# Strategies to Involve County Surveyors in Watershed Enhancement

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Construction and maintenance of regulated drains by county officials in Indiana is often done in a manner that conflicts with watershed heath. Changes to the ways in which county Drainage Boards and Surveyors function are necessary to improve the health of Indiana waterways. These officials must consider water quality and watershed health in their regular functions, and must participate and cooperate, pro-actively, in national, state, and local efforts to improve watersheds and water quality. In this report we briefly consider the issues, and possible solutions.

## Introduction

Following the settlement of Indiana, and the passage of the Swamp Land Acts, the landscape of Indiana was drastically changed. The prairies, savannas, forests and wetlands were cleared and drained for agriculture. Laws were enacted to authorize local officials to drain wetlands and manage waterways for efficient drainage. During the times of early settlement, little was known about the negative impacts that these practices would have on the quality of our waterways and the organisms that inhabit them. A lot has changed in our understanding of the negative impacts from these practices. However, reform is needed in some state laws that still authorize these negative practices.

Indiana Drainage Code authorizes county drainage boards to manage rivers and streams that fall within their jurisdiction. County Surveyors act as the technical authority on county regulated drain issues and play an official role on county drainage boards. While some Indiana counties work to protect and enhance streams through their drainage board and County Surveyor, the protection and/or enhancement of streams is generally not considered. Construction and maintenance of regulated drains have negative impacts on our streams, and give rise to major conflicts:
1. The efforts of government entities, watershed organizations, and individuals to enhance Indiana streams are rendered less efficient and effective;
2. Some traditional practices of drainage boards and County Surveyors may conflict with the Clean Water Act.

The influence and impact of these officials and practices are widespread, simply in terms of geographical area. For example, a recent study proposal from Ball State University states that “In 2000, the USGS estimated that more than 85% of all tributary waterways in the White River Basin have been ditched or tiled but are legal drains under current regulations.” (Florea & Kuban, citing USGS.) This fact alone demonstrates the need for scrutiny of the state statutes and local practices and policies that affect these tributaries. It is our premise that sufficient scrutiny has been lacking, and that the state of Indiana has not caught up with today's science; nor has it achieved compliance with its own stated policies, let alone those of the nation.

