Potential Ramifications of Repealing the 2015 WOTUS Rule

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ABSTRACT

The author gives a history of federal water policy in the U.S. and current controversy and actions taken as of 2019. A sample of the Florida wetland mitigation market is taken as a barometer of the success and aptitude of wetland mitigation banking to offset the effect of development on ecosystem services provided by wetlands. This study used peer review sources for background information and data from the RIBITS database where wetland mitigation bank data for all thirty-six U.S. districts is made available to the public. Price information for eight banks in the Jacksonville District were collected from The Mitigation Banking Group, Inc. It was determined Florida with its large amount of wetlands and high rate of development was a good regional market to analysis. Quantitative measures were taken on mitigation wetland bank size, credit price, sales to determine trends in the sample market.

INTRODUCTION

In 2015, the Environmental Protection Agency (EPA) sought to clarify the boundaries and definition of navigable waters of the United States as regulated under the Clean Water Act (CWA) by publishing the 2015 Definition of Waters of The United States (WOTUS), also known as the Clean Water Rule (CWR) (CFR, 80 FR 37053). Under the Trump Administration, environmental activists and other portions of the public have developed new concerns about changes in Federal protection of natural resources. One of the changes in policy include the repeal of this 2015 Obama-era CWA WOTUS regulations (Trump, 2017a).

Opponents to the 2015 WOTUS Rule claim it is a Federal overreach of policy. According to a statement released by the Western Caucus on December 11th 2018, the Obama Administration reached beyond the scope of the CWA original intent by including “tiny, seasonal or even [streams] that do not connect up with larger water systems.” They claim family farmers were, “kept awake at night, worried rains wouldn’t let up before turning their puddles into regulated ponds and drumming them out of business in the process.” They assert this extended to an overregulation of waterways and marshes because of adverse impacts from recreational activities. They also claim developers have preemptively ended projects potentially impacted by what has been considered a dubious claim of a “significant nexus” between these wetlands and navigable waters downstream of them. The bipartisan Congressional Western Caucus, a seventy-two member group within the House of Representatives has made the claim that CWA permits generate an unnecessary burden, requiring an average 788 days to process at a cost of $271,596 to the applicant with additional fines and criminal liability to those who do not obey the law (Western Caucus, 2018).

Advocates of repeal further claim markets, or State legislatures are better suited to deal with environmental externalities (Kansas, 2014). While others claim repeal is necessary because climate change is a hoax propagated by the scientific community and the American left-wing political establishment (Potenza, 2018). On February 28th, 2017 The National Pork Producers issued a statement applauding the decision of WOTUS repeal under the conclusion Obama-era policies were a “big government land grab that would have allowed activists to micromanage all kinds of farming and business activities” (NPPC, 2017).

This is a common perception of private landowners throughout the U.S. as protestors of federal environmental policy have two main concerns – unnecessary burdens on land owners and their property rights, or the duplication of existing, perhaps superior local policies creating inefficiencies and degradation of the overall system (Kansas, 2014). Most importantly, this debate over best environmental and economic practices concerning wetland mitigation started long before the current political climate turned so divisive.

The proposed repeal of Federal policy protecting wetlands, also presents an unintended opportunity to reexamine the status of State wetland protection efforts. The impending federal absence creates an opportunity to investigate States' responses to a potential new policy void, along with both the positive and negative externalities created through such change. This paper gives a history of federal water policy in the U.S. and current controversy and actions taken as of 2019. A sample of the Florida wetland mitigation market is taken as a barometer of the success and aptitude of wetland mitigation banking to offset the effect of development on ecosystem services provided by wetlands.

