SPEA

Lead for the Greater Good

Strategies to Improve Conservation Practices in the Lower Wabash

Report submitted to Mr. Michael Sertle, Ducks Unlimited, and The Lower Wabash Collaborative Partnership

December 16, 2016

SPEA-V 600
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Executive Summary

The purpose of this report is to provide the Lower Wabash Partnership with a set of interdisciplinary strategies to improve conservation and climate change adaptation measures for use throughout the Lower Wabash watershed. We begin with a brief discussion of the motivations driving this report. An overview of our research spanning academic, government, and community engagement literature will detail our findings and relate them to conservation practices and the Lower Wabash Partnership.

The Discussions and Recommendations section explores our five recommendations in more detail. Based on our research findings, we recommend the Lower Wabash Partnership consider the following:

I. Continue to implement collaborative adaptive management (CAM) strategies to further its mission.

II. Frame conservation and climate change mitigation as a local community initiative.

III. Identify key stakeholders and implement specific engagement strategies.

IV. Highlight the importance of crop insurance premium subsidies in incentivizing conservation compliance practices.

V. Advocate for a more personalized approach to conservation program outreach for agricultural stakeholders**.**

Introduction

This report is built off the understanding that successful conservation efforts are not the product of a single actor. Stakeholders such as government representatives, farmers, and conservation groups bring their knowledge and expertise to the table. While specific conservation programs and efforts have been well documented, we believe little attention has been placed on *how* these conservation efforts work together.

Within this report, we will analyze and attempt to understand how conservation groups work together. We will produce a series of recommendations that, if implemented, can improve communication and decision making within the Lower Wabash Partnership.

Methods

Under the guidance of Dr. Vicky Meretsky and Dr. Gwen White, our group has undertaken extensive research efforts spanning academic sources, government resources, and community engagement literature. Our research was motivated by the following questions:

I. How do government policies and programs affect the Lower Wabash Partnership?

II. Are there opportunities for improved communication within the Lower Wabash Partnership?

Due to the range of available literature, we limited our scope to larger government programs. We limited our collaboration research to examples within environmental fields. Our recommendations reflect what we believe are realistic actions the Lower Wabash Partnership could undertake.

Findings

1. Strategic Management Principles and Issue Framing

Throughout the past several decades, there has been significant growth in popularity of networks and collaborations to solve complex, multidisciplinary problems (Rainey 2014). The Lower Wabash Partnership's business plan emphasizes aspects associated with collaborative adaptive management (CAM) strategies. The Lower Wabash Partnership notes its intention to rely on interdisciplinary science and best management practices that enable its stakeholders to address climate change in a dynamic policy arena. Former Deputy Secretary of the U.S. Department of the Interior, Lynn Scarlett, describes the CAM approach as "incorporat[ing] and link[ing] knowledge and credible science with the expertise and values of stakeholders and managers for more effective management decision-making" (Scarlett 2013, p. 3).

Scarlett's research suggests **credibility, relevance, and legitimacy** are three links that connect credible science to the decision-making process (Scarlett, 2013). Ongoing changes in conservation policy and the effects of climate change have caused a high degree of uncertainty among stakeholders, and Dr. Linda Prokopy's work at Purdue University has been instrumental in highlighting uncertainties among stakeholders. A CAM strategy helps develop a stronger shared knowledge base that provides insights into the specific motivations of agriculture stakeholders to determine which methods have the best chance of success (Shmeuli 2008).

The CAM links provide insight into the importance of issue framing. Scarlett's second CAM link, relevance, suggests that the more direct an impact has on a stakeholder's interests, the greater the likelihood he or she will act to address the issue. Issues that are carefully framed to elicit a response (and more importantly, action) from a targeted audience have a much greater likelihood of success. Framing conservation and climate change mitigation as a community benefit can improve the success of conservation efforts and increase stakeholder buy-in.

Care must be taken when framing climate change. Its potential impact can be lost or understated when framed primarily in a broader national or global context. Reimer et al. (2012) found that farmers who view themselves as "caretakers of their land and resources" rather than "profit maximizers" were "more likely to reduce their negative impact on the *local environment* [emphasis added] through adoption of conservation practices" (Reimer et al. 2012, p. 37). Framing climate change to highlight its impact on the local region appears to resonate the most with surveyed Corn Belt farmers and this is expected to remain true for the Lower Wabash.

Reimer et al. (2012) study of 32 farmers in the Eagle Creek (IN) watershed demonstrated that farmers who express a concern for the local environment are more willing to assume the additional costs of implementing conservation strategies and climate change mitigation (Reimer 2012). For these stakeholders, issue framing may not change their perspectives on climate change

2. Community Collaboration and Decision Making

Stakeholder identification and engagement provides conservation groups with credibility among community members by involving local stakeholders and incorporating local knowledge on region-specific agricultural practices. Ensuring that conservation is a product of multiple stakeholders and not restricted to those with a strong environmental interest can help build consensus and trust to advance conservation practices. Bryson (2012) notes the significance of beginning a collaborative process with an "inclusive definition of stakeholders so that the net consideration about who and what counts is cast widely from the beginning" (Bryson 2012, p. 427). To maximize the chances of success, conservation efforts require effective engagement of the scientific community, agricultural stakeholders, such as farmers and agricultural advisors, as well as policymakers at all levels of government. Thompson and Prokopy (2016) discuss how an individual's sense of place and environmental attitudes influence support for steps in the collaborative process (Thompson and Prokopy, 2016). Allowing these perspectives to be shared in the conservation planning process can increase support for conservation practices.