## Analysis

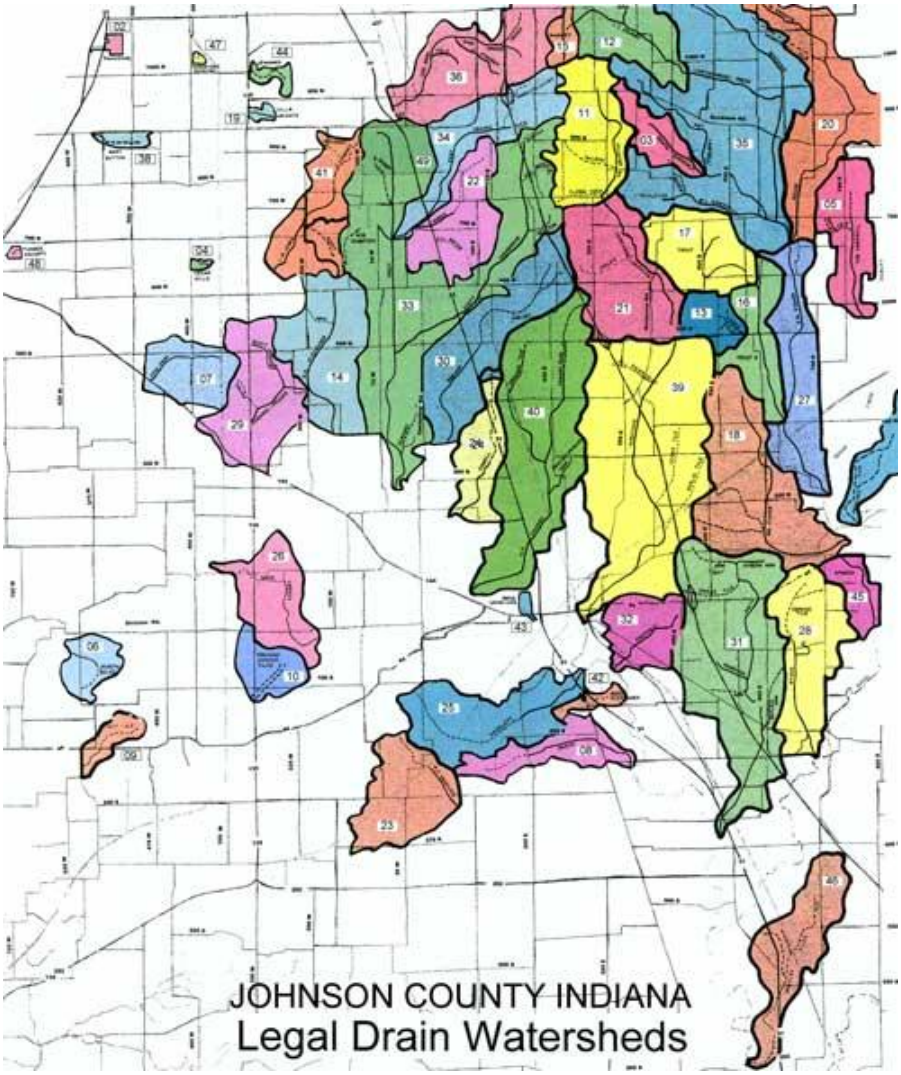
Stream Quality

Regulated drains tend to have inferior water quality and instream and riparian habitat compared to streams that are not under the jurisdiction of county drainage boards. Regulated drains are often straightened. Many will have little or no riparian habitat or buffer. Their banks will often be cleared of vegetation, steep and unstable, and either eroding or armored with rip rap. Instream habitat like woody debris or vegetation is removed. Stream substrate is dredged out or is covered by fine silt or sand. Channel morphology is uniform and impaired. Lack of diversity among habitat types results in lack of diversity among biological communities. Following a rain event, flood levels have more intense peaks with high concentrations of sediment and other forms of pollutants. Further sedimentation and erosion occurs within the stream as increased water velocities erode stream banks.

Indiana streams in their natural state tend to be sinuous, with adequate flood plains and riparian habitat. Logs, woody debris and other forms of vegetation are often present providing habitat for fish and other organisms. Stream banks are generally stabilized by trees and other growth. The sinuosity of the stream, along with falling trees and other natural features give rise to a series of complex riffles, runs, glides, pools, eddies, and backwaters. Dynamic instream morphology facilitates subtle changes in flow and the natural movement and deposition of substrates. Substrates are diverse, from fine silt and sand in the backwater areas and deep pools, to large boulders and cobbles in the swift riffles. Diversity in habitat and microhabitats promotes diverse communities of aquatic plants and animals. The riparian areas soak up and filter stormwater runoff. Following a heavy rain event, however, water levels in larger streams may rise significantly along with sediment and pollutant concentrations from upstream regulated drains.

Local Examples

The consequences of regulated drain management are made clear during watershed assessments. In a 2003 study of the Youngs Creek Watershed in Johnson County, most of the sites located within regulated drains were determined to have stream Qualitative Habitat Evaluation Index (QHEI) scores less than 51. A score of 51 or lower is considered to be too low to support healthy aquatic communities. Among the study's findings is the following:




*In order to more thoroughly examine the watershed, a QHEI was conducted at 18 sites throughout the watershed during November 2001 and August 2002... Although the QHEI is typically used in conjunction with fish sampling, these results can be used to characterize instream habitat throughout the watershed. The results show that most sites located in agricultural areas north of Franklin are classified as "not supporting." In addition, most sites that were found to be "not supporting" are located within legal drains. In general, these reaches are straight, an indication of channelization, and were designed to move water away from the land quickly. Due to their straight nature and lack of streamside vegetation, they have little opportunity to score high on the QHEI parameter. The sites classified as "partially supporting" occur on stream reaches that have increased channel morphology. On these channels, streambanks are more stable, and sinuosity increases. The two sites classified as "fully supporting" are located on Youngs Creek, south of Franklin. Youngs Creek is fairly wide in this area and has abundant streamside vegetation, instream cover, and well-developed riffle–run–glide reaches...*

Data from the St. Joseph River in North Central Indiana clearly illustrate the effects of regulated drain activities on aquatic communities. For example, Bowman Creek and Juday Creek, two regulated drains, have impaired fish communities.