Policy Background: Clean Water Act and Legal Challenges

The Clean Water Act of 1972 is the main piece of legislation in the United States guiding the protection and use of bodies of water. From the inception of the 1990 "No Net Loss Policy" (NNL) which increased federal scrutiny of wetland fill activity (Page, 1990), wetlands property owners and developers have wanted clearer definition of what bodies of water are subject to Federal CWA policy, often taking the ACOE to court in order to obtain this clarity (Denisoff, 2012). Over the past decade, three Supreme Court (the Court) cases, SWANCC ('01) as well as both Rapanos v. US and Carabell v. US ('06) drastically decreased Federal jurisdiction over these waters. All three cases pertained to private-property rights and non-navigable waters and resulted in a reduction in federal jurisdiction over wetlands, leaving previously protected areas vulnerable (Kusler, 2003).

SWANCC v. U.S. Army Corps of Engineers Background and Implications

In 1987 The Solid Waste Agency of Northern Cook County (SWANCC) was granted permits to fill abandoned sand and gravel pits to service the waste disposal needs of 23 municipalities. The Illinois Nature Preserves Commission notified the Corps one-hundred-twenty-one migratory bird species were using aquatic resources on the property, arguing, permitting their destruction violated the Migratory Bird Rule (McElfish Jr., 2006). Upon review, the Corps agreed the 533-acre plot of land includes "waters of the United States" and denied SWANCC the permits claiming they failed to propose alternatives that would cause the least amount of environmental externalities and lacked sufficient funds to protect both leaks into public drinking water or damage to habitat of area-sensitive species.

Both US District and Court of Appeals for the Seventh Circuit ruled in favor of the Corps. However, on January 9, 2001 The Supreme Court ruled a 5-4 majority decision that Congress did not include isolated water in Section 404(a) of the Water Pollution Control Amendments of 1972 or the Clean Water Act of 1977. This preserved State rights and responsibilities while severely limiting the scope of the Clean Water Act (Section 404).

According to a 2003 article from Ecology Law Quarterly, Justice Kennedy voted against the ACOE interpretation of the CWA, following the ACOE definitions of “Significant Nexus” - the connection between non-navigable waterways which will cause detrimental effects to the navigable bodies they are connected to. These detrimental effects include reduced water filtration, changes in natural nutrient flows and adverse effects on aquatic life (Mank, 2003). The SWANCC decision ultimately exempted isolated wetlands from CWA regulations because since they are not navigable waters, they are no longer part of the USACOE responsibilities.

However, even those these waters are not directly linked to waterways such as riparian wetlands, isolated wetlands still exchange water and material with surrounding watershed (Whigham et al., 2003). Water entering the system can have small quantities of pollutants which accumulate over time as only water exits the wetland through evaporation. These pollution sinks are risks to the surrounding environment either through flooding events or eventual aquifer penetration (McKee, 2005).

After SWANCC, the EPA issued guidelines restricting regulatory review of approximately 20 million acres of isolated wetlands and presented proposed rule-making with the potential effect of substantially narrowing the scope of WOTUS. The gap in regulation for isolated wetlands therefore, presented an ecological risk, particularly in states such as Delaware, where 50% of wetlands (92% of freshwater) are deregulated or Florida where thirty-four to sixty-six percent of wetlands are omitted in the Panhandle (Kusler, 2001).

These rule changes were immediately met with strong opposition from Congress, citing concerns over the exclusion of non-navigable waters, leaving many isolated wetlands unprotected to development. In addition, other opponents of the SWANCC decision expressed concerns that granting property owner's greater liberty over their land use would have far reaching implications beyond the boundaries of their legal parcel, degrading key environmental services such as water quality protection, flood control, and habitat degradation (Denisoff, 2012 B). One recreational group that was particularly vocal was Ducks Unlimited, a hunting organization with over one-million members has a keen interest in the both conserving and restoring isolated wetlands since their sport requires such habitats. The organization continues its mission to protect wetlands for water fowl through land acquisition, conservation and restoration (Ducks Unlimited, 2013).