More importantly, stakeholder engagement should occur at the onset of the planning process in order to form feasible and appealing conservation techniques. Given the persistent and potentially drastic changes that are associated with climate change, early stakeholder engagement is critical to the implementation of mitigation practices. Increasing the number of stakeholders at the table can present challenges to efficient decision making, but this cost can be offset by the sharing of more opinions and more inclusive discussions about performance metrics (Scarlett 2013). Simply, more input from stakeholders can result in more informed decisions.

In addition, targeted stakeholder identification and tailored engagement ensures desired conservation strategies are communicated in a way that maximizes their importance. We will expand our analysis to two main stakeholder groups: (A) farmers; and (B) landowners, including non-operating and absentee landowners.

A. Farmers

I. Conservation Practices

Acknowledging heterogeneity among farmers can help conservation groups understand their perspectives on conservation practices. Over half of the corn and soybean production in the United States occurs within the Corn Belt. Cultivation of these crops requires intensive soil management which can cause soil erosion if proper conservation practices are not implemented. Assuming or treating these farmers as willing participants in soil erosion mitigation practices can result in little to no change in their behavior. Understanding farmers' attitudes throughout these states is a significant factor in determining effective conservation strategies, and the pitfalls of erroneous assumptions about farmers applies to the Lower Wabash Partnership. Finding conservation techniques that reflect the needs and wants of farmers will improve the region's natural resource conservation and mitigate risks to farmers caused by climate change.

The role of public opinion can also play a significant role in conservation planning. Reimer et al. (2012) suggest the general public's perception of farmers' environmental management abilities has worsened, that "farmers are no longer trusted as environmental stewards" (Reimer 2012, p. 29). Here, it is useful to recall the significance of issue framing: a conservation group may be able to use declining public opinion of the agricultural community to persuade farmers to adopt more conservation strategies.

Finding ways to communicate with farmers in innovative ways can improve the adoption conservation practices. Reimer et al.'s (2012) Eagle Creek study found that farmers who were classified by the authors as land stewards were most likely to adopt conservation practices and willing to lose some productive land or farm-based income (Reimer 2012). In this example, identifying farmers who can act as conservation champions can help reach farmers who do may be unwilling to talk to conservation groups.

II. Climate Change

Despite the science supporting the existence of anthropological climate change, farmers do not uniformly agree on its existence. Nearly one-third of farmers do not believe climate change is occurring (Arbuckle Jr. et al 2013). The remaining two-thirds believe climate change is occurring (Arbuckle Jr. et al 2013). In addition, approximately two-thirds of farmers believe action should be taken to protect against climate change, yet only 58 percent would be willing to take action on their own land (Arbuckle Jr. et al 2013). Understanding the underlying motivations for these ideas can be difficult and time-consuming, but would allow a more targeted approach to discussions about the effect of climate change on farmers.

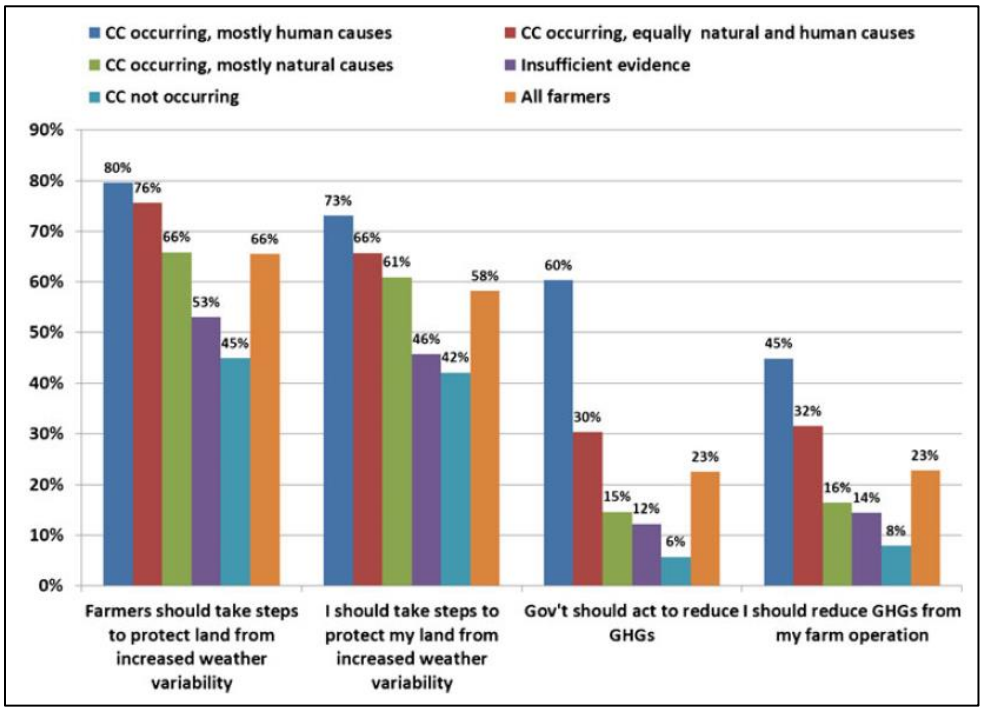

Figure 1: Climate change beliefs among farmers, from Arbuckle 2013.

B. Landowners

When considering the heterogeneity of stakeholders participating in conservation, conservation groups should distinguish the difference between farmers and landowners such as non-operating owners (NOLs) and absentee owners. Several studies reveal trends that suggest a targeted approach towards NOLs and absentee landowners may increase support for conservation practices.

