effort.

## Purposes of Report

This report is not meant to be entirely comprehensive. The purposes of this report are to: 1) provide CI participants a brief summary of the scope of accomplishments of CI through 2019, 2) identify priority barriers that CI needs to address, 3) encourage continued engagement of current partners, and 4) recruit additional partners to get the work done.

## Working Group Reports

Leaders from the private sector are well represented in the leadership of CI (Table 1).

<b>Overall Co-Chairs</b>	<b>Cover Crops Working Group Co-Leads</b>	<b>Conservation Drainage Strategy Group Co-Leads</b>	<b>Strategy Group Co-Leads</b>
<ul style="list-style-type: none"> <li>• Sec. Mike Naig (IDALS)</li> <li>• Ray Gaesser (farmer-leader)</li> </ul>	<ul style="list-style-type: none"> <li>• Sarah Carlson (Practical Farmers of Iowa)</li> <li>• Bert Strayer (LaCrosse Seed)</li> </ul>	<ul style="list-style-type: none"> <li>• Dr. Chris Hay (Iowa Soybean Association)</li> <li>• Charlie Schafer (Agri Drain and Ecosystems Services Exchange)</li> </ul>	<ul style="list-style-type: none"> <li>• Brian Selinger (Iowa Economic Development Authority)</li> <li>• Sean McMahon (IAWA)</li> </ul>

Reports from each of the three working groups are provided in the following sections.

## Cover Crops Working Group Projects

- **Cover Crops Boot Camp.** The first camp was held December 19, 2019, in Ames, with over 100 farmers participating. Presentations and discussions covered best practices for growing cover crops, economic benefits, and ways farmer leaders can most effectively promote cover crops. The CI website will be an ongoing resource to find farmers to speak to groups about cover crops. There is interest in planning another boot camp.
- **Cover Crop Incentives for Landowners:**
  - The Peoples Company and Stine Seed [Sustainability Cover Crop Initiative](#) incentive program is continuing. The cost of cover crop application will be covered up to \$30/acre, with a minimum of 120 acres and a maximum of 500 acres planted per client for new Peoples Co. land management clients who sign a 3-year management agreement and agree to plant an approved Stine seed for 3 years. Termination of the cover crops is not a covered expense. The program will be available up to a maximum of 10,000 acres. The program is available to landowners in Iowa, Illinois, Minnesota, Nebraska and Missouri.
  - ISU, PFI and the Ag Appraisers Association are working on a project to train appraisers to consider soil health changes in land valuation.
- **Third Party Cover Crop Business Program.** PFI and ISA have recently begun providing financial, business planning and marketing support to farmers and entrepreneurs involved in seed production and cover crop custom seeding businesses through a Walton Family Foundation grant. This could include support for buying equipment to share as well as paying applicators by the acre for seeding cover crops. The project is working with 10 businesses this year, and hopefully another 10 next year.
- **Public-private Partnership Incentives<sup>1</sup>.**
  - Cover crop cost share programs PFI administers for Unilever and PepsiCo with partners ADM and Cargill in 2019 accomplished:
    - Unilever/ADM Sustainable Soy and PepsiCo/Cargill Low Carbon Corn - 82,291 acres planted and \$483,270 of incentives paid.
    - Unilever/Cargill Sustainable Soy - 7,692 acres planted and \$35,320 of incentives paid.
    - PFI is expanding these programs to the Council Bluffs and Blair, NE areas.
  - Seed production companies provided cover crop incentives to farmers in addition to the publically-funded Iowa Seed Association cover crop program incentives. Approximately 1/3 of Iowa seed corn acres had cover crops in 2019.
- **Research.**

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<sup>1</sup> Original terminology in CI recommendation was 'cost-share'.

- Extensive research on the agronomics and economics of conservation practices is continuing, including work by ISU, PFI, American Farmland Trust, the Nature Conservancy, Soil Health Partnership, Soil Health Institute, EDF and others. ISA and PFI have complimentary studies under way on cover crops rates, dates, and skip row planting.
- Yield variability appears to decrease with long term use of cover crops with strip-till/no-till. Dr. Jerry Hatfield (emeritus director National Laboratory for Agriculture and the Environment) is documenting this effect through analysis of Wayne Fredericks' meticulous and long-term farm records. Analysis of similar datasets from another Iowa farm is underway.
- **Unified Messaging.** The 'Putting it Together: An Innovative Approach to Increasing Iowa's Conservation Infrastructure' project team (ISU, Iowa Learning Farms, PFI, ISA, and IAWA, through funding from NRCS) developed a process for evaluating current recommendations and building consensus for successful implementation of cover crops, strip-till, no-till, multi-year rotations, and edge-of-field conservation drainage nitrate reduction practices. To focus this process, the goal was to develop a set of best management practices for farmers and landowners who have made the decision to adopt the outlined practices and have 0 to 3 years of experience.

