Waters of the US Rule and Clean Water Act Fail to Provide Cost-Effective Improvements in Water Quality

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Executive Summary

To protect navigable waters, the Clean Water Act’s jurisdiction extends to waters linked to navigable ones. But because essentially all waters are connected, under the 2015 Waters of the United States (WOTUS) rule, agencies will assess the degree of connectivity on a case-by-case basis. A recent executive order from President Donald Trump asks the Environmental Protection Agency to rewrite the WOTUS rule using Justice Antonin Scalia’s “continuous surface connection” definition. All this confusion threatens property rights.

Farmers often will not know if their land is under Clean Water Act jurisdiction, yet they can face fines of $25,000 per day of violation for certain activities. If farmers are aware that their land is under Clean Water Act jurisdiction, then they must apply for costly permits: up to $28,915. Moreover, the WOTUS rule fails to address pollution from nonpoint sources and ongoing farming activity. It does not estimate the cost and benefit trade-offs well. In the past 25 years, water quality has seldom improved.

This paper proposes a new, market-based approach to reduce pollution and reach the optimal cost and benefit trade-off. As theorized by Ronald Coase in 1960, property rights would be assigned, to either farmers (right to pollute) or environmentalists (right to clean water). They would then make contracts in which one would accept not to use his or her right fully in exchange of compensation.

The initial allocation of property rights is to be established by states. State governments must ensure that parties comply with their contracts. State governments should also support the development of organizations that represent individuals and may use tax dollars to finance them, as these organizations would otherwise suffer from a free-riding problem.
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One of the most contentious debates between agricultural and environmental interests is about the Clean Water Rule finalized in 2015—commonly referred to as the Waters of the US (WOTUS) rule. The WOTUS rule was a response to uncertainty that previous Supreme Court cases created that found the Environmental Protection Agency (EPA) and Army Corps of Engineers (Corps) had overreached in their definition of jurisdiction provided by the Clean Water Act (CWA). The EPA and the Corps argue that the WOTUS rule provides greater clarification on the jurisdiction of permitting programs and is based on legal precedent and scientific evidence with respect to hydrologic connections. Agricultural interests—among others—argue that the rule represents the government’s vast overreach into private landowners’ decisions.

The CWA gives the agencies authority to issue permits to protect the water quality of navigable waters. The Supreme Court has recognized that the jurisdiction must expand to non-navigable waters, but much of the debate hinges on whether to use Justice Antonin Scalia’s or Justice Anthony Kennedy’s test to define jurisdiction. In an opinion, Justice Scalia argued that jurisdiction only extends to waters with a “continuous surface connection” to navigable waters. Justice Kennedy argued that jurisdiction extends to waters that have a “significant nexus” with navigable waters, in which a significant nexus is defined as any water that “significantly affects the chemical, physical, or biological integrity” of downstream waters under the agencies’ jurisdiction.1 The WOTUS rule applied the Kennedy test, and the EPA issued a scientific report documenting the connection of non-navigable waters to navigable waters. The rule leaves a significant amount of jurisdiction to case-by-case examination, so landowners are uncertain about whether they fall within the jurisdiction without obtaining a jurisdictional determination from the Corps.

The main conclusion of this study is that the WOTUS rule would have little to no impact on improving water quality while creating regulatory uncertainty because in many situations, whether a government agency has jurisdiction over a body of water has to be determined on a case-by-case basis. This regulatory uncertainty is especially burdensome due to large fines for violations, even if the violators are inadvertent. Additional permitting requirements under the WOTUS rule also create significant application costs and delays to implement activities on private land to obtain permits. David Sunding and David Zilberman2 estimated the average cost of applying for a general permit from the Corps at $28,915 and 313 days. The average cost of applying for an individual permit was much higher ($271,596), and the process was much longer (788 days).
While such regulatory uncertainty has negative economic impacts, impacts on agriculture are often overstated. Contrary to some claims, the WOTUS rule would not have required agriculture to obtain permits for regular farming activities. Agriculture—except concentrated animal feeding operations (CAFOs)—is largely exempt for permitting requirements under the CWA, and the WOTUS rule did not affect those exemptions. However, there are legitimate concerns that in some settings agricultural exemptions may be undermined by how EPA and the Corps interpret vague language in the applicable legislation. A prime example is the John Duarte case, in which the Corps determined that plowing a field did not meet the agricultural exemption since the field had not been tilled for 24 years.