I. Climate Change

NOLs hold views that support the implementation of conservation practices. Over 51 percent of cropland in Indiana, as well as 46 percent of all U.S. cropland, is owned by NOLs (Ulrich-Schad et al. 2016). Qualitative studies find that despite nearly 75 percent not having any farming experience themselves, 41.4 percent of Indiana NOLs are willing to include lease provisions requiring tenant farmers to implement soil erosion control practices (Ulrich-Schad et al. 2016). In certain cases, NOLs are somewhat or very comfortable encouraging a variety of conservation strategies including grassed waterways, no-till, cover crops, as well as wildlife habitat environment. (Ulrich-Schad et al. 2016). In other cases, NOLs are not familiar with any conservation practices (Ulrich-Schad et al. 2016) This suggests that NOLs, a significant portion of the agricultural community, are relatively knowledgeable about conservation and are willing to take action.

Absentee owners, or landowners are defined as those who reside outside of the county where their land is owned, exhibit similar beliefs about conservation practices when compared to NOLs. Absentee 76 percent of absentee owners would be comfortable encouraging renters to use certain conservation practices (Ulrich-Schad et al. 2016). Absentee owners seem to be knowledgeable and willing to partake in government-sponsored soil, wildlife, and water conservation (Ulrich-Schad et al. 2016).

Tables 1 and 2 provide more detailed information about NOLs and absentee landowners' beliefs on conservation and factors that influence their decision making. This type of rich, qualitative information should be sought and can improve conservation marketing efforts.

Table 1: Comparative statistics between in-state NOLs and out-of-state absentee NOLs, from Ulrich-Schad et al. 2013.

	In-state NOLs ($N = 395$)	Out-of-state NOLs ($N = 246$)	T-test/chi-square test
Socioeconomic and farm characteristics			
Sex (% female)	35.3%	40.3%	
Education (% with 4 year college degree or higher)	35.4%	72.4%	***
Average acres owned	202.3	216.7	
Percent earning 20% or less of income from renting out land	63.3%	78.5%	***
Factors influencing decision making			
Distance live from rented out land (mean in miles)	N/A	806.0	N/A
Percent with farming background	N/A	15.1%	N/A
Percent who inherited land renting out	N/A	74.7%	N/A
Sole owner of farmland (alone or with spouse)	N/A	43.0%	N/A
Percent visiting the land less than once a year or never	N/A	29.6%	N/A
Rent out land to family or friends	N/A	38.4%	N/A
Crop share agreement with tenant	N/A	58.0%	N/A
Factors with a lot of influence on who landowners rent out to			
Aesthetics (they keep the land looking nice)	58.6%	38.9%	***
Tradition (that's who we've always rented out land to)	54.9%	48.2%	
Tenants' concern for conservation/the environment	64.1%	48.0%	***
Income (they pay a fair value and on time)	68.2%	62.8%	
Landowner involved in decision making			
Crops grown/rotation	23.5%	26.4%	
Tillage practices	19.0%	18.5%	
Fertilizer application	13.2%	21.1%	*
Installation of structures	76.4%	74.4%	
Manure management	27.0%	29.0%	

Note: $^{*}p < 0.05$; $^{***}p < 0.001$; N/A = question not included on survey.

Table 2: Descriptive statistics for conservation practices, from Ulrich-Schad et al. 2013.

Question	Percent	Don't know practice
Somewhat or very comfortable with encouraging tenants to adopt **grassed waterways**	68.0%	21.1%
Somewhat or very comfortable with encouraging tenants to adopt **no-till**	70.9%	14.8%
Somewhat or very comfortable with encouraging tenants to adopt **adaptive nutrient management**	55.8%	32.7%
Somewhat or very comfortable with encouraging tenants to adopt **cover crops**	62.0%	21.4%
Somewhat or very comfortable with encouraging tenants to adopt **filter strips**	32.5%	38.6%
Somewhat or very comfortable with encouraging tenants to adopt **wildlife habitat enhancement**	56.0%	23.4%

Question	Percent	Uncertain
Agree or strongly agree with including a lease provision requiring tenants comply with **a Conservation Plan** under the guidance of USDA NRCS personnel	18.4%	55.5%
Agree or strongly agree with including a lease provision requiring tenants to implement **soil erosion control practices**	41.5%	41.5%
Agree or strongly agree with having lease provisions requiring tenants adopt **targeted practices**	34.5%	47.2%

Question	Percent	Don't know
Land owned enrolled in any **conservation program**	31.3%	35.8%

3. Crop Insurance Subsidies and Conservation Compliance

Pursuant to the 2014 Farm Bill, a farmer's eligibility to receive subsidies on crop insurance premiums from the Federal Crop Insurance Corporation (FCIC) is contingent upon compliance with Natural Resource Conservation Service (NRCS) requirements for proper stewardship of highly erodible lands (HELs) and wetlands. These requirements, collectively known as conservation compliance provisions, aim to prevent soil loss on HELs and maintain wetland integrity (NRCS 2016).

Financial assistance with insurance premiums is one of many U.S. Department of Agriculture (USDA) program benefits that farmers can lose if found to be non-compliant. Other benefits include Farm Service Agency (FSA) disaster relief, FSA marketing assistance and facility storage loans, and NRCS and FSA conservation program benefits (e.g., Conservation Reserve Program payments). All farmers receiving these USDA program benefits – not only those producing on or near HELs and wetlands – must complete and sign an AD-1026 form certifying compliance with these provisions (NRCS 2016). For reference, these provisions are housed within the Code of Federal Regulations at 7 CFR Part 12.

Over time, the financial safety net farmers rely on has gradually shifted away from direct payments and price supports and moved towards crop insurance products (Doering and Smith 2012). From 1996 until 2014, crop insurance was unlinked with conservation compliance, but the 2014 Farm Bill reinstated the link between the two. As a result, the increasing reliance of farmers on crop insurance as a safety net should make crop insurance premium subsidies a strong economic incentive for conservation compliance going forward.