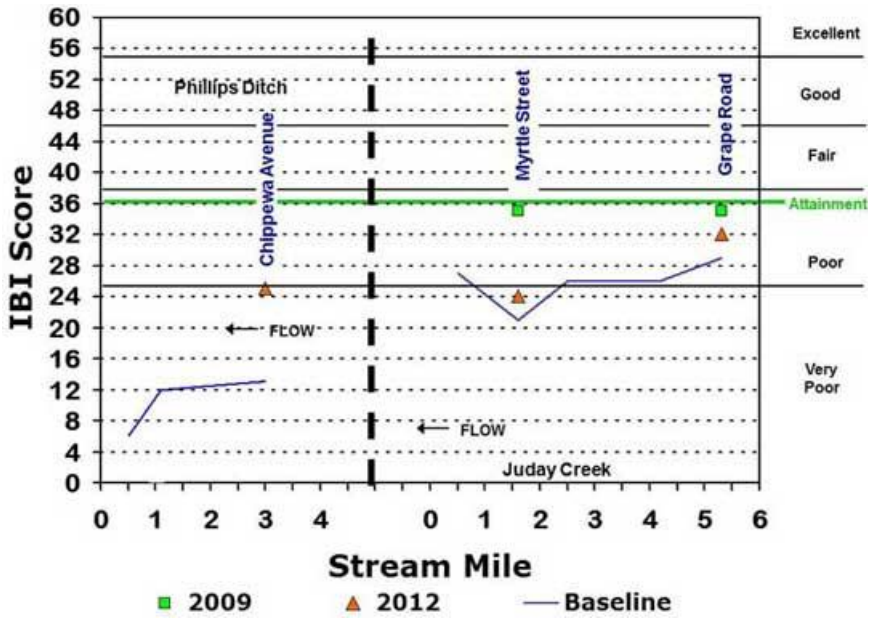



Figure 1. Fish IBI Scores from Bowman Creek and Juday Creek.

Sites monitored along both streams in 2012 fell below IDEM's standard of 36 for supporting healthy fish communities. Furthermore, historic baseline monitoring results illustrate that both streams are significantly impaired.

At the other end of the spectrum, streams that are not regulated tend to have supporting fish communities. Figure 2 presents the fish IBI scores for the Little Elkhart River and Christiana Creek in the St. Joseph River Watershed.

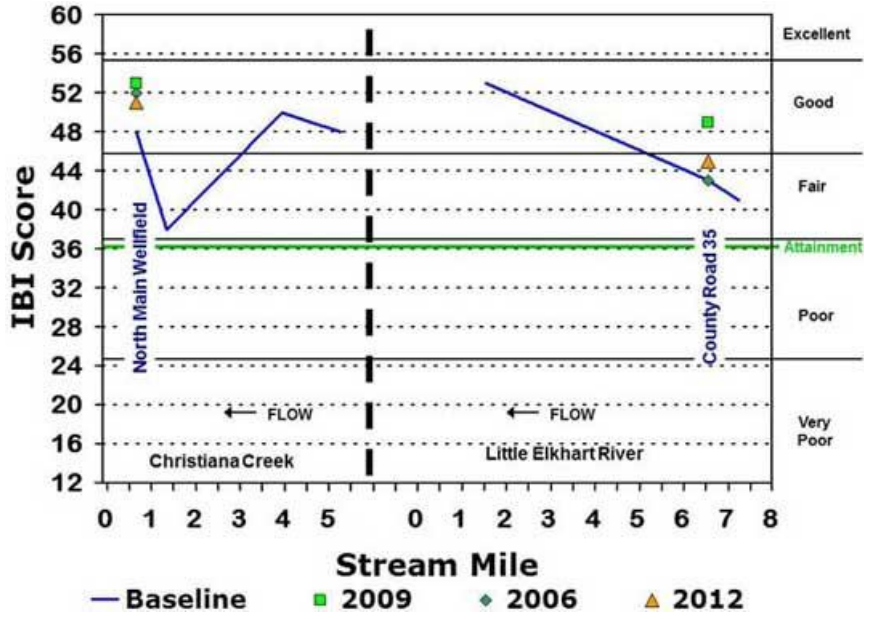



Figure 2. Fish IBI Scores for Christiana Creek and the Little Elkhart River

Sites along Christiana Creek and the Little Elkhart River scored above IDEM's attainment value of 36 in 2012 and in previous monitoring events. It should also be noted that although the Little Elkhart River is not a regulated drain much of its headwaters and the tributaries that drain into it are. As a result, fish community integrity drops as you move higher in the watershed.

Although the Elkhart River is not a regulated drain, it is a prime example of a stream that is heavily impacted by regulated drains. All of its tributaries are regulated drains. So, following a heavy rain event, water levels will rise significantly along with pollutants concentrations. Figure 3 illustrates the impact of regulated drains on the main stem of the Elkhart River. Stream discharge (flow) on the Elkhart River is significantly correlated with concentrations of total suspended solids and nutrient concentrations.