While the WOTUS rule has created significant political tension, the fundamental problem with addressing water quality is the lack of secure property rights for agricultural nonpoint emissions. A clear property right would define whether agricultural nonpoint sources have the right to emit pollutants into water or society has the right to have water with few pollutants. Nonpoint source emissions are largely exempt from permitting under the CWA. However, those emissions can be regulated if a waterbody is determined to be impaired and the state establishes a Total Maximum Daily Load (TMDL). Some states explicitly exempt agriculture from pollution regulations, while other states have laws that would allow for regulation of nonpoint source emissions.

Insecure property rights often lead to lawsuits and lobbying. Some environmental interests find it more cost-effective to improve water quality by paying lawyers to force the government to enact regulations on agriculture rather than paying landowners to improve water quality. The courts play an important role in deciding cases that define property rights, so lawsuits certainly have merit. However, the CWA’s language is unnecessarily vague and has resulted in decades of lawsuits with still unclear property rights.

There is an alternative to lawyers and lobbyists—harnessing the power of markets to improve water quality. In this solution, environmental interests and agricultural interests work together to find solutions using incentives created through market transactions for water quality. The government need not place a heavy regulatory burden or overlook water-quality concerns. The government simply needs to clearly define the property rights for agricultural nonpoint emissions.

Agriculture and Water Quality

Agricultural production majorly contributes to water pollutants. The key pollutants of concern are nitrogen, phosphorus, pesticides, and sediment. Even though agricultural production practices have changed over time and the CWA has been in place since 1972, there have been little to no observed improvements in water quality over the past 25 years. It is therefore useful to review some basic facts about agriculture and water quality.

First, pollution from agricultural nonpoint sources is costly to measure, and the water-quality impacts of adopting best management practices (BMPs) to mitigate those impacts are highly uncertain. Agricultural emissions, except for CAFOs, are primarily nonpoint emissions because they come from diffuse sources, making them costly to measure. Once a pollutant reaches surface water bodies where its concentration levels can be measured, it is difficult or impossible to determine the original source and location of the pollution.

Water-quality impacts of adopting BMPs are uncertain because the emissions associated with any given practice depend on weather and soil conditions. The impacts are difficult to measure in a real-world setting, and even in a field experiment. For example, nutrient losses from crop fields may enter surface streams directly or enter groundwater that then discharge into surface streams. Researchers have also found it difficult to assess water-quality improvements due to adopting BMPs at the watershed scale.

Second, water-quality impacts from agricultural production occur in both local and distant water bodies. The EPA reported that 100,000 miles of rivers and streams and 2.5 million acres of lakes, reservoirs, and ponds have poor water quality due to excess
states contribute nutrients to the Chesapeake Bay.

Third, few to no improvements in water quality have been observed over the past quarter century. Figure 1 shows the trend in nutrient concentrations in streams between 1993 and 2003. In many cases, nutrient concentrations have actually increased over time, especially in the central United States. The data certainly do not suggest a significant improvement in water quality.

Recent scientific studies also indicate no improvements in water quality. E. G. Stets, V. J. Kelly, and C. G. Crawford found large increases in nitrate concentrations in streams from 1945 to 1980 as fertilizer use increased, but three concentrations have remained relatively stable since 1980. Lori Sprague, Robert Hirsch, and Brent Aulenbach found that nitrate concentrations increased by 10 percent from 1980 to 2008 at the outlet of the Mississippi River into the Gulf of Mexico. Large increases in nitrate concentrations in some agricultural watersheds are of particular concern. Concentrations increased by 76 percent in the Mississippi River at Clinton, Iowa, and by 75 percent in the Missouri River at Hermann, Missouri. In terms of pesticides, Wesley Stone, Robert Gilliom, and Karen Ryberg found that concentrations of several different pesticides increased in streams during 1992–2011.

The Conservation Effects Assessment Project conducted by the Natural Resources Conservation Service found that conservation practices have largely

Figure 1. Trend in Nutrient Concentrations in Streams, 1993–2003

affected water-quality improvements. However, this project used physical process simulation models to estimate water-quality impacts rather than measuring actual changes in watershed water quality. The project also compares only two scenarios—one that included current conservation practices and an extreme case in which no conservation practices were adopted.

Clean Water Act and Agriculture

Three sections of the CWA are particularly relevant for agriculture. Section 402 establishes the National Pollutant Discharge Elimination System permit program. Section 404 establishes a permit program for discharge of dredged or fill material (i.e., sediment). Section 303 gives the states authority to establish TMDLs for a waterbody.

The permit programs in Sections 402 and 404 regulate point sources of pollution. A point source is defined by the CWA (Section 502(14)) as “any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture.” This definition’s last sentence provides an exemption for agriculture.