In general, farmers will only decide to implement conservation compliance practices if the benefits of doing so outweigh the costs. The benefits do outweigh the costs, in fact, for a majority of farmers largely due to the wide-array of USDA program benefits linked to conservation compliance (Doering and Smith 2012). The net beneficial nature of conservation compliance is particularly true for farmers enrolled in conservation programs because they receive payments that meet many of the direct costs associated with compliance (Doering and Smith 2012).

Efficacy of Conservation Compliance Practices

Practices promoted by conservation compliance provisions are proven and effective means of reducing soil erosion and improving water quality. These practices include conservation tillage, crop residue management, crop rotation, and outright avoidance of putting HELs and wetlands into production. A study conducted by Claassen et al. (2004) estimated that between 1982 and 1997, conservation compliance practices directly reduced soil erosion by 295 million tons, or approximately 20 million tons per year. This estimate comprises 25 percent of total soil erosion reduction that took place over that time period. In addition, several of these conservation practices are associated with farmers earning higher profits due to savings accrued in avoided labor and fuel costs and more efficient use of time in the spring planting period (Claassen et al. 2014).

Within the Lower Wabash watershed, reducing soil erosion resulting from agricultural production is crucial to the Gulf Hypoxia Initiative's mission. Soil erosion directly causes nutrient loading in the Wabash River and, in turn, the Mississippi River, into which it feeds. Although the Wabash River is only responsible for one percent of water flow in the Mississippi River Basin, it is responsible for 11 percent of the nitrogen load entering the Gulf of Mexico (Lower Wabash LCD). Therefore, widespread adoption of conservation compliance practices in the Lower Wabash watershed will significantly reduce hypoxia in the Gulf of Mexico.

Findings: Crop Insurance Reliance in the Lower Wabash

1. **Illinois-based Lower Wabash farmers are significantly more reliant on crop insurance than their in-state peers and farmers in neighboring states.** The subsidized loss ratio best illustrates this point (Table 3). This ratio was calculated by dividing total indemnity payments by net premiums (i.e., total premiums less subsidies). Between the 2011 and 2015 crop years, these farmers were paid compensation for crop losses four times larger than the premiums they had to pay. As a result, these farmers are particularly vulnerable to crop losses, making the crop insurance safety net central to their economic well-being. Accordingly, premium subsidies should function as a very effective lever to incentivize these farmers to adopt conservation compliance practices.

2. **Indiana-based Lower Wabash farmers are slightly more reliant on crop insurance than their in-state peers.** Again, the important metric used here is the subsidized loss ratio (Table 3). Due to slight differences compared to the rest of Indiana farmers and the comparison states, conclusions regarding incentive efficacy are less clear. However, it is evident that premium subsidies are *at least* as important economically to these farmers as they are to the other evaluated groups included in Table 3.

Table 3: Crop insurance statistics for 2011-2015 crop years, from the U.S. Department of Agriculture Risk Management Agency (http://www.rma.usda.gov/data/sob.html).

State	Total Liabilities ($)	Total Premiums ($)	Total Subsidies ($)	Total Indemnities ($)	Subsidy % of Total Premium	Loss Ratio[1]	Subsidized Loss Ratio[2]
Illinois Total	58,355,751,794	3,899,521,937	2,178,520,186	5,334,143,992	0.55	1.37	3.10
Rest of State	53,962,797,498	3,485,195,109	1,924,842,771	4,669,954,455	0.55	1.34	2.99
Lower Wabash	4,392,954,296	414,326,828	253,677,415	664,189,537	0.57	1.60	4.13
Indiana Total	27,709,097,395	2,170,044,607	1,197,205,258	2,569,030,636	0.56	1.18	2.64
Rest of State	24,721,901,811	1,819,674,571	989,669,667	2,169,136,786	0.56	1.19	2.61
Lower Wabash	2,987,195,584	350,370,036	207,535,591	399,893,850	0.56	1.14	2.80
Kentucky	7,830,094,219	759,486,771	483,714,484	892,697,148	0.57	1.18	3.24
Missouri	17,108,085,084	1,965,139,493	1,274,948,423	2,671,604,284	0.57	1.36	3.87
Tennessee	5,175,199,232	538,833,240	366,584,085	357,516,596	0.61	0.66	2.08

[1]Loss Ratio is calculated as Total Indemnities divided by Total Premiums
[2]Subsidized Loss Ratio is calculated Total Indemnities divided by Total Premiums less Total Subsidies

3. **Over 85 percent of Lower Wabash crop losses in recent history have been due to drought and excessive rain.** Drought single-handedly caused 62.5 percent of total losses in the 2010 to 2015 crop year timeframe (Figure 2). With nearly $700 million in indemnity payments, the extreme drought conditions occurring in 2012 had a disproportionately large impact on total indemnities claimed over this time (Figure 3). As climate change impacts will increasingly affect weather norms, extreme drought conditions will become more common and have a severe impact on farmers in the Lower Wabash. Crop insurance is the most important economic protection these farmers have to withstand the crop, thus revenue, losses caused by drought.