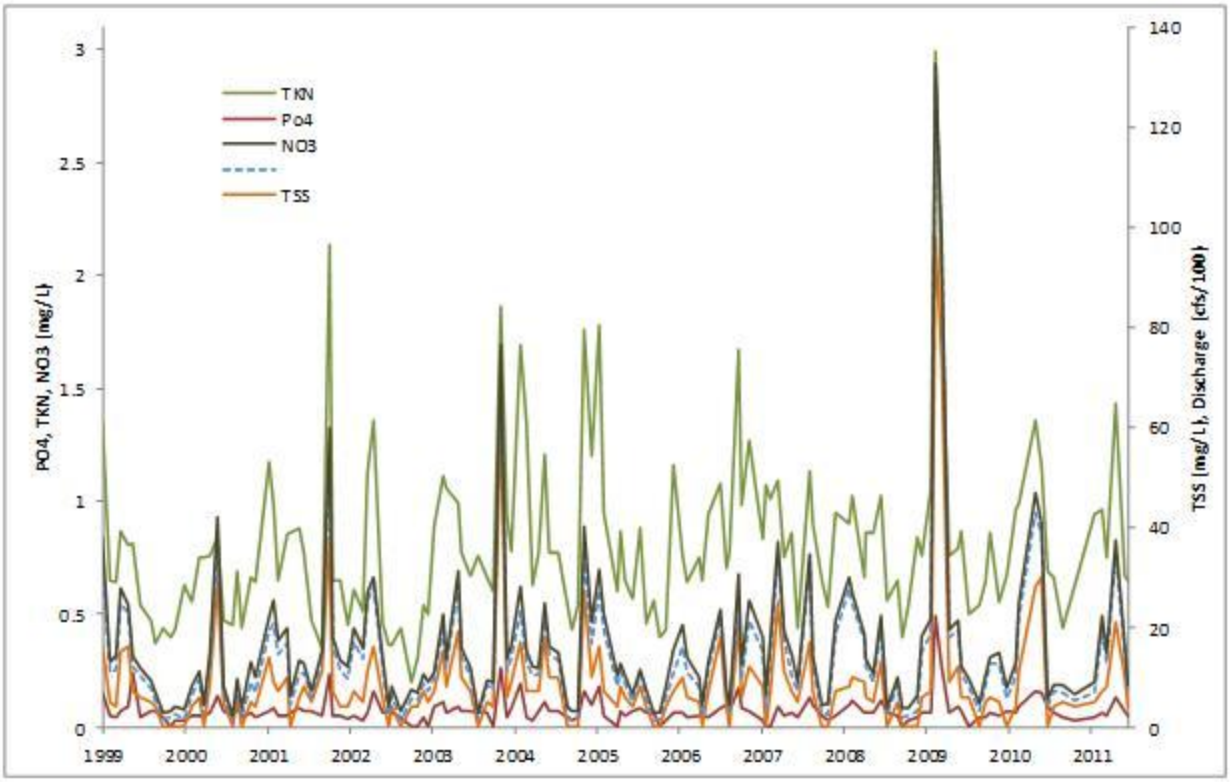



Figure 3. The relationship between discharge and pollutant concentrations at the Elkhart River SR 120 IDEM Fixed Monitoring Station, Elkhart, IN.

Water Quality Efforts

Due to conflicts stemming from Indiana Drainage Code, County Surveyors and drainage boards tend not to participate in the efforts of other entities, including citizens' groups, to jointly plan, manage, and enhance watersheds with the goal of improved water quality. The obvious conflict is that traditional “legal drain” practices tend to have negative impacts on watersheds and water quality, which is contrary to and counterproductive towards the efforts of watershed groups.

For example, a 2012 web presentation on a Clean Water Act Section 319 grant study of the Middle Eel River watershed listed the participation of numerous local, state, and federal stakeholder organizations in their efforts. (Even county highway departments!) But when asked if local County Surveyors had participated, the answer was “no.” Therefore, key local officials with essentially complete control over many miles of streams which are tributary to the Middle Eel didn't participate in a federally-funded and otherwise fully cooperative effort to improve water quality in that watershed. One may surmise that these officials (as is definitely the case in certain other jurisdictions) use practices (channelization, clear cutting, etc.) which degrade water quality and stream habitat, while at a location in the same watershed, not far away, other parties are going to great lengths, at taxpayer expense, using exactly the opposite techniques (i.e. Best Management Practices) in order to obtain the opposite results in terms of water quality and stream habitat.

**Tools, Strategies, Solutions**

Clean Water Act

While the Middle Eel River situation boils down to lack of cooperation from a few recalcitrant local officials, and thus watershed efforts which ultimately lack some degree of impact and efficiency, we also contend that the status quo in Indiana does not align with, and is to some degree in violation of, the Clean Water Act. Anecdotal evidence suggests that there is a high degree of dislike of the Clean Water Act among many farmers, and the local officials in question, which also

suggests that there may be a tendency to avoid compliance with it.