Whether this exemption applies to agricultural tile drainage was questioned in a recent court case. Des Moines Water Works sued drainage districts in Iowa for discharge of nutrients, arguing that tile drainage is a point source discharge and subject to permitting under the CWA. Des Moines Water Works argued that stormwater discharges cover surface runoff only during a storm event and not flows that were absorbed by the soil and removed using subsurface drainage. They also argued that the exemption applies only to farming and does not apply to Iowa drainage districts. If drainage districts were required to obtain permits and reduce nutrient discharges, then farmers would be implicitly regulated and not exempt from discharges.

In early 2017, the Iowa Supreme Court ruled that Des Moines Water Works was not entitled to collect monetary damages from the drainage districts. Subsequently, in March 2017, the United States District Court for the Northern District of Iowa dismissed the lawsuit on the grounds that drainage districts could not be held liable for any damages. Des Moines Water Works has said that it will not appeal the decision, so the exemption for agricultural tile drainage appears to be settled for now.

Section 404 of the CWA exempts “normal farming activity” from permits for dredged or fill material as long as they are part of an ongoing farming operation. Thus, farmers may continue farming an area that is a wetland without a permit as long as the area has been part of continuous farming activity. Agricultural exemptions do not apply when a wetland designated as a water of the US is converted to crop production.

The case of John Duarte, a farmer in California, is widely cited by agricultural interests as an example in which agricultural exemptions are undermined by the CWA’s vague language. Duarte plowed a field in 2012 that contained vernal pools, which are considered wetlands. Duarte instructed the person hired to plow the land to avoid all vernal pools, but some pools were plowed. In 2016, the US District Court for the Eastern District of California sided with the Corps that Duarte violated the CWA because he did not obtain a permit for discharge into waters of the US. The court found that the act of plowing constituted the discharge of dredge and fill material from a point source into waters of the US. The court did not allow the agricultural exemption for plowing because the CWA, not the WOTUS rule, requires the exemption to be part of an “established (i.e., ongoing) farm operation” and the plowed field had not been in crop production since 1988.

Section 303 of the CWA gives states the authority to establish TMDLs if previous point source reductions have not met water-quality standards and a waterbody is listed as impaired. The state establishes a TMDL and defines the total pollutant loads—from both point and nonpoint sources—allowed within a waterbody. The state must then allocate TMDLs
across point and nonpoint sources. The state could implement incentive-based programs to reduce nonpoint emissions or mandatory programs that require BMPs for agriculture. So although nonpoint source pollution from agriculture is largely exempt from permitting under Sections 402 and 404, it is not necessarily exempt from regulations established to achieve a TMDL under Section 303.

States are given the primary authority related to establishing TMDLs. States determine the list of impaired waters and determine the implementation plan for achieving TMDLs. States also determine if reductions of nonpoint sources of pollution occur through voluntary, incentive-based programs or through regulations.

According to the decision issued in *Gulf Restoration Network v. Jackson*, the CWA also gives the EPA a “backstop role.” The EPA has authority under the CWA under Section 303(d), 33 USC §1313(d) to establish its own TMDL for a waterbody if the state fails to implement a TMDL. The EPA must also approve any TMDL proposed by a state and can develop an alternative TMDL if it disapproves. In *Gulf Restoration Network et al. v. Jackson*, several environmental nonprofits sued the EPA for failing to take action to control nutrient pollution into the Gulf of Mexico. These groups argued that the EPA was compelled to act in the absence of state action to reduce nutrient pollution given the water-quality concerns in the Gulf. The EPA argued that imposing the necessary regulations would significantly burden the agency and preferred instead to work cooperatively with states. The courts ruled in 2016 that the EPA was not compelled under the CWA to abandon its approach of working with the states.

Cost-benefit analyses of the CWA have not been favorable. One analysis the EPA commissioned found that the costs the CWA imposed to reduce emissions from point sources were greater than estimated benefits.15 David Keiser and Joseph Shapiro16 estimate that the CWA has had a statistically significant impact on water quality but find that it is not clear that the benefits from such improvements have exceeded the costs. Keiser and Shapiro17 also estimate that the CWA’s grants to municipal wastewater treatment facilities increased housing prices by only about a quarter of the cost of the grants.

Not all the benefits from cleaner water are likely to be reflected in higher housing prices, but the findings do raise concerns about the program’s cost-effectiveness. Looking forward, further reductions in emissions from point sources are likely to come at a high cost with few improvements in water quality since nonpoint emissions and atmospheric deposition are the major contributors to water-quality concerns.18

One analysis the EPA commissioned found that the costs the CWA imposed to reduce emissions from point sources were greater than estimated benefits.