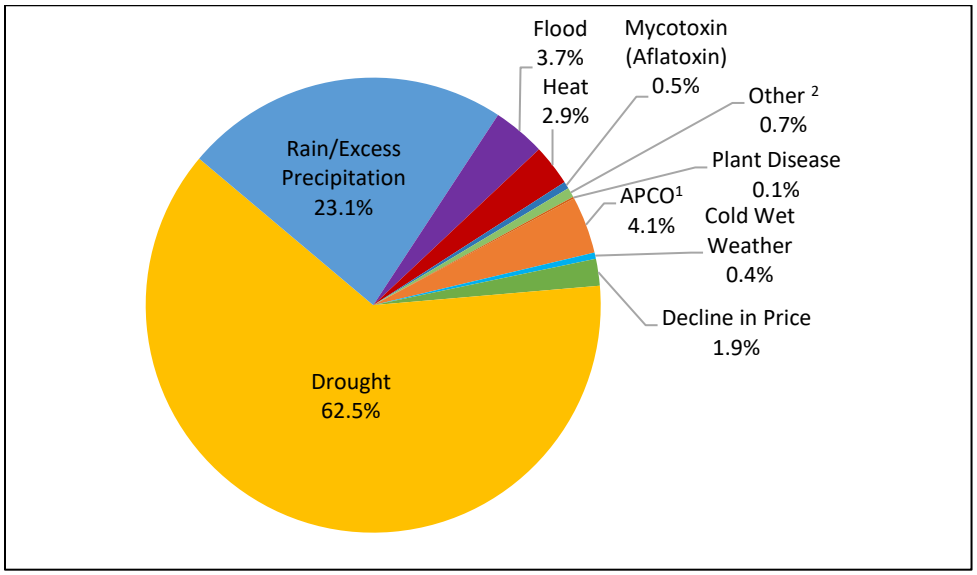

Figure 2: Top 10 causes of crop loss by indemnity amount for 2010-2015 crop years, from the U.S. Department of Agriculture Risk Management Agency
(http://www.rma.usda.gov/data/cause.html).

[1]Area Plan Crops Only
[2]RMA description of "Other" causes: "Snow-Lightning-Etc."

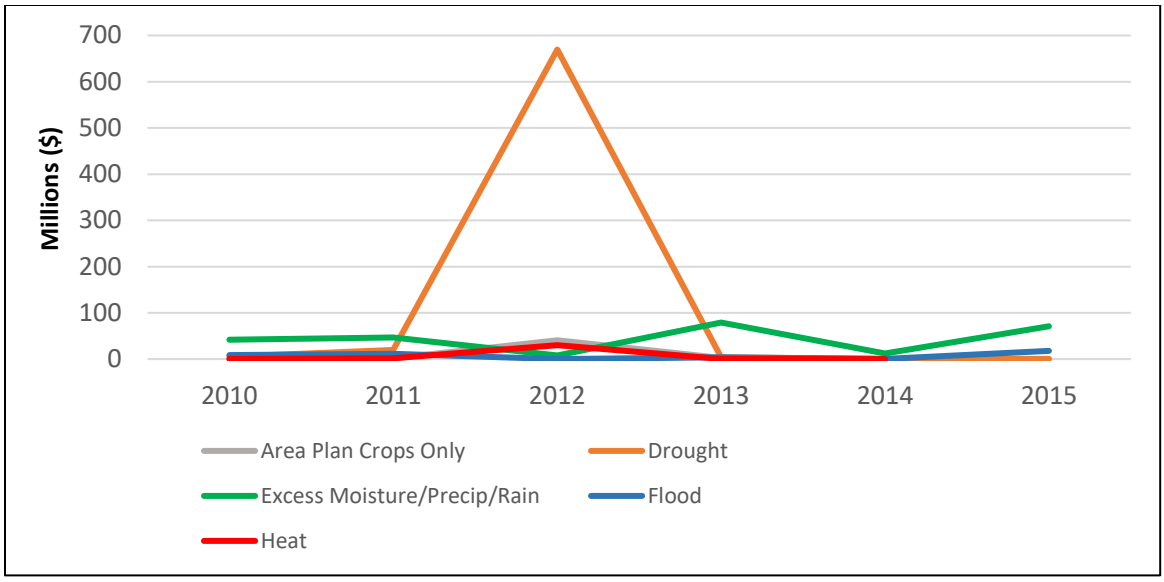

Figure 3: Top 5 causes of crop loss for 2010-2015 crop years, from the U.S. Department of Agriculture Risk Management Agency (http://www.rma.usda.gov/data/cause.html).

Conservation **Reserve Program (CRP) payments function along with crop insurance premium** subsidies **as strong economic incentives for conservation compliance in the Lower Wabash, except in three outlier counties.** Many Lower Wabash counties that received high indemnity payouts in 2015 also had large amounts of land enrolled in CRP (Figure 4). This relationship indicates that for many Lower Wabash farmers, crop insurance premium subsidies and CRP payments each function as a strong incentive to engage in conservation compliance practices. However, three Lower Wabash counties – Gallatin (IL), Gibson (IN), and Knox (IN) – received high indemnity payments but had relatively low CRP acreage. Therefore, crop insurance in these three counties likely functions as a much stronger incentive for conservation compliance than CRP payments. It also indicates that there is likely farmers in these three counties that could benefit from enrolling in CRP.