Unfortunately, the authors are not trained in the law, nor are we in any way experts on the complexities of the CWA. We do see conflicts, some specific, some more of a gut feeling. It is indisputable, however, that more study should be done of how the state may be in conflict with the CWA. Increased compliance in Indiana with both the letter and spirit of the CWA will further our goal of improving the health of our watersheds.

(Section 319 grants)

Starting with the example of Section 319 grants, state and federal officials must cooperate to ensure that grant monies are used with the utmost efficiency. EPA officials may need to review the situation and consider new rules for 319 grants in Indiana. Given that prospect, state officials should be anxious to close such a large loophole as exists in the Middle Eel watershed, and craft legislation and/or rules which ensure the participation and cooperation of County Surveyors and drainage boards in federally-funded watershed efforts statewide.

(NPDES/MS4)

As stated at the beginning, the history of Indiana Drainage Code extends back into the 19th Century. It was last recodified in 1981, and has changed little since. In recent years, however, NPDES Stormwater Program requirements of the CWA have been codified by the state, and MS4 stormwater utilities have been formed by municipal and county governments statewide. According to EPA:

> The regulatory definition of an MS4 (40 CFR 122.26(b)(8)) is "a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created to or pursuant to state law) including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States. (ii) Designed or used for collecting or conveying stormwater; (iii) Which is not a combined sewer; and (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2."

Generally, the boundaries of the utility jurisdiction conform to the city or town limits, in the case of municipalities, or in the case of counties, an Urban Area (UA) outside of the municipality(s), as determined by the Census. A county may broaden its unincorporated jurisdiction, and there also are county-wide utilities inclusive of all relevant entities.

Under Indiana Administrative Code:

> 327 IAC 15-13-4(b) For each MS4 entity, the permit covers all storm water discharges from conveyance systems for which it has jurisdiction or, in the case of designated counties, the portion of the county jurisdictional area depicted in a mapped UA, as specified under section 3(a)(2) of this rule, *unless appropriate written, enforceable, legal documentation has been obtained to allow another entity to have permit responsibilities for systems and areas within another entity's jurisdiction*.

These requirements in what is commonly known as “Rule 13” stem from federal regulations:

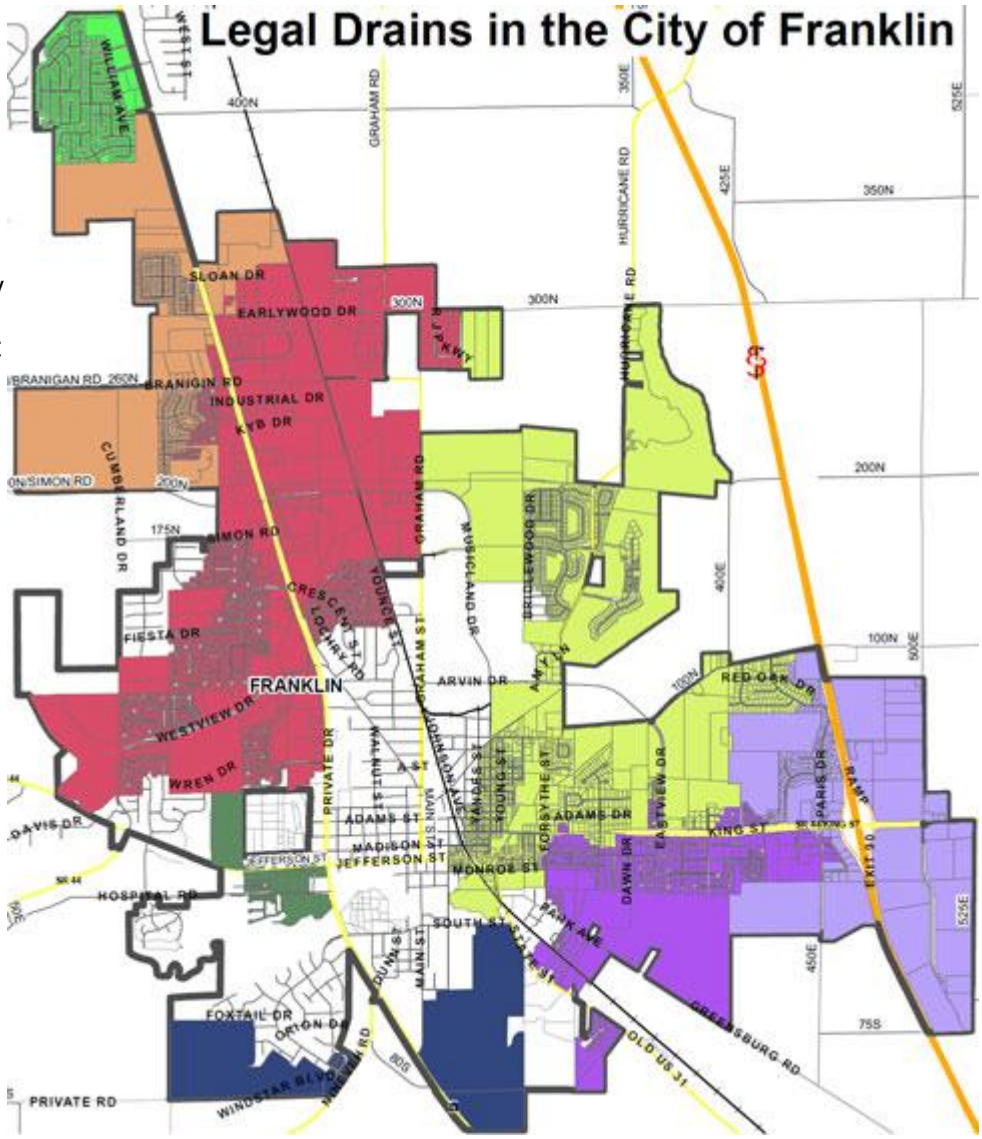
> 40 CFR § 122.35 As an operator of a regulated small MS4, may I share the responsibility to implement the minimum control measures with other entities?
> (a) You may rely on another entity to satisfy your NPDES permit obligations to implement a minimum control measure if:
> (1) The other entity, in fact, implements the control measure;
> (2) The particular control measure, or component thereof, is at least as stringent as the corresponding NPDES permit requirement; and
> (3) The other entity agrees to implement the control measure on your behalf. In the reports you must submit under §122.34(g)(3), you must also specify that you rely on another entity to satisfy some of your permit obligations. If you are relying on another governmental entity regulated under section 122 to satisfy all of your permit obligations, including your obligation to file periodic reports required by § 122.34(g)(3), you must note that fact in your NOI, but you are not required to file the periodic reports. You remain responsible for compliance with your permit obligations if the other entity fails to implement the control measure (or component thereof). Therefore, EPA encourages you to enter into a legally binding agreement with that entity if you want to minimize any uncertainty about compliance with your permit.