Water-quality permit trading has been proposed to reduce the cost of implementing further regulations on point sources. Current regulations allow point sources to meet their obligations by paying nonpoint sources to reduce their emissions. In some cases, these markets are created due to the establishment of a TMDL for a waterbody. However, water-quality trading between point and nonpoint sources has involved little activity.19

Trades involving nonpoint sources often require the nonpoint source to implement a new management practice. The EPA allows estimates of nonpoint emission reductions to be used since the change in emissions cannot actually be measured. The EPA also usually requires a larger predicted reduction in emissions from nonpoint sources than those required for the point source due to uncertainty about the actual
impact on water quality. However, trading ratios that discount nonpoint pollution may not be optimal since reducing nonpoint pollution can help reduce the variability of emissions.

**Definition of WOTUS**

The CWA's jurisdiction, known as WOTUS, has been the subject of controversy since the legislation was enacted. Three Supreme Court cases provide important legal precedent. In *U.S. v. Riverside Bayview Homes*, the Supreme Court ruled that the EPA did have jurisdiction over adjacent wetlands that affect navigable waters. This decision provided precedent that the CWA jurisdiction in fact extended to non-navigable waters to control pollution at the source of emissions into navigable waters.

In *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, the Supreme Court said the EPA's jurisdictional rule was too broad. EPA claimed that a location used as habitat for migratory birds fell within their jurisdiction—known as the “migratory bird rule”—including remote ponds with little connection to navigable waters. The court ruled that this approach could not be reconciled with the legislative authority for regulating navigable waters under the CWA.

In *Rapanos v. U.S.* the Supreme Court again ruled against the EPA's definition of jurisdiction. The court rejected the definition of areas connected to navigable waters through ditches or drains as waters of the US. The *Rapanos* case was decided on a 4–1–4 split with Justice Kennedy writing a separate opinion from the plurality opinion Justice Scalia wrote. Justice Scalia argued that jurisdiction only extends to waters with a “continuous surface connection” with navigable waters and that jurisdiction could not be determined based solely on a hydrological connection. Justice Kennedy's opinion argued that jurisdiction extends to waters with a “significant nexus” to navigable waters.

The 2015 WOTUS rule gives the agencies jurisdiction over navigable waters, interstate waters, and the territorial seas. The WOTUS rule also defines tributaries and adjacent waters within the jurisdiction of the agencies. Tributaries must have physical indicators of flow and contribute to navigable waters. Adjacent waters must be within a defined distance of navigable waters or tributaries or in the 100-year floodplain. The rule also allows waters determined to have a “significant nexus” to any navigable water to fall within the CWA's jurisdiction.

A major controversy with respect to the final rule is that the EPA defined its jurisdiction over waters with a “significant nexus” to any navigable water. It defines a significant nexus as any water that “significantly affects the chemical, physical, or biological integrity” of downstream waters under the agencies' jurisdiction. The agencies issued a connectivity report to provide scientific evidence that other waters have a significant nexus with navigable waters. The connectivity report reviewed the scientific literature on the connectivity of streams and wetlands on downstream waters. The authors of the report argued that essentially all waters are connected, but the degree of connectivity varies. Therefore, the agencies should assess other waters that are under their jurisdiction on a case-by-case basis. Critics of the rule argue that it is unconstitutional because the language of the regulation is too vague and that landowners have little certainty about whether their property is under the CWA's jurisdiction.
The WOTUS rule was finalized on June 29, 2015. In October 2015 the Sixth Circuit Court of Appeals placed a nationwide stay on the rule. On February 28, 2017, President Donald Trump issued an executive order to review the WOTUS rule and requested that the courts put a hold on legal challenges to the rule until the review is completed. Furthermore, the executive order directed the agencies to interpret waters of the US using the Scalia test rather than the Kennedy test until the review is complete. The agencies are now tasked with creating a revised rule that defines the WOTUS consistent with current law. The legality of any revised rule, whether it uses the Scalia or Kennedy test, is almost certain to be challenged in the courts.

Consequences of the 2015 WOTUS Rule

The 2015 WOTUS rule created additional regulatory burden and uncertainty on landowners conducting activities on private property. Since much of the jurisdiction is defined on a case-by-case basis, many landowners would be required to obtain a jurisdictional determination from the Corps. Large penalties for failing to obtain a permit create an incentive for landowners to be excessively cautious in conducting activities and obtaining jurisdictional determinations. For the first offense, negligent landowners could face a fine of up to $25,000 per day of violation for failing to obtain a permit. In his opinion in *Corps v. Hawkes*, Justice Kennedy wrote, “As Justice Alito has noted in an earlier case, the act’s reach is ‘notoriously unclear’ and the consequences to landowners even for inadvertent violations can be crushing.”