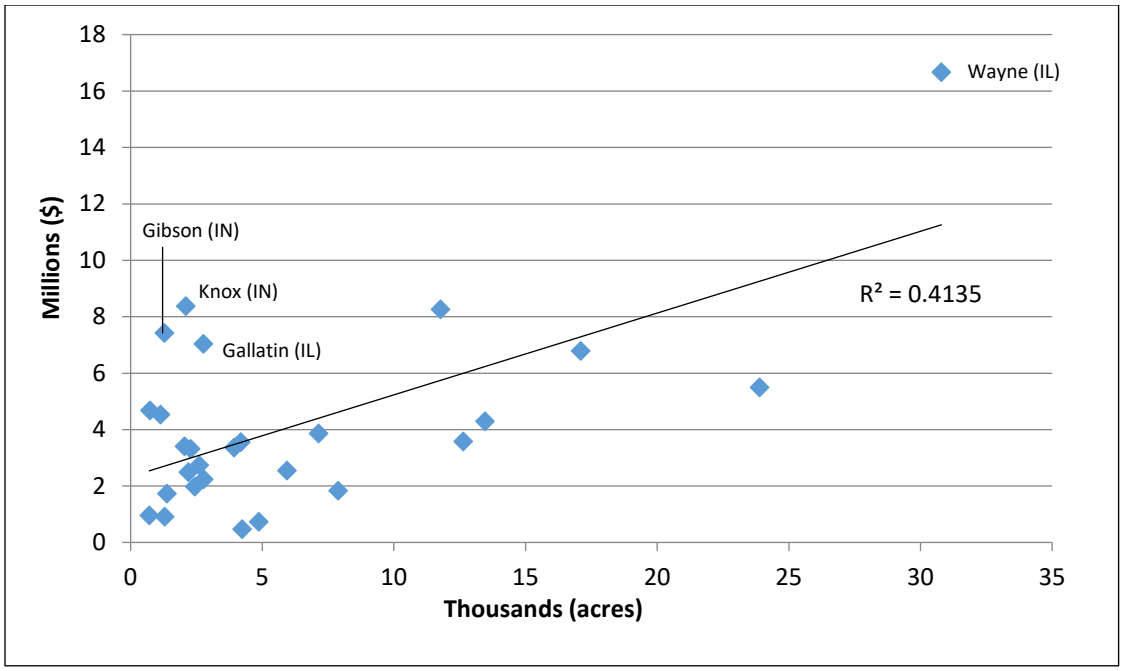

Figure 4: Lower Wabash county-level indemnity payouts (y) by Conservation Reserve Program enrolled acres (x) for 2015 crop year, from the U.S. Department of Agriculture Risk Management Agency (http://www.rma.usda.gov/data/sob.html) **and the Environmental Working Group** (https://farm.ewg.org/index.php)**.**

Crop Insurance Findings Summary

Taken together our findings regarding the drivers behind conservation compliance can inform a more effective approach towards promoting conservation practices among farmers in the Lower Wabash. Outreach efforts conducted by the Lower Wabash Partnership should highlight the economic importance of conservation practices insofar as they relate to eligibility for crop insurance premium subsidies. The Lower Wabash Partnership should also advocate for continued linkage of crop insurance to conservation compliance in the 2019 Farm Bill reauthorization. We will elaborate on these recommendations in Recommendation IV of this report.

4. NRCS Conservation Programs

According to Reimer et al. (2012), "one-size-fits-all conservation policies are inadequate given the diversity of motivations among farmers" (Reimer et al. 2012, p. 38). The current structure of the NRCS outreach program could be characterized as such. The way it is currently marketed appears to assume stakeholders are ultimately interest in conservation program implementation. There are no on-ramps to accommodate diverse stakeholders such as NOLs or farmers who want to learn more about conservation programs and practices. Figure 4 shows the five-step application process.

Figure 5: The NRCS assistance process, from the U.S. Department of Agriculture Natural Resources Conservation Service
(https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/home/?cid=stelprdb119381).

While each step containing clearly defined actions, they are cumbersome and may perceived by farmers as inaccessible and overly bureaucratic. This can discourage farmers from participating in NRCS conservation programs. According to Reimer et al (2012), "Effective use of conservation dollars, whether it is given directly to farmers or spent on technical assistance and outreach, is dependent on the ability to target outreach to the most critical areas and the landowners who manage them" (Reimer et al. 2012, p. 38). This five-step process does not have any provisions that would allow a more targeted outreach, nor are there mechanisms that enable NRCS staff to perform outreach toward farmers. In some instances, landowners note a lack of

communication renders them unknowledgeable about conservation practices (Ulrich-Schad et al. 2013).

Beyond the five-step NRCS assistance program, there are other barriers to participation in conservation programs. Table 4 illustrates some of these barriers. 29 percent believe the application process is too time consuming, 31 percent believe documenting compliance would be too time consuming, and 63 percent shared that they were unaware of environmental problems.

Table 4: Barriers to conservation participation, from McCann and Claassen 2014.

	Agree	Neutral	Disagree
	Proportion of Respondents		
I was not aware of USDA or other conservation programs	0.15	0.37	0.49
I was not aware of environmental problems (on surveyed field)	0.63	0.23	0.14
Payments are not high enough	0.20	0.68	0.12
Government standards make practices more expensive than they need to be to get the job done.	0.34	0.56	0.10
My offer would not have been accepted because the problems in this field are not national or state priorities.	0.23	0.61	0.15
The application process is too complicated and time consuming.	0.29	0.57	0.14
Documenting compliance would be too complicated and time consuming	0.31	0.55	0.12

*Based on 2012 field-level survey of soybean production and conservation practices
Source: 2012 Agricultural Resources Management Survey

The importance of effective conservation program outreach cannot be overstated. Since 2010, Indiana has received over $245 million in federal funding for the Conservation Reserve Program (CRP). This number is disproportionately larger than other conservation programs receiving federal funding. While farmers are mostly aware about CRP, they might not be as knowledgeable about these smaller programs. Ensuring that farmers are made aware of all conservation programs available to them can provide more opportunities for participation in conservation.

Discussion and Recommendations

Recommendation I. The Lower Wabash Partnership should continue to implement collaborative adaptive management (CAM) strategies to advance its mission.

We recommend the Lower Wabash Partnership strengthen its current work in adaptive management through continued adoption of CAM practices. This process will provide stakeholders at the operational level with information that enables effective decision making in regards to the implementation of conservation strategies and climate change mitigation.

CAM does not prescribe how to make decisions using this information, but it can supply the information required to make these decisions. As discussed in the findings section, CAM is effective at addressing knowledge gaps that produce uncertainty. Figure 5 presents a framework for knowledge collection that will ultimately can used to make decisions.

Figure 6: Strategic planning overview process, from Bryson and Alston 2011.