Recommendations for in-field and edge-of-field practices were summarized in the Conservation Systems Best Management Practices Manual and practice selection decision trees. The manual, released in March 2020, was developed using a cropping systems approach where the adoption of cover crops, no-till, strip-till, multi-year crop rotations and edge-of-field practices included nutrient management practices where appropriate.

- A project update will be developed and posted on the Conservation Infrastructure website. It will include a link to a digital copy of the manual.
- Copies of the decision trees will be printed separately for distribution. They will be made available in every NRCS field office.

#### Communications and Coordination

**CI Cover Crops Working Group Monthly Conference Call.** Half-hour conference calls are held on the 4th Friday of the month at noon to facilitate coordination of efforts and sharing of technical information. Eleven calls were held in 2019 with a total of 200 live attendees. Regular attendees include representatives from ISU, Iowa Soybean Association, NRCS, IDALS, farmers, IAWA, Conservation Technology Information Center (CTIC), Agribusiness Association of Iowa (AAI), Co-ops, etc. Manufacturing and ag supply business have also been regular attendees (e.g., Hagie Mfg. Co., Montag Mfg. and LaCrosse Seed). Past topics have included updates on projects, initiatives, new technologies, metrics, etc. The calls provide an important means of keeping the working group members informed, engaged, and coordinated. New ideas are needed for future calls.

- **'Agronomists in the Know' Monthly Conference Call.** A monthly 30-minute call was launched in July as a means of sharing technical information on cover crops with CCAs / professional agronomists (not farmers), and to provide a forum for discussion. In 2019 topics included

information on prevented planting, overseeding, methods for increasing cover crop usage by clients, seeding rates and dates, etc. Live attendance on these calls ranges from about 10 to 30 people. CCAs can receive CEUs for attending.

- **CI Website Blog.** The blog ([iowaci.org/blog](http://iowaci.org/blog)) provides a forum for news on the latest developments in building Iowa's Conservation Infrastructure. Information for a few cover crop farmer "Champions" that are ready to speak at events will be posted on the website this year. A link to PFI's website will be added for matching requests to individual speakers.

## Trends

- **Growing Ag Retail Leadership.** Landus, New Coop, and Nutrien are sharing a conservation agronomist provided by Agriculture Clean Water Alliance and the Iowa Soybean Association to help the cooperatives' farmer customers adopt conservation practices. IAWA and SARE recently co-hosted a cover crops training for over 30 Certified Crop Advisors and sales agronomists from several agricultural retail companies based or operating in Iowa. Land 'O Lakes emphasized conservation at a recent national conference for SUSTAIN growers. In addition to rebranding SUSTAIN as TruTerra, there were presentations on the importance of conservation to growers and their ag retail partners. The meeting included a presentation by a long-time cover crops and no-till farmer who described a reduction of fertilizer and crop protection inputs.
- **Trafficability and Timeliness Advantages of Cover Crops.** Anecdotal reports increasingly indicate cover cropped fields have improved infiltration, drainage, surface soil strength, etc., which enables planting and harvesting when conventional tillage fields are too wet, but definitive data are lacking. This benefit may also be important for manure application. The years when Iowa receives above-average precipitation are creating opportunities to promote these advantages of cover crops.
  - The most common impact may be late spring trafficability advantages, e.g., spraying in June, especially for the 'planting green' approach with soybeans.
  - Stories of farmers seeing the benefit of trafficability with no-till and cover crops need to be shared more widely.
  - Montag and Hagie are developing a video that addresses this issue. It highlights the ability of one farmer to get into his fields and harvest relatively soon after a 3-inch rain.
- **Ecosystems Services Markets.** Private companies (Indigo, Ecosystem Services Markets Consortium, NORI, Soil and Water Outcomes Fund, TruTerra, and others) and NGOs are building a carbon market. This may help incentivize the use of cover crops and no-till.
- **Research:** ISU will establish research plots to inform conducive herbicide packages with interseeded cover crops in 30-in and 60-in corn rows.

## Tools

- **Economics of Cover Crops.** The cover crops ROI calculator [\*is complete\*](#). ISU has two versions of the calculator on-line. NRCS also has a downloadable tool.
- **Seeding Calculations.** ILF and the Midwest Cover Crops Council have on-line tools.