If private property contains waters of the US according to the jurisdictional determination, then the landowner must obtain a permit for nonexempt activities. For example, a landowner would be required to obtain a permit to construct a building or demolish an old farmstead if the land is under the CWA’s jurisdiction. The expanded jurisdiction under the WOTUS rule could require additional permitting requirements for CAFOs, but the EPA stated that there is uncertainty about whether the new rule will require additional CAFO permits.25

The cost of obtaining a permit is burdensome. Sunding and Zilberman26 estimated the cost of preparing a general permit application—for activities that have minimal impacts—was $28,915. The cost of preparing an individual permit application—for activities with greater impacts that receive individual scrutiny—was $271,596. The process of obtaining a permit also requires substantial amounts of time and delays to the proposed activities. Sunding and Zilberman27 also found an average of 313 days to obtain a general permit and 788 days to obtain an individual permit. These are only the cost of applying for a permit and do not account for any mitigation costs the permit requires.

In practice, it may well be that the incremental benefits of an expanded jurisdiction are smaller than the benefits of a more narrowly defined jurisdiction.

These new permitting requirements, while costly, are unlikely to result in any significant improvement in water quality. As noted earlier, a primary cause of water-quality impairments is from nonpoint sources, and the WOTUS rule does nothing to reduce pollution from such sources. While the EPA conducted a cost-benefit analysis of the new jurisdictional rule, they have no plausible estimates of the improvement in water quality due to the rule.

The EPA’s economic analysis of the rule has several serious flaws. The key assumption in its analysis is that costs and benefits change proportionally to the change in jurisdiction. Its analysis indicates that the benefits of CWA permitting exceed the costs. Thus, a positive economic outcome is baked into
the analysis. The EPA methodology would inevitably indicate that any expansion in jurisdiction results in greater benefits than costs. But in practice, it may well be that the incremental benefits of an expanded jurisdiction are smaller than the benefits of a more narrowly defined jurisdiction.

The EPA's economic analysis also assumes implausibly large benefit estimates from wetlands preservation. For example, the analysis assumes that 177 acres—roughly 0.28 square miles—of wetlands in the Midwest will not be destroyed under the expanded jurisdiction. The EPA's estimate of the corresponding aggregate willingness to pay for saving those 177 acres is a whopping $114.4 million, yielding an average willingness to pay $645,445 per acre. As a point of comparison, average land values in Iowa were $7,183 per acre in 2016. The EPA assumption about the value of wetland preservation is crucial to its analysis because roughly 90 percent of the benefits from the expanded jurisdiction occur due to avoided losses of wetland under Section 404 permitting requirements.

Since the WOTUS rule does not change exemptions for agricultural nonpoint emissions, it is not expected to dramatically affect agricultural production—or water quality for that matter. Agricultural interests sometimes claimed that the WOTUS rule would require them to obtain permits for each time they apply pesticides or plow. This is simply not true and exaggerates the impact of the WOTUS rule. To the extent that these farming operations are part of ongoing farming activity, they are exempt from permitting requirements, and no permits or jurisdictional determination are necessary. A permit is required if farmers convert wetlands into farm production that is under EPA jurisdiction. However, given that ongoing farming operations are a major source of water-quality concerns, the WOTUS rule does little to improve water quality.

The concerns expressed by agricultural interests about the WOTUS rule are understandable. The EPA defines exemptions for normal farming activities, and those definitions are subject to change. No list of exemptions can be comprehensive, and current exemptions could be undermined by overly specific interpretations of the CWA language. After all, at one point the EPA interpreted “navigable waters” to mean any pond where a migratory bird landed.

The Duarte case, mentioned previously, is widely cited by agricultural interests as an example of the potential problems WOTUS created. The Corps claimed that Duarte’s plowing did not fall under the CWA’s agricultural exemption, but another key aspect of the case is that the Corps claimed that the discharge into vernal pools constituted a discharge into waters of the US. The court found that the vernal pools on the land did constitute waters of the US because they have a significant nexus with a tributary of a navigable water.

This definition of waters of the US was based on prior guidance defining waters of the US and not the 2015 WOTUS rule. However, the vernal pools would still constitute waters of the US under the 2015 WOTUS rule since the 2015 WOTUS rule applies the Kennedy test of a significant nexus. The vernal pools would not constitute waters of the US under the Scalia test suggested by President Trump’s executive order.