We recommend the Lower Wabash Partnership revisit and utilize CAM practices frequently. The iterative drafting process the Lower Wabash Partnership has undertaken in constructing a business plan is a prime example of the CAM processes and practices we recommend.

Recommendation II. The Lower Wabash Partnership should frame conservation and climate change mitigation as a local community initiative.

The Lower Wabash Partnership should identify opportunities to work with local, community-based organizations to improve conservation efforts throughout the watershed. Our research suggests that farmers are more likely to partake in conservation programs if a clear connection to how it affects them can be established. For example, clearly illustrating the consequences of soil erosion on farmers' profits will be more impactful than stating soil erosion is harmful.

To build out this effort, we suggest identifying champions in the farming community that can act as a source of information. We understand that conservation groups and government stakeholders may have an adversarial relationship with farmers. By utilizing champions in the farming community, conservation efforts appear less top-down and more like a community outreach effort.

Recommendation III. The Lower Wabash Partnership should identify key stakeholders and investigate the implementation of specific engagement strategies.

We recommend the Lower Wabash Partnership consider implementing two frameworks to designed facilitate the exchange of information across farmers and other stakeholder groups. Collective impact is designed to improve how collaborations work, and Strategic Decision Making (SDM) prescribes a specific process for how to arrive at important decisions.

Collective Impact

Formally introduced by John Kania and Mark Kramer in the Winter 2011 edition of the Stanford Social Innovation Review, collective impact is the commitment of a group of important actors from different sectors to a common agenda to solve a specific social problem. A wide body of literature prescribes collective impact as a potential problem-solving approach to complex issues. Successful collective impact efforts such as StriveTogether and Memphis Fast Forward suggest when implemented correctly, collective impact can create positive change for communities.

Our research suggests that successful conservation efforts require two-way communication between farmers and conservation groups. Collective impact enhances communication by creating systems that ensure transparency and alignment toward a singular outcome. The five principles of collective impact are designed to provide a framework for how to achieve this end. They are presented in Table 5.

Table 5: Five principles of collective impact and applications to the Lower Wabash, adapted from Kania and Kramer 2011. (https://ssir.org/articles/entry/collective_impact)

Principle	**Definition**	**Lower Wabash Application**
1. Common Agenda	Stakeholders have a shared vision for change that includes a common understanding of the problem and the joint approach to solve it through agreed upon actions.	The Lower Wabash will continue to revisit its goals and wants on a semiregular basis to respond to changes in priorities or stakeholder attitudes.
2. Shared Measurement Systems	System that enables stakeholders to collect and measure results consistently.	The Lower Wabash may decide on a set of measurable indicators (both leading and lagging) that can help the group understand their progress. Sample indicators can include # of farmers participating in CRP, # of new farmers newly educated about government conservation programs,
3. Mutually Reinforcing Activities	Activities that utilize the strengths of each stakeholder in pursuit of the common agenda.	Conservation groups might focus on conservation outreach to farmers; government representatives might focus on streamlining required paperwork to take advantage of government programs; farmers focus on providing information to government and conservation groups that can affect their ability to participate in conservation.
4. Continuous Communication	Mechanisms that build the capacity of each stakeholder to trust and transparently communicate with any other stakeholder in the group.	Continue meetings amongst Lower Wabash stakeholders, and asking who else can be included at the table. Identifying champions who can act as the voice of larger groups. Building time to help stakeholders understand what others are doing in pursuit of the common agenda.

5. Backbone Support Organizations	A new separate organization, group of organizations, or already existing organization assigned to handle the administrative tasks of the group such as marketing, budgeting, and communication.	An organization with specialized communication staff may oversee the collection of information across the group to disseminate in a biweekly newsletter; stakeholder groups can rotate who runs meetings; grants can be used to help hire employees to clearly market conservation programs.

The five principles are not a definitive checklist for success, but they can serve as a guide for the types of management structures and communication processes required to implement a successful collective impact initiative. In the case of the Lower Wabash, there is already a group of stakeholders that meet regularly, and these principles may simply act to clean up communication channels, enumerate expectations, or clearly define each stakeholder's role.

Structured Decision Making (SDM)

While collective impact is focused on stakeholder alignment and information exchange SDM focuses on each aspect of decision making to inform stakeholders of all potential consequences. There is not one universally agreed upon definition of SDM, but generally it tries to break down decisions in a way that clearly defines the problem, the potential solutions, costs, and benefits. Keeney's decision making framework serves as a starting point for understanding elements of SDM (Table 6).

Table 6: Elements of the skill of decision making, from Keeney 2004.

1. Problem: Define your decision problem so that you will solve the right problem.
2. Objectives: Specify what you are really trying to achieve with your decision.
3. Alternatives: Create better alternatives to choose from.
4. Consequences: Describe how well each alternative meets your objectives.
5. Trade-offs: Balance pros and cons of different alternatives for meeting your objectives.
6. Uncertainty: Identify and quantify the major uncertainties affecting your decision.
7. Risk Tolerance: Account for your willingness to accept risks.
8. Linked Decisions: Plan ahead by effectively coordinating current and future decisions.

Like collective impact, SDM breaks down a complex process into smaller, more manageable parts. SDM allows decision making to become a transparent process while accounting for the input of each stakeholder at the table. Furthermore, SDM can help build credibility, relevance, and legitimacy for the Lower Wabash Partnership and its stakeholders.

Recommendation IV. The Lower Wabash Partnership should highlight the importance of conservation practices in regards to eligibility for crop insurance premium subsidies.