## Needs and Next Steps

- **Cover Crop Science and Education Portal:** The portal is still needed. The portal could be a single place for researchers to collaborate on research, share research, and for farmers and industry stakeholders to access this information in one location.
  - One potential location for a link to the portal is ISU's Iowa NRS website.
  - Ideally the portal would have both a peer-reviewed research section and a section devoted to less rigorous but still useful information such as data from demonstration projects.
- **"Uber" Type Application.** PFI will develop and launch an EPA-funded "Uber"-style app for matching cover crop customers with applicators.
- **Unified Cover Crops Messaging for Ag Retail.** The unified cover crops messaging concept needs to be expanded to include ag retailers. It would be most effective for them to go through their own process to develop unified messaging.
- **Water Balance Impacts of Cover Crops.** Cover crops increase evapotranspiration, especially in the spring. This needs to be better understood and shared in terms of impacts on field operations, drought impacts and flood benefits to others downstream.
- **Targeted marketing for cover crops.** A significant fraction of seed corn acres now use cover crops. What are the next segments to target?
  - Grazing cover crops. Cow-calf operations often need more extensive and economical sources of feed.
    - More fence infrastructure is needed. There is a proposed fence pilot project with NRCS, PFI, IAWA, and the Iowa Cattlemen's Association. Minnesota NRCS is cost-sharing fence for grazing cover crops on cropland using EQIP funds.
    - Pesticide labels are also a barrier in terms of grazing restrictions. Labels are less restrictive for wheat than other species. It is difficult to find products that control tough weeds like water hemp that don't have a label restriction on grazing. A dialogue with herbicide providers is needed to help address this issue.
  - Swine – manure nexus?
    - Timely manure application has become increasingly difficult in recent years due to seasonal shifts in precipitation (recent increases in spring and fall precipitation create smaller/shorter windows for application). Improved trafficability due to cover crops can expand the application window without excessive compaction. Spring manure application results in less nutrient loss and increased yields, but application equipment and operator limitations, in addition to weather-influenced application windows, are barriers.
    - A detailed study of the large water quality benefits of combining cover crops with swine manure is continuing at ISU's Northeast Research Farm (Nashua, IA)



(Dougherty et al., 2020a, 2020b). Results from this study to date have showed that an early fall manure (applied when soil temperatures were greater than the recommended 50°F) with cereal rye cover crop resulted in significantly lower 4-yr average nitrate-N concentrations in drainage water compared to early fall manure without a cover crop in a corn-soybean rotation. Data from the 4-years of data suggest significant recycling of both residual soil nitrate-N and manure N occurred with both crops. Potentially informing an expanded window of manure application with reduced impact to the environment

- **Pre-Payment of Input Costs as Barrier.** Farmers often pre-pay on some inputs such as herbicides 6 months in advance. They don't know until late in spring if cover crops will allow avoiding a herbicide pass. A greater understanding of the impact of this kind of decision process is needed.

## Conservation Drainage

### Projects

- **Best practices and decision tool development (for Conservation Drainage, see previous entry under Cover Crops).** This project also includes conservation drainage practices. As part of this effort, several members of the Conservation Drainage core team and working group participated in an edge-of-field practice summit to inform the development of the decision trees. The decision trees provide a first cut analysis to see if it's worth taking planning and design to the next step.
- **Transforming Drainage Project (EPA-funded).** IDALS-led project includes installing and monitoring drainage water recycling systems, bioreactors, saturated buffers, and new tile zone wetlands. Several new drainage water recycling sites are to be constructed and monitored to evaluate this emerging practice in Iowa. The bioreactors will cover a range of situations to better evaluate the impacts of the current capacity-based practice standard that restricts bioreactors to fewer places on the landscape. A combined bioreactor/saturated buffer site will provide information on the environmental and financial benefits of stacking edge-of-field practices in the same location. Tile zone wetlands will be installed and monitored as a potential new siting option for treatment wetlands.
- **Drainage water recycling.** Drainage water recycling is being studied at the Hermanson farm near Story City, IA. The 2019 dataset should provide important insights — a wet spring followed by a dry summer were ideal for gathering data. Irrigation was extensive in July and August 2019, and crop yield and water quality impacts will be examined.
- **High Intensity Application of Saturated Buffers - Polk County.** Polk County Soil and Water Conservation District, in partnership with Agricultural Drainage Management Coalition, will be doing outreach for construction of up to 25 saturated buffers in the Four Mile Creek watershed as a single project with one general contractor. The overall objective is to develop and demonstrate a more efficient model for delivery of edge-of-field practices.



- **Potential Large-Scale Demonstration Farm.** Ecosystems Services Exchange (ESE) is working with an 825-ac northwest IA farm to design and install a conservation drainage system from scratch. The system will be optimized for water management, water quality and yield through technology. The owner is interested in using the farm as a demonstration site.
- **Scaling Up Capacity to Implement Water Quality Wetlands.** This new INREC-led, IDALS-funded project seeks to develop a model for increasing the technical and landowner services available to build water quality wetlands. The project taps into the existing capacity of drainage district boards of trustees and their associated drainage engineers to potentially design and build wetlands faster. The project hopes to provide a model that can be replicated in other counties, but the primary focus areas are Kossuth, Palo Alto, Clay, Pocahontas, Boone, Story and Hamilton counties.
- **Using EQIP to Fund Constructed Wetlands.** IDALS is working with NRCS on using EQIP to fund constructed wetland projects. One has been built, four are underway, and several more are under development. By comparison, there was only one constructed wetland completed through EQIP in Iowa in the previous decade.