There are also concerns that the WOTUS rule could discourage private conservationists from restoring wetlands on private land. The WOTUS rule expands jurisdiction to many wetlands on private land, so conservationists seeking to restore wetlands would likely need to submit a request for jurisdictional determination to the Corps. If the land is determined to be within their jurisdiction, then a permit is required for any fill material entering waters of the US. Such regulatory costs may well have the unintended consequence of discouraging wetlands restoration.

Other potential impacts are associated with expanded jurisdiction. For example, the rule could increase the number of waters for which TMDLs could be established. However, these waters must be connected to a navigable water, and TMDLs can clearly be established for the navigable water that could affect all upstream sources. Another impact is that additional facilities that produce or store oil could be in the CWA’s jurisdiction and be required to implement Spill Prevention, Control, and Countermeasure plans. The EPA claims that requiring these plans could reduce oil spills.
The Real Issue

Clearly defined property rights are a prerequisite for market solutions to water-quality problems. Unfortunately, the CWA does not define property rights for agricultural nonpoint emissions. The property right for nonpoint emissions needs to define whether farmers have the right to discharge into waters of the US or society has the right to water with pollutant levels below certain thresholds. Agricultural nonpoint emissions are largely exempt from permitting requirements under Sections 402 and 404 of the CWA. However, lack of clarity in the language of these exemptions leads to insecurity even in this right. Nonpoint emissions are also not necessarily exempt from regulations under Section 303 when a TMDL is established.

The insecure nature of such property rights has meant that environmental interests have often paid lawyers and lobbyists to regulate agriculture rather than paying polluters to improve water quality by reducing emissions or seeking support for public expenditures to mitigate emissions. Lawsuits can play an important role in defining property rights when legislation is unclear. But the excessive vagueness of the current legal framework creates a situation in which lawyers and lobbyists are too often perceived as the more cost-effective option, and many years are spent in legal battles rather than creating solutions to water-quality problems.

The choice of paying for reduced emissions or paying lawyers and lobbyists is part of a rational decision in which environmental interests seek the least cost method (to them) to improve water quality. If environmental interests choose to pay for improved water quality, then they incur the cost of estimating water-quality improvements from alternative agricultural practices and providing incentives for farmers to change those practices. If environmental interests choose lawyers and lobbyists, then they incur significant fees and an uncertain outcome of their efforts.

An interview with Des Moines Water Works by MacKenzie Elmer in the Des Moines Register on April 11, 2017, illustrates this decision process. The Water Works board of trustees had agreed to spend $1.35 million to pursue the 2015 case against drainage districts. After Water Works lost its lawsuit, the CEO Bill Stowe said “resources would be better spent” on lobbying efforts rather than continued legal action. Des Moines Water Works continues to calculate that changing the property rights represents its least cost method to improve water quality, but the least-cost method has changed from a lawsuit to lobbying.

Market Solutions to Water Quality

Ronald Coase, a Nobel Prize recipient, famously argued that bargaining could overcome the inefficient welfare losses from pollution (i.e., externalities) when transaction costs are sufficiently small. If farmers are given the right to discharge pollution into water, then cities or environmental interests could pay farmers for changing their management practices to reduce discharges or pay to mitigate the damage through water treatment. Alternatively, if property rights were reversed, then farmers would incur the cost of changing management practices or pay cities to treat the water. While both of these potential solutions require secure property rights, neither require government bureaucrats to determine the optimal outcome.

While government entities—such as cities—may be involved in these transactions, a Coasean solution occurs when (1) neither party in the transaction has regulatory authority over the other and (2) the parties directly related to the damages are involved in the transaction. The lack of regulatory authority implies that the only actions available to the parties are market-related transactions that may include bargaining or cash transfers. Since the parties are directly related to the damages—both those that cause the damages and those affected—the parties have an incentive to find an economically optimal outcome.

Market solutions arising from well-defined property rights have two key advantages over government solutions. First, market solutions are more likely to identify the most cost-effective manner of improving water quality. Consider the example of a city paying upstream landowners to reduce pollution. Entrepreneurial landowners will seek to find the least-cost
method to reduce pollution to obtain greater benefits from incentives provided by the city. And the city has an incentive to ensure that their expenditures are resulting in observed improvement in actual water-quality outcomes. Together the city and landowners work to find innovative solutions to the water-quality concern.