Our analysis of crop insurance data provided insights as to how strong an economic incentive crop insurance premium subsidies are for Lower Wabash farmers to be in conservation compliance relative to other in-state farmers and farmers in neighboring states. Illinois-based Lower Wabash farmers are particularly reliant on crop insurance and the premium subsidies provided by the FCIC (Table 3). Accordingly, the Lower Wabash Partnership should communicate the importance of either maintaining conservation compliance or becoming compliant to farmers in this area. Such efforts can communicate the co-benefits of conservation practices: farmers will enjoy continued access to crop insurance protections and soil erosion within the Lower Wabash watershed will be reduced.

Crop insurance will become increasingly important as climate change-induced drought conditions become more frequent and severe. The extreme drought conditions experienced in 2012 resulting in nearly $700 million of indemnity payments illustrate the magnitude of crop losses that can result (Figure 3). The Lower Wabash Partnership should work with farmers to communicate the importance of properly insuring crops in increasingly volatile climate conditions. The Partnership should also advocate for continued linkage between crop insurance premium subsidies and conservation compliance in the 2019 reauthorization of the Farm Bill. Through keeping these programs linked, there will be powerful economic incentives to embrace conservation practices and proper soil stewardship within the Lower Wabash.

Lastly, our comparison of indemnity payments to CRP data allowed us to identify three counties in the Lower Wabash – Gallatin (IL), Gibson (IN), and Knox (IN) – that should be the focus of outreach efforts to increase enrollment in CRP. As farmers in these counties have high levels of indemnity payments for crop losses and very low acreage enrolled in CRP (Figure 4), it is plausible that some land in this area could be better utilized if taken out of production.

Recommendation V. The Lower Wabash Partnership should advocate for a more personalized approach to conservation program outreach for agricultural stakeholders.

The following list contains potential strategies the Lower Wabash Partnership could use to achieve a more personalized approach to conservation program outreach. A more personalized approach can increase farmers' participation in conservation programs, reduce information gaps, and build trust.

- **Peer-to-peer programs:** Identify conservation champions amongst farmers, and having them communicate the benefits and importance of successful conservation practices can help convince otherwise apprehensive farmers.
- **More active NRCS staff outreach:** Advocate for NRCS staff to directly communicate with farmers to close knowledge gaps and answer questions that may go unaddressed in the five-step assistance process
- **Establish promising practices:** Interview farmers who have successfully implemented conservation programs and have them share tips for streamlining the onboarding process into conservation programs.
- **Find ways to reduce red tape:** Minimize bureaucratic barriers and find ways to eliminate unnecessary paperwork or steps to participating in conservations programs.

In order to identify other potential strategies, we suggest that the Lower Wabash Partnership conduct a strengths, weaknesses, opportunities, and threats (SWOT) analysis. We recommend involving farmers and other stakeholders to ensure a wide range of perspectives are included. However, we understand that the NRCS assistance process is controlled at the federal level, and is unlikely to be directly influenced by the Lower Wabash Partnership. Therefore, these recommendations might be brought up as potential provisions for the 2019 Farm Bill or with NRCS staff for further discussion.

Acknowledgements

We would like to thank Dr. Vicky Meretsky. Dr. Gwen White, Michael Sertle, Jorgen Rose, and Abby Donnelly for their assistance. Without their support and expertise, this report would not have been possible.

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Appendix A: Counties Included in Crop Insurance Analysis

Table 7: Lower Wabash counties. Based on boundaries in Figure 7. Counties only marginally within boundaries were excluded.

Illinois	Indiana
Clark	Davies
Clay	Dubois
Crawford	Gibson
Edgar	Greene
Edwards	Knox
Jasper	Pike
Lawrence	Posey
Richland	Sullivan
Wabash	Vanderburgh
Wayne	Vigo
White	

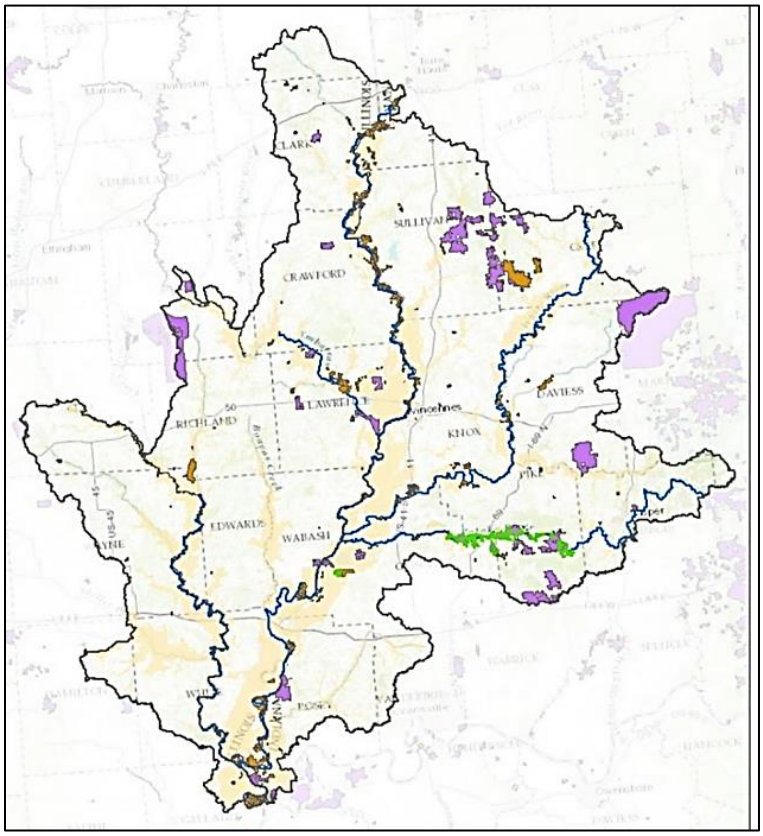

Figure 7: Lower Wabash watershed map, from the Lower Wabash LCD 2016.