#### Communications and Coordination

- **Drainage Water Quality Workshop.** This December event in Fort Dodge focused on building the network of designers for conservation drainage practices. The training was primarily for engineering firm designers and contractors interested in practice design, but the workshop was also attended by watershed coordinators wanting to better understand site suitability and gain a deeper appreciation for conservation drainage design.
- **Contractor Education.** There has been a conservation drainage component at the Iowa Drainage School for several years, but now contractors are being encouraged through this training to consider conservation drainage practices as a business opportunity, including examples of drainage contractors that have incorporated these practices into their services. Another program, the Drainage Water Quality Practices Workshop, provides information on how contractors can include conservation practices in their projects.
- **Conservation Station ‘On the Edge’.** Iowa Learning Farms developed an educational trailer on edge-of-field practices for use at field days. It was first used in 2018 and was heavily used in 2019. It has been a very helpful education tool with farmers and landowners. In the first two years, 46 events were held, reaching nearly 1500 farmers and stakeholders. Conservation Station ‘On the Edge’ is a collaboration of Iowa Learning Farms, IDALS, Iowa Department of Natural Resources, USDA-Natural Resources Conservation Service, Iowa State University Extension and Outreach, Leopold Center for Sustainable Agriculture, Iowa Corn, Iowa Soybean Association, IAWA, Iowa Farm Bureau Federation, and Agri Drain Corporation. A new wetlands-themed Conservation Station trailer is being developed and will be available in late 2020.

#### Tools

- **Scaling Up Edge-of-Field Practice Design.** Chris Hay supported development of a University of Illinois proposal on edge-of-field practices. One key goal is to define how to design bioreactors in the 1,000s (as opposed to the typical research study focused on optimization of the design of

individual bioreactors). The project includes real-time nitrate sensors, HYDRUS modeling and design changes to scale-up bioreactors in the Midwest.

- **Evaluating Drainage Water Recycling Decisions.** ISA and ISU contributed to the development of the Evaluating Drainage Water Recycling Decisions (EDWRD) online tool for farmers, contractors, and agency staff to explore the potential of drainage water recycling to provide supplemental irrigation and water quality benefits.

## Needs and Next Steps

- **Funding automated control of conservation drainage practices.** The NRCS State Technical Committee has approved a payment structure for automation of edge-of-field practices.
  - New technology with two-way telemetry allows automated control of water levels. Agri Drain notes that manual control is feasible (i.e., infrequent adjustments) to achieve water quality objectives of edge-of-field practices; yield enhancement from controlled drainage requires automation (i.e., frequent adjustments).
  - Automation of water level controls, even with relatively infrequent adjustments, increases the likelihood that seasonal adjustments will need to be made. Moreover, automation may increase the attractiveness of edge-of-field practices as a reliable source of nutrient credits in the Nutrient Reduction Exchange or other future markets.
- **Economic Data for Edge-of-Field Practices.** A proposal has been submitted for a national NRCS Conservation Innovation Grant (CIG) for on-farm edge-of-field research. A key component will be to show impacts of these practices on both water quality and return on investment (ROI). More water quality funding will be coming in future years. Additional data are needed to back up how money would be used for conservation drainage practices.
- **PE Stamp Requirements.** The core team suggests the requirement for a professional engineer (PE) stamp on many conservation drainage practice plans be evaluated and potentially eliminated. Designs are becoming relatively standardized, consequences of practice failure are low, and the cost and time associated with the PE stamp is a significant barrier to accelerating progress on edge-of-field practices.
- **Crop Insurance Discount.** The core team suggests creating a federal crop insurance premium discount to farmers who invest in drainage water management.
- **Building Edge-of-Field Practice Design Capacity.** More designers will be needed to scale-up these practices, however, demand for the practices must increase to incentivize designers to provide this service. Inadequate design capacity results in excessively long waits for landowners, and interest can fade.
- **Other Needs**
  - The ACPF statewide saturated buffer website is misidentifying site suitability for (saturated buffers) because of the former 8-ft channel depth standard.
  - Providing adequate technical assistance for conservation drainage practices is a challenge because current policies add unnecessary complexity.
  - Bioreactors currently have a capacity-based standard. More sites could be approved for bioreactors without this standard, and more water could be treated. More research is needed to support changing to an outcomes based standard.