(b) In some cases, the NPDES permitting authority may recognize, either in your individual NPDES permit or in an NPDES general permit, that another governmental entity is responsible under an NPDES permit for implementing one or more of the minimum control measures for your small MS4 or that the permitting authority itself is responsible. Where the permitting authority does so, you are not required to include such minimum control measure(s) in your storm water management program...Your permit may be reopened and modified to include the requirement to implement a minimum control measure if the entity fails to implement it.

Without getting into discussion of minimum control measures and such, the point here is that EPA "encourages" a legally binding agreement between two stormwater entities which overlap: For example, a county drainage district with a conveyance that extends into a municipal MS4. The state, however, mandates such an agreement. That is because the permitted MS4 utility is responsible to ensure that another stormwater entity which operates within its jurisdiction also meets the requirements for certain standards and practices required by the permit. Anything short of a formal, legally binding agreement is a no-no.

Nevertheless, it appears to be a widespread practice in Indiana that, where new MS4 districts (municipal, at least) have been created on top of older county regulated drain jurisdictions, the two entities have not instituted a formal, legal agreement in order to comply with the Clean Water Act and Rule 13. Instead, there may be many situations where the old legal drain system continues in a sort of "doin' what we always done" mode, sometimes ignoring the existence of the MS4 jurisdiction (or vice-versa), sometimes maintaining a cobbled-together and perhaps uneasy relationship, with property owners paying both "ditch fee" and MS4 stormwater levies on the same property to both entities.

For example, currently there are eight (8) county legal drain watersheds within the City of Franklin. These districts cover the majority of the area within the city limits. Each private property within these districts is assessed an annual "ditch fee" for "legal drain maintenance." The Surveyor and Drainage Board ostensibly have full control over the main "ditch" in each of these districts and presumably a 150-foot wide easement spanning the channel.




However, in 2004 the city created its MS4 stormwater utility, and five years later levied a monthly stormwater utility fee. To this day, there exists no "written, enforceable, legal" agreement between the city and county which allows the perpetuation of the county's regulated drain jurisdiction within the Franklin MS4 boundary. Such is the situation county-wide, in several other counties we know of, and doubtless in a number of other Indiana counties as well.