**Market solutions are more likely to identify the most cost-effective manner of improving water quality.**

Government solutions often either incentivize farmers to adopt certain practices or require them to use certain practices through regulations. The problem with government solutions is that government agencies are poorly suited to determine the most cost-effective practices. Agencies do not know the cost of farmers implementing alternative practices. Nor can agencies quickly adapt to new information about the effectiveness of alternative practices to improve water quality. Furthermore, government solutions provide no incentive for entrepreneurs to innovate and find new, unique solutions. A caveat is that government solutions can incentivize firms to identify low-cost methods of pollution control if the mandate is placed on emissions or if a technology mandate allows firms to substitute with a better technology. The nature of nonpoint emissions from agriculture prevents the government from placing restrictions on field-specific emissions.

The second advantage of market solutions over government solutions is that markets more optimally evaluate costs and benefits. For example, a city only pays landowners to change practices if the cost of paying landowners is less than the cost to treat the water. Environmental interests concerned about the Gulf of Mexico only pay landowners in the Corn Belt if the benefit from changed practices outweighs the cost of paying the landowners. While everyone desires improved water quality, these improvements come at a cost, and market transactions account for such costs.

Government agencies are often poor at implementing policies based on costs and benefits. One issue is that agencies may lack good information on costs and benefits. The EPA does not possess knowledge about the magnitude of damages from poor water quality. As discussed earlier, economic analysis the EPA conducted estimated that 177 acres of wetlands in the Midwest were worth $114.4 million. Another issue is regulatory capture—agencies may represent the interest of a powerful special interest group rather than society as a whole. Thus, the agencies implement regulations that please the interest group rather than selecting a regulation based on costs and benefits. A core problem is that agencies that implement environmental policies are not determining how much they would be willing to pay with their own money to improve water quality or preserve wetlands. The EPA often reduces pollution by mandating practices or setting thresholds for pollutant levels, but neither of these approaches forces an interested party to face the difficult trade-off between costs and benefits of alternative actions.

An important condition for Coasean bargaining to reach an economically optimal solution is that transaction costs must be sufficiently small. At first glance it appears difficult for all persons affected by water quality to bargain with farmers, but in many cases organizations are formed to represent the interests of affected individuals. City governments that treat water represent the interests of urban residents who drink water.

The Mississippi River Collaborative and Gulf Restoration Network are organizations that represent individuals with an interest in the environmental quality of the Gulf of Mexico. The Environmental Defense Fund collaborates with companies such as Walmart, Smithfield, General Mills, and United Suppliers to provide incentives for agriculture to reduce

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nutrient pollution. Ducks Unlimited has a long history of representing the interests of hunters in protecting migratory bird habitat.

In addition, several voluntary markets currently exist. The nonprofit organization Forest Trends has documented a significant number of ecosystem markets in place throughout the US, most of which are related to water quality. Some of these markets are driven by the need for compliance with government regulations—not surprisingly given the lack of secure property rights—but there are at least 52 examples of voluntary watershed markets.

Another central question is how to define the property rights. Farmers could have the right to discharge, or society could have the right to water with few pollutants. Economically optimal outcomes can occur regardless of how the property rights are defined. So this decision is primarily a choice for society about the preferred method to distribute costs of improved water quality. If farmers are given the property right, then the beneficiary of improved water quality incurs the cost. If society is given the property right, then farmers incur the cost to mitigate damages or compensate society for damages.

Three important considerations have to be addressed in defining the property rights. First, agricultural nonpoint sources have faced minimal restrictions on discharges—effectively providing them with the right to discharge. The CWA explicitly provided this right in Sections 402 and 404. A reversal of this implicit property right is better defined through expressing the will of the people rather than a government agency reinterpreting different sections of the CWA. Second, how property rights are defined may affect transactions costs. For example, environmental interests may be more likely to provide incentives to farmers in a relevant watershed to improve water quality than farmers are to compensate individuals affected by their discharges.

Third, providing farmers payments to reduce emissions on a per-acre basis could incentivize an increase in agricultural production that undermines the impacts of the emissions reduction. Erik Lichtenberg and Ricardo Smith-Ramírez find that payments to farmers in Maryland to implement conservation practices in crop production led farmers to switch from vegetative cover to cropland. This adverse effect of payments may be avoided through enforcement by the party providing payments.

Clearly the most significant challenge to achieve market solutions is the political battle associated with defining the property right. Environmental interests would lobby to avoid giving the right clearly to agriculture. Agricultural interests would lobby against any action that would not give them the right to discharge. In addition, the property right needs to be established by states since the CWA gives states authority to implement many aspects of the legislation.

Besides defining property rights, the government could take a number of steps to encourage market solutions. The government could implement policies to reduce transaction costs. In some cases, transaction costs could be reduced by developing new local institutions that represent the collective interests of those affected by poor water quality. The government could also provide enforcement for market transactions. For example, the government could enforce a contract to ensure farmers actually make the changes in management practices to which they have agreed.