## Strategy

### Projects

- **Scaling up watershed planning.**
  - IDALS has funded eight watershed planning projects through Planning and Development Grants based on CI recommendations. The grants will fund some traditional holistic plans and other plans specific to infrastructure practices that can be developed quickly.
  - A cheaper, quicker “watershed plan light” has been developed and tested for diffusion areas around the “hub” of an established, successful watershed project. Five diffusion hub projects have been established with financial support from the Walton Family Foundation and National Fish and Wildlife Foundation (NFWF).
  - The Iowa Watershed Approach, through a \$97M grant from the U.S. Dept. of Housing and Urban Development (HUD), is developing watershed plans for 8 different watersheds in Iowa. Flood protection and resiliency is the primary objective of the project, but water quality is a key secondary objective. All of the plans are either complete / in some stage of adoption or are nearly complete.
- **Biodigesters.** For the past year, IEDA has been on a strategic path to explore the potential for biodigesters. EcoEngineers have been mapping overlays of livestock production, cover crops use, and natural gas infrastructure. Cover crops (and corn residue) can provide a source of additional biomass to feed digesters.
  - A surprising benefit has emerged. Connecting biodigester gas production from crop residue and manure feedstocks to the ethanol industry appears to dramatically increase the economic feasibility of biodigesters. Processing manure in a biodigester reduces greenhouse gas emissions from manure storage. The net result of integrating the biodigester with ethanol production is an opening of the more lucrative California low carbon market to Iowa ethanol. Row crop producers, livestock producers, and the ethanol industry could all reap benefits. IEDA is working closely with IPPA to make sure the concept is well-aligned with the needs of livestock producers in the area.
- **Private Sector Conservation Planning.** A process for private sector conservation planning has been established. Conservation plans for approximately 30,000 ac have been completed in Middle Cedar, Upper Cedar, and North Raccoon watersheds.
- **Iowa BMP Mapping Project.** GIS maps have been created detailing the location and extent of structural conservation practices (terraces, ponds, water & sediment control basins, grass waterways, contour strip cropping, contour buffer strips) for every watershed in Iowa. This provides the current status of practices across Iowa to provide a complete baseline set of BMPs dating from the 2007-2010 timeframe for use in watershed modeling, historic occurrence, and future practice tracking. This project has been funded by the Iowa Department of Natural Resources, IDALS, Iowa Nutrient Research Center at ISU, National Laboratory for Agriculture and the Environment, the Iowa Nutrient Research and Education Council and AmericaView.
  - Preliminary statewide data (Appendix E, 2017-2018 Annual Progress Report of the Iowa Nutrient Reduction Strategy):

- 246,139 WASCOBs, 88,874 miles of terraces, 114,423 pond dams, and 327,904 acres of grassed waterways, 557,732 acres of contour buffer strips
  - A companion project to the 2010 baseline inventory data tracks whether one of these conservation practices was evident in the 1980s or in current 2016-2018 imagery. The goal of this project is to assess a representative sample of HUC12 watersheds across the state in order to determine the trends in overall changes in practice levels from the 1980s to 2010 and on to 2018. For the 1980s review, practices that are identified as partially existing are split at the relevant location and each piece is identified with the necessary status. No new practices are digitized from the 1980s imagery, only practices existing in the baseline inventory are evaluated. With the current imagery, practices existing in the inventory are evaluated like the 1980s; new practices are digitized and added to the dataset. The evaluation procedure is being done on 20 percent of the entire state's HUC 12s; random sampling is done by HUC 8 to choose which HUCs are processed. After a HUC 12 has QA/QC performed it is then evaluated for 1980s and current imagery presence or absence.
- **INRS Progress Tracking System (via Ag Retailer Sales records).** A statistically representative, random survey of ag retailer sales records and field notes detailing farmer adoption of nutrient management practices outlined in the Iowa NRS science assessment. INREC and ISU are the collaborators on this public-private partnership. INREC collects confidential farmer data on practice adoption levels across Iowa and provides this data in aggregate form to ISU. This information is used to estimate practice adoption and track progress towards the INRS goals. 2019 crop year data collection and analysis are underway. 2017 and 2018 crop year surveys are complete.

#### Communications and Coordination

- There has been recent outreach with farm management companies (Peoples and Hertz) to help them integrate conservation drainage into their approach with clients.

#### Funding

- Supplemental funds (\$2M) from MRBI funding have been secured as FA to support 8 watershed projects.
- IDALS secured \$100k agreement with EPA to support advancing the Iowa NRCS. Iowa's project focuses on reporting, quantifying, outreach, analysis, and assessing the current approach.
- CI partners such as IDALS, ISU, PFI and IAWA have raised nearly \$3,000,000 through grants that directly pertain to the Conservation Infrastructure initiative.
- IEDA has funds for economic development assessment, including:
  - DOE federal funds: These funds can be used for assessments, analysis deliverables, salary costs, etc. Applications are reviewed monthly.
  - Iowa Energy Center (utility funded): There is at least one competitive grant funding announcement per year and it is expected there will be an opportunity announced in early 2020. The Iowa Energy Center also manages a 0% interest revolving loan fund

which supports the development of renewable energy production projects including anaerobic digesters. The loan funding decisions are made at least once per quarter.

### Needs and Next Steps

- IDALS is increasing staff to support water quality projects, hiring 3 more watershed coordinators (in Floyd, North Raccoon, and Middle Cedar). This is in addition to the current watershed coordinators stationed in the North Raccoon, Boone and Middle Cedar River watersheds. It is anticipated that this transition to permanent positions with benefits will significantly reduce turnover in these positions.
- The Ag/Energy/Water nexus is a key focus area of IEDA and connects directly with CI.
- The Nutrient Reduction Exchange is operational, and project data are being entered in the Regulatory In-lieu fee & Bank Information Tracking System (RIBITS) database.
- Work is on-going for expanded options that fit low interest financing or other financial mechanisms for conservation infrastructure.
- IEDA is investigating the potential to support the development of a Wastewater Treatment Research and Development Facility. More details need to be ironed out on this particular project but new technologies could provide benefits for water quality and economic expansion, particularly for small towns. IEDA is investigating the potential synergies and opportunities related to bonding authority (i.e., green bonds related to water quality) through collaborations between IEDA and IFA. IDALS is also looking at emerging markets for cellulosic ethanol, SO<sub>2</sub> credits, etc. IDALS submitted a CIG proposal that wasn't successful but was connected with FSA's Soil Health Income Protection Pilot Program (SHIPP).