Correcting this problem, and ensuring that Rule 13 is strictly adhered to statewide, would be a major step in improving the quality of these legacy "legal drains" which persist within MS4 entities without proper agreement. Placing these streams under the control of the MS4 entity, or, alternatively, ensuring that the stream is being managed to MS4 standards via a legal agreement, will help to ensure that clean water best management practices are being used on these streams, and that their environmental quality is fully considered, along with their drainage

capacity. Applying NPDES regulations to all regulated drains statewide – which may already be applicable under current law – would, hopefully, fully end the era of overlooking conflicts with the Clean Water Act which persist in Indiana Drainage Code, and in local drainage practices.

Indiana law

Indiana law considers professional surveyors as fully qualified for the office of County Surveyor (a quick tally in 2012 found 26 County Surveyors in Indiana with a Land Surveyor license). Prior to 2013, others elected to the office were given two years to complete 24 hours of training out of a list maintained by the Association of Indiana Counties. That has been increased to 15 hours within one year, and 40 hours within three years. As before, that requirement must be repeated for each term of office. The list of courses, which is not detailed, can be viewed at:

http://www.indianacounties.org/department/division.php?structureid=21#Surveyors%202

However, whether elected with surveyor qualifications or brought up to speed – eventually – by the designated training, there is currently no requirement that County Surveyors, or anyone on their staff, possess the knowledge which is necessary to make rational, science-based decisions which affect the waterways in their jurisdiction (whether those are legal drains or streams affected by other County Surveyor functions, such as planning). Which is obviously the root of the problem that is the subject of this report. Therefore, without proper training, these officials do not know (and may not care to know) the environmental impacts of their “legal drain maintenance.” Nor do they know about stream hydrology, knowledge which would tell them that the less they tamper with a stream, the less likely it is that they will need to tamper with it again, because it will function better un-tampered-with. A key consideration simply in terms of conserving taxpayer dollars.

In 2007, the Kernan-Shepard report made comprehensive suggestions on streamlining local governments. Very few of those were adopted. Given the fact that major change in government is so difficult to accomplish, we can nevertheless hope to improve our standards. Therefore County Surveyors should be provided with a broader range of training options, with some provision to ensure that they have training which is at least adequate for them to be able to make rational, science-based decisions affecting waterways. That training is readily available, particularly from sources within state government, the prime example being the knowledge provided by the Indiana Watershed Leadership Academy. This training should also be provided to, and required of to some extent, other local officials of various districts which deal with waterways, from drainage to conservation to flood control districts.

(Indiana Drainage Handbook)

The “Bible” of Indiana Drainage Code and associated practices, permitting, etc. is the Indiana Drainage Handbook. It is based upon the work of a legislative task force report issued in 1994. The following year, the Legislature created a task force to produce the Handbook, which was issued in 1996, with the addition of appendixes and minor revisions up to 1999.

The 1994 group devised five top discussion priorities, most notably:

1. Indiana drainage code is not compatible with other state and federal laws.
2. Recommendations that become part of permits issued by state and federal agencies to county drainage boards are contrary to Indiana Code.
4. There is a lack of consideration of environmental concerns by some county drainage boards.

The report also states: “Ultimately, because of time constraints, *only the first priority was formally considered*.” Nevertheless, that report, and the Handbook as a whole, contains much valuable analysis and many valuable recommendations and guidelines.

However, the Indiana Drainage Handbook needs to be revised and updated as soon as possible. Under the heading “Future Revisions & Updates”, it states “It is anticipated that the Handbook will be periodically reviewed and updated... Users who wish to receive the new and revised material as it becomes available must fill out and return the registration form which is placed inside the back cover.” Sadly, those who did so have apparently been watching their mail for updates since 1999.

Updating (and completing!) the Handbook would be an important first step in an essential task: Reforming and updating Indiana Drainage Code. For example in the section on Mitigation, the Handbook states:

> Some stream and ditch improvement activities may inevitably cause unreasonably detrimental environmental impacts, even if best management practices are used... Drainage Code (IC 36-9-27 [IC 36-9-27-53.5(e)(3), specifically]) prohibits the IDNR from requiring tree planting or tree retention within the easement of a regulated drain if certain conditions are adhered to. However, tree planting or replacement when it does not create a conflict with maintenance activity may be considered in streams not considered "regulated drain" as an enhancement measure or to compensate for trees lost as a result of a drainage improvement activity.

The first sentence is untrue and rather nonsensical, and the rest is appalling. While the “certain conditions” referred to include working from one side of the ditch and leaving trees on the opposite side alone, some County Surveyors apparently believe that state law allows or even encourages them to clear-cut a regulated drain entirely. Furthermore, if *modern* best management practices (BMPs) were applied thoroughly and consistently, then there would be little if any need for “improvement” upon the vast majority of these waterways.