In addition, there could be a role for the government to provide financial incentives in certain cases. Free riding presents a major challenge in achieving optimal private transactions for water-quality improvements. Consider the case of water quality affecting recreational users of a lake. A nonprofit organization could form to represent its interest, but free riding would result in suboptimal donations to improve water quality. In this case, the government could use tax dollars to improve water quality.

Agricultural interests promote using conservation payments in the farm bill, but these programs are ineffective at achieving improvements in environmental quality. A key reason for these farm bill programs’ failures is that the party providing the incentive (i.e., the federal government) is not directly affected by any damages, so they have little interest in ensuring that the payments achieve the desired outcome.

Rather than directly compensating farmers, the government could provide grants to parties affected by poor water quality. These parties could then use...
the funds to make transactions with farmers to alter management practices. This approach is more likely to result in water-quality improvements because the party providing the incentive has a strong interest to ensure the payment results in improved water quality.

Rather than directly compensating farmers, the government could provide grants to parties affected by poor water quality.

A Tale of Two Cities

Des Moines and Wichita both face water-quality problems and significant expenditures to treat their water. Des Moines and Wichita both face upstream agricultural production that hurts water quality. But Des Moines and Wichita have pursued different routes to improve the quality of their water.

Des Moines Water Works sued upstream drainage districts in Iowa. Most corn and soybean production in Iowa has subsurface tile drains to remove excess moisture from the soil, but this often also contains significant amounts of nitrates. As discussed earlier, Des Moines Water Works argued that tile drainage does not qualify for the CWA exemption for agricultural stormwater discharges. Now that Des Moines Water Works lost its lawsuit, it intends to spend resources lobbying. Alternatively, Des Moines Water Works could provide incentives for farmers to change management practices to reduce nitrate loads or pay the cost of water treatment, depending on which strategy reduces nitrates at the least-cost. But Des Moines decided that the least-cost method to improve water quality was to hire lawyers to test farmers’ property right to discharge nitrates. Unfortunately, the case pitted farming interests against urban interests and delayed improvements in water quality.

In contrast, the city of Wichita has implemented a program that provides incentives for farmers to change management practices to reduce the level of atrazine—a popular herbicide—in surface water. The city has estimated that the cost of providing incentives for farmers is less than the cost of treating the water. The program was featured on the front page of a recent agricultural magazine with the headline “Program Benefits Urban and Rural Interest.” An advantage of this approach is that Wichita will monitor water-quality conditions and adjust or end the program based on a comparison of costs and the benefits from observed changes in water quality.

Conclusion

Even though the president recently signed an executive order to begin dismantling the WOTUS rule, the debate on WOTUS is far from over. The executive order asks the EPA to rewrite the WOTUS rule and use the Scalia definition of jurisdiction. Crafting and editing a revised rule will take significant time and effort. Once a revised rule is finalized, lawsuits will immediately follow, and the rule will likely make its way once again to the Supreme Court. All this could take 10 or more years, and the legal battles over the interpretation of language in the CWA will bring no changes in the nation’s water quality.

The WOTUS rule did nothing to resolve the core issue of insecure property rights for nonpoint emissions. If anything, the WOTUS rule created even greater uncertainty in terms of the exemption from permitting requirements for nonpoint emissions. A revised rule using the Scalia test would reduce regulatory uncertainty by providing a clearer definition of the EPA’s jurisdiction. But a revised rule using the Scalia test will not resolve the issue of insecure property rights for nonpoint emissions.

The current regulatory uncertainty has created an incentive for environmental interests to pursue
lawsuits to regulate agricultural discharges, as in the case of Des Moines Water Works. But market solutions to improve water quality are possible, as in the case of Wichita. Clearly defining property rights for agricultural discharges will result in fewer conflicts like in Des Moines and more cooperation like in Wichita.

Too often agricultural interests dismiss water-quality concerns by arguing that farmers are excellent stewards of the environment because they rely on the land and water. And too often environmental interests see regulatory action as the only way to improve water quality. An alternative path is to pursue market solutions in which parties causing the damages and those affected by the damages agree to a transaction that improves water quality. The key to unleashing the power of the market for water quality is to clearly define the property rights for agricultural nonpoint emissions. Then we will see innovative, new solutions that bring together agricultural and environmental interests to achieve a common goal of improving water quality in a cost-effective manner.

About the Author

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Notes


17. Keiser and Shapiro, “Consequences of the Clean Water Act and the Demand for Water Quality.”

23. Ibid.
26. Sunding and Zilberman, “The Economics of Environmental Regulation by Licensing.”
27. Ibid.