### General Outreach on Conservation Infrastructure

The Conservation Technology Innovation Center held the Conservation in Action Tour in Iowa in August. The CI initiative sponsored at the diamond level and helped line up speakers and tour stops. CI Co-Chair Sec. Naig spoke to the CTIC tour attendees at the kick-off event. He highlighted the great work that CI is doing through public-private partnerships to address the recommendations in the Conservation Infrastructure Action Plan. Sean McMahon also presented on CI to tour attendees at the Couser farm.

- [CI Website Blog](#) – use to create awareness of opportunities.

### Public Facing Events in 2020

The CI leadership team is considering several opportunities to broaden awareness of the important work many partners are doing to advance Iowa's Conservation Infrastructure. These include:

- 75th SWCS International Annual Conference (July 26 - 29, 2020, Des Moines, IA)
- Soil Health Institute Annual Conference (July 30-31, 2020 Des Moines, IA)
- Farm Progress Show (September 1-3, 2020, Boone, IA)

### Other Events in 2020

- There may be a CI conference in late 2020 or in 2021 to bring participants together.

- The bulk of the updates from the working groups' co-leads on projects and progress would be provided in advance of the meeting. The majority of the conference will be spent on engagement of participants and identifying the next steps.

## References

Dougherty, B., Pederson, C., Andersen, D. and M. Helmers (2020a). Effect of Manure Application Timing and Cover Crops on Yields, *Research Farm Reports* (In Press)

Dougherty, B., Pederson, C., Andersen, D. and M. Helmers (2020b). Effect of Manure Application Timing and Cover Crops on Water Quality, *Research Farm Reports* (In Press)

## Appendix – Conservation Infrastructure Recommendations

<b>Table 1. Strategy Working Group Recommendations</b>		
<b>No.</b>	<b>Title</b>	<b>Description</b>
1	Tracking CI Progress	Develop and share a semi-annual dashboard to track the progress of CI recommendations, activities, and results that are focused on achieving the Iowa NRS goals.
2	Multi-Stakeholder Training Workshops	Conduct at least two multi-stakeholder training workshops covering existing and new tools to put information and best practices into the hands of farmers and landowners as well as technical assistance providers. Workshop locations and content will be tailored to the unique needs of the area and audience.
3	Business Infrastructure Needs Assessment	Survey existing conservation related businesses and entrepreneurs to evaluate existing barriers to entry and expansion. Conduct a needs assessment regarding access to capital and equipment, business planning, advertising, technical training, etc.
4	Economic impact scenarios	IDALS, IAWA, and IEDA collaborate with other stakeholders to analyze the economic impacts that varying levels of conservation practice implementation will deliver for local communities, counties, and the state.
5	Expand public-private partnerships	Expand funding and engagement opportunities for public-private partnerships across both sectors, enabling private sector conservation delivery while making implementation of practices easier and providing increased business opportunities for private sector investment and leadership. Encourage sustainable agriculture supply chain projects by working with supply chain partners to create value that increases the adoption of conservation practices by farmers and landowners. Potential options could include: commodity premiums, information exchange, and access and training to decision support tools.
6	Land management and financial sector outreach	Work with farm and land management organizations, agribusinesses, and the financial sector to revise models for socio-economic benefits of conservation practices. Leverage precision ag platforms and publicly available data sets to conduct sub-field scale profitability analyses to better determine acres within fields with negative ROI. These institutions and land managers can then quickly and easily see the value of putting conservation practices on those acres.
7	Renewable energy – Water quality nexus	Encourage and promote projects that deliver multiple benefits related to expanding renewable energy production and improving water quality and soil health. Pilot biomass projects utilizing cover crops and perennial bioenergy feedstocks for