The process of updating the Handbook should include checking for compliance with the Clean Water Act in all aspects. The list of BMPs should be updated and expanded, and destructive or “worst management practices”, and associated myths, should be defined and exposed for what they are.

Reforms to Indiana Drainage Code should follow along these lines. Consideration of BMPs in all drainage projects should be mandatory. Currently, agency review of projects utilizes a “checklist” of conditions and restrictions, such as those involving trees. However, that process has little “teeth” in it, and often results in a poorly designed project being rubber-stamped by regulators, with no follow-up as to the results. Any wiggle room which allows needlessly destructive practices must be removed from the review process, and that process must only allow choices for BMPs. A deficient plan from an applicant would therefore not even reach the point where it could possibly be rubber-stamped. Large projects should require interim inspection and/or reports. Follow-up inspection must take place upon completion. Non-compliance with the permit requirements should result in severe sanctions upon the violator, including full mitigation of violations.

Signs of voluntary progress are beginning to appear more and more. The “2-Stage Ditch” BMP, pioneered by Purdue and The Nature Conservancy, is catching on with both farmers and County Surveyors. They're being built in several northern counties, and the Jasper County Drainage Board has recently agreed to implement the practice. Very importantly, Hamilton County is constructing a 2-stage in an urban area, which will demonstrate their value for flood control.

(Drainage/conservation districts, MS4 utilities)

An important further step in statutory reform would be to streamline and/or update the state provisions for districts which control drainage, and thus control waterways. Indiana has drainage boards, conservation districts, flood control districts, etc., and of course MS4 jurisdictions due to federal law. As mentioned above, some counties have rationalized and unified their drainage and MS4 bodies. Others should be encouraged to do so as well, or allowed to use a solution which works best for that particular county in their efforts to improve their watersheds. All county districts should fully consider actual conservation in terms of water resources and quality, and work closely with their local Soil & Water Conservation District.

(Leveraging Common Values)

Garnering support for change will be difficult. The mindset of most that work with and are really "benefited" by regulated drains is that we need to continue "doin' what we always done." Most Hoosiers value clean water, fish and wildlife, and conservation, but don't fully understand the issues involved with regulated drains. Currently, only those that have been associated with regulated drains would truly understand the significance of legislation to reform Indiana Drainage Code. A tie-in to issues that are understood and common to all will help garner support from the public and their legislators.

As we have discussed previously in this report, there is a cost to "maintaining" regulated drains. It is very common among Indiana counties to levy annual “ditch fees” on all property owners in the watershed of a regulated drain regardless of whether or not they are truly "benefited" by the project. In some situations, local officials are double-dipping by collecting both “ditch fees” and MS4 fees from the same properties. In an era when government taxation is unpopular and where many services are being cut due to major property tax reforms, is the "maintenance" of regulated drains for the benefit of a few really a need for all? Or, on the other hand, does the public have a basic right to clean and healthy watersheds? A questionnaire mailed out in 1996 by the Legislative Services Agency elicited this curious point of view:

> County surveyors expressed that environmental benefits are necessary but that the general public is benefiting from environmental benefits ***without paying for them***. (*Issues Relating to Drainage*: LSA 1997)

Finally, something that everyone perceives as a negative is flooding and associated property damage. Management of our

regulated drains call for the movement of water from point A to point B as quickly as possible. As demonstrated in Figure 3, there is a clear connection between water quantity and quality, which stems from poor management of stormwater and our desire to push water downstream on others as quickly as possible. If water is slowed down to reduce flooding and property damage, water quality will also improve.

All stakeholders in a watershed, across all political boundaries, should be brought into the process of watershed planning and improvement. Examples abound in Indiana and other states of citizens working together and/or with local officials to improve watersheds. Perhaps the most important stakeholder in the state is the Indiana Farm Bureau and the members it represents. If the IFB has not yet taken the opportunity to do so, it should clearly and unequivocally declare that it acknowledges and supports the Clean Water Act, and the reforms necessary to comply with and fully implement it in Indiana. Persuading IFB executives to do so will probably take a grass-roots effort from its members, and that can start by getting those members involved in and enthusiastic about local watershed efforts.

**Conclusion**

With the advance of climate change and species decline, rational, modern, and aggressive steps to improve our watersheds are essential for Indiana's future as a prosperous, productive, and liveable state. “Doin' what we always done” to our streams, pretty much, ever since pioneer days, is nothing but a recipe for continued environmental decline, continued waste, mounting costs, and disasters we shouldn't even try to imagine. But the bottom line is that Hoosiers always have, and always will, treasure our rivers and streams, and no one will ever convince us otherwise.