		methane digesters. Expand natural gas pipeline infrastructure for renewable biogas projects that will create additional value for perennial vegetation and cover crops.
8	Sustainable funding	Secure public and private sector resources, including financing, to leverage public funding to provide adequate financial assistance, technical assistance, watershed planning, water quality monitoring, communications, and outreach to implement the Iowa NRS.
9	Expand urban-rural partnerships	Foster greater collaboration among urban and rural partners including urban utilities and rural community source water utilities interested in investing in upstream conservation practices (i.e. Watershed Management Authorities, Nutrient Reduction Exchange, watershed planning and other urban-rural activities).
10	Evaluate public and private benefits of conservation practices	Conduct a study on the benefits of conservation practices conferred to farmers, private landowners, downstream users, and the public. The study should include a component on how conservation practices factor in Life Cycle Analyses (LCA) and environmental footprints for food and agricultural value chain products. The LCA will be used to inform the supply chain of socio-economic benefits and opportunities to invest in local conservation efforts. The public-private benefits study will be used to inform the appropriate levels of cost-share associated with practices.
11	Conservation practice funding analysis	IDALS, IAWA, and other interested stakeholders engage IEDA to assess the economic development benefits and public-private partnership funding opportunities and their potential impact on adoption of conservation practices that lead to improved water quality and flood control for downstream communities.
12	Watershed planning capacity assessment	Assess the state's current public-private capacity to create effective watershed plans and adjust resources to fully support (or increase) that capacity. The assessment should consider the capacity of, and acknowledge the need for, local leadership involvement in the development and implementation of watershed plans. The assessment should also consider opportunities for targeting conservation practices where they will be most effective and adapt management based on water quality monitoring, farmer engagement, and other effectiveness measures.
13	Market driven opportunity assessment	IEDA and other interested stakeholders collaboratively assess market driven solutions (e.g., Environmental Services) that leverage both public and private benefits and that can create

		new revenue streams for conservation practices (e.g., proposed Nutrient Reduction Exchange).
14	Increase capacity for conservation planning	With conservation plans being a prerequisite for enrolling in the Environmental Quality Incentives Program (EQIP), ensure there are adequate resources available to efficiently help Iowa farmers develop these plans. This includes having enough certified conservation planners.
15	Create financial incentives for private sector conservation planning	Partner with NRCS to create a Conservation Activity Plan (CAP) payment to incentivize private sector engagement in conservation planning.
16	Soil health metric that links soil health to farmland valuation	Calibrate and validate existing soil health measurement tools (chemical, physical, and biological indicators) to create a widely accepted soil health metric that is complementary with Corn Suitability Rating 2 (CSR2).
17	Nutrient Reduction Exchange and water quality trading	Create value for farmers and landowners as well as point source permittees through a voluntary nutrient reduction and water quality exchange.
18	Certified Land Steward program	Develop a certification program whereby farmer operators who employ conservation practices may obtain a certification that provides a competitive advantage for their farmland rental agreements.
19	Scale up watershed planning	Scale up watershed planning initiatives led by local farmer and community leaders that employs an adaptive management approach leveraging research, information, and tools to target practices for maximum effectiveness.

**Table 2. Cover Crops Working Group Recommendations**

No.	Title	Description
20	Cover Crop Champion Boot Camp	Identify and assemble training for Cover Crop Champions, co-led by farmer organizations and cover crop industry leaders to engage 500+ farmers to hone their knowledge of the science and practice of cropping systems that include cover crops and share their story to other farmers. Following training, farmers would be compensated for recruiting other farmers to plant cover crops, providing mentoring assistance, and sharing knowledge and research at meetings/workshops.
21	Ag Retailer and Ag Professionals Cover Crop Program	Provide ag retail field staff with access to credible, third party, neutral cover crop information to enable them to increase customers' agronomic and economic success in implementing cropping systems that include cover crops. Develop, coordinate, and better communicate cover crop recommendations for Iowa

		among ag retailers, state and federal conservation agencies, and academic and extension partners. Ag retail owners and executives increase conservation promotion and incentivize field staff to deliver cover crop and cash crop support succinctly to farmers and landowners.
22	Unified Cover Crop Messaging	Develop and promote a unified message around agronomics and conservation benefits of cover crops/soil health. IDALS and leading cover crop stakeholders coordinate key cover crop messaging and commit to those messages by all stakeholders involved in innovation, partnerships, implementation, outreach, and funding as part of the Iowa NRS. Celebrate and promote cover crop success stories.
23	Cover Crop ROI Calculator	Create a common cover crop ROI calculator. Publish complete information and simplified messaging that informs farmers and landowners of existing ROI information and how to calculate it for their farm. Engage with the ag retail sector to create a set of business case scenarios that show the benefits when they add cover crops to their portfolio and update the scenarios frequently.
24	Cover Crop Incentives for Landowners	Create economic incentives targeted to landowners. Build and target economic incentive programs for landowners and land management companies for using cover crops practices.
25	Third Party Cover Crop Business Program	Develop a 'Third Party Cover Crop Business Program' to increase capacity to seed 13+ million acres* and target beginning/young farmers for start-ups. Inventory gaps in the current infrastructure and account for the human labor needed to properly seed and manage 13+ million acres of cover crops. Promote beginning/young farmer entrepreneurs servicing cover crops and connect them with Ag retailers who are short on human capacity. Incentivize retailers who provide acres to custom applicators who can provide planting and termination services to increase capacity.
		* acreage figure represents only one of multiple possible scenarios for cover crops along with a mix of other practices to achieve NRS goals.
26	Public: Private Cover Crop Cost Share	Conduct two or three pilot studies to evaluate and identify which cost share models support greatest cover crop adoption and retention. Increase available cost-share funding for cover crops while leveraging existing public cost share with private investments.
27	Ag Retailer Cover Crop Business	Generate income streams and customers for ag retailers/ag businesses.

28	Cover Crop Science and Education Portal	Create a Cover Crop Science and Education Portal. Connect stakeholders with current peer-reviewed and anecdotal farmer and ag-retailer staff testimonies about cropping systems that include cover crops in Iowa.
29	Agronomic and Economic Research on Cover Crops	Fund, conduct, publish, and promote more Iowa cover crop-inclusive cropping system research focused on the intersection of agronomics and economics. Facilitate development of cover crop focused research projects throughout 2018, 2019, and beyond.
30	Align precision ag platforms and digital farm record keeping systems Cover Crop Impacts on Water and Temperature	Align precision ag platform tools with cover crop-inclusive cropping system recommendations. Leverage the growing popularity of ag platform programs to scope and conduct a pilot project that will identify the best way to incorporate cover crops' effects on water and temperature into two existing tools and models and evaluate changes in recommendations. Use the pilot project results to determine the best approach to incorporating cover crop effects into additional tools in 2019.

**Table 3. Conservation Drainage Working Group Recommendations.**

<b>No.</b>	<b>Title</b>	<b>Description</b>
31	Saturated buffer criteria	Evaluate the practical application of revised NRCS saturated buffer criteria.
32	Integrate conservation drainage into conservation planning	Develop a decision support tool (e.g., checklist or decision tree) for use by conservation planners, watershed coordinators, and other public and private sector interests to identify conservation drainage practice opportunities. Evaluate establishing CAP payments for conservation planning, bioreactors, and saturated buffers to facilitate private sector engagement in conservation drainage practice planning.
33	Conservation drainage education and training needs assessment	Conduct a needs assessment that identifies audiences and evaluates their needs for education and training on conservation drainage practices so that coordinated and comprehensive education and training programs can be developed.
34	Conservation Client Gateway integration	Integrate the (NRCS) Conservation Client Gateway tool with state-level tools so that program requirements and expectations are quickly accessible and clarified for farmers and landowners.
35	Private sector outsourcing for Technical Assistance	Collaborate with NRCS to develop a pilot project that enables private sector TSPs to fulfill the existing technical assistance needs on projects that could be designed and constructed in "bulk" allowing TSPs to participate to provide economies of scale.

36	Conservation drainage education and training	Develop a coordinated and comprehensive program of education and training on conservation drainage practices that is tailored to specific audience needs and engages public and private sector stakeholders in the design and delivery of the programs.
37	Conservation prospectus	Provide incentives to TSPs to develop a conservation prospectus that outlines the linkages between each step in the plan. This would become an avenue for piloting tools and sharing case studies that show best practices and key lessons learned.
38	Leverage Watershed Planning	Use watershed planning as a tool to identify the most efficient potential sites for conservation drainage practices in terms of performance and cost.
39	Assessment of engineering needs	Map the processes that require a licensed PE to be involved. Assess potential opportunities for revised involvement to improve efficiency without jeopardizing safety and effectiveness.
40	Income foregone	Place emphasis on federal and state incentives to alleviate constraints on construction during the growing season by incentivizing farmers to participate in an “income foregone” program that opens field access in the summer for more cost-effective construction of EOF practices.
41	Leverage tools	Combine, leverage, and enhance existing tools at multiple scales (sub-field to watershed) to better and more easily identify cost effective sites for conservation drainage practices.
42	Conservation Concierge	Develop a cloud-based service to connect farmers and landowners with conservation practice service providers to achieve their farm and field conservation goals. The service would provide the following: <ul style="list-style-type: none"> <li>• Qualifications for eligibility for private, local, state, and federal technical and financial assistance and programs.</li> <li>• Recommendations for most appropriate conservation practices by farm and field.</li> <li>• List of potential, qualified TSPs to help with planning, siting, and implementation of these conservation practices.</li> <li>• Conduct a pilot project with IDALS and NRCS.</li> </ul>
43	Restructure cost-share programs	Restructure programs according to the benefits of the practices and ecosystem services. Potential restructuring could include: <ul style="list-style-type: none"> <li>• Cost per pound (N and P) reduced.</li> <li>• Weighted to public/private benefit. If benefit is largely public, the cost should be largely covered by public</li> </ul>

		sector. If benefit is largely private, the cost should be largely covered by private sector (farmer).
44	Fully leverage LiDAR and GIS	Create a state-based data layer looking at flow ways, hydro-conditioning, and digital elevation modeling to make it cheaper, better, and faster to develop watershed plans and site and design conservation drainage practices in collaboration with on-the-ground experts and watershed coordinators.
45	Smart drainage	Link technology providers to conservation data and management tools. Enable IEDA to support system integrators to conduct a pilot in a county that has flooding issues.
46	Appropriate level of technical assistance	Evaluate technical assistance and administrative needs relative to financial assistance to support implementation and administration of conservation drainage practices to make recommendations on concomitant increases in technical assistance with increases in financial assistance for practices.
47	Evaluate financing mechanisms	Evaluate the potential for different, new, or innovative financing mechanisms to incentivize structural practices that have greater up-front costs and evaluate potential roles that drainage districts could play.