Prior to SWANCC, there were fifteen State programs designed to protect isolated wetlands (Kaplowitz, 2008) while, thirty-five States lacked programs of their own using instead the C.W.A. (Sec. 401) standards. These states include

Alaska, Louisiana, Texas, North Dakota, South Dakota, North Carolina South Carolina, Georgia, Nebraska, Kansas, and Mississippi. Furthermore, one third of federally owned lands are no longer under ACOE jurisdiction because of the SWANCC ruling. The scope of Coastal Zone management plans were also significantly reduced because of the decision. This placed more of the economic burden to protect wetlands on States and local governments. In fact, the Association of State Wetland Managers suggests thirty to seventy-nine percent of all wetland acreage could be affected by the decision (Mank, 2003).

The immediate response of the Associations of State Wetlands and Floodplain Managers was to not respond to SWANCC with broad regulation but instead with site-specific regulations specifically for wetlands excluded because of the migratory bird rule. Twelve states attempted a response to federal jurisdiction Ohio, Indiana, Illinois, North Carolina, South Carolina, Delaware, Washington, Wisconsin, California, Nebraska with half not achieving this goal as of 2003. Florida and Minnesota are improving existing legislation. Twenty-five states have had no attempt to change legislation (Mank, 2003).

Proponents of the SWANCC decision included legislators in support of states' rights and mitigation bankers/construction industry who wanted clearly defined rules (Brownback, 2013). Disagreements between the two groups along with demands from the private sector over the following decade would eventually lead to the 2015 Obama-era WOTUS Rule (Stefanik, 2012).

Rapanos v. United States & Carabell v. U.S. Army Corps of Engineers Background

In the late 1980s, John A. Rapanos filled twenty-two acres of wetlands on his property in Michigan with sand for the construction of a mall, without filing for a permit. The land was located twenty miles from the nearest navigable waterway, yet it was determined under federal policy the land was connected through tributaries. Rapanos appealed and the case worked its way to the Ninth Circuit. In September 2003, Rapanos was forced to serve three years of probation and pay $5,000 in fines for his actions. According to a 2017 Law Review from the University of Denver, the Justices were unable to produce a majority decision, forcing future decision into the lower courts on a case to case basis and creating uncertainty for future rulings (Hopper, 2017).

A similar case pertaining to private property use and isolated wetlands began in 1993 when the Carabell family wanted to construct a 130-unit condominium development on their property in Michigan. A ditch adjacent to the development site had gravel excavated which was used to build a four-foot berm around the perimeter to prevent runoff and contamination from surface water drainage back down into the ditch.

It was determined the ditch connected to the Sutherland-Oemig Drain a smaller part of the Great Lakes Drainage system, leading the Michigan Department of Environmental Quality (MDEQ) to deny a permit for the 15.9-acre devel-

opment project with pressure from both the EPA and United States Fish and Wildlife Service. Both federal agencies concluded the project would have significant inverse impacts on the natural resources. In 1998, Carabell appealed and won, with a state administrative law judge ordering the MDEQ to issue the permit for a 112-unit condominium development with on-site wetland enhancement.

Shortly after the permit was issued, the EPA notified the MDEQ the permit did not have authority under Federal policy. The USACE consequently conducted three inspections over the following two years and on October 5, 2000 notified the Carabells' their permit had been denied. The permit also stated it does not waive any jurisdiction of the USACE.

Implication of Rapanos and Carabell Cases

With no majority opinion, future cases concerning the jurisdiction of Federal policy would have decisions deferred to Marks v. United States where decisions should be held to specific case holdings when no majority is reached. This variability in the possibilities of future rulings were, therefore, tested seven times, each with varying results.

Case and Circuit	Decision	Grounds
• Fifth Circuit – U.S. v. Lucas • Sixth Circuit – U.S. v. Cundiff	• Cases avoided the question	• Determined the evidence presented was adequate to support federal jurisdiction under either standard.
• Seventh Circuit – U.S. v. Gerke Excavating, Inc. • Ninth Circuit - Northern California River Watch v. City of Healdsburg • Eleventh Circuit – U.S. v. Robinson Three Cases	• Jurisdiction may be established under held Justice Kennedy's opinion • **Supreme Court denied petitions to appeal the 7th court decision.	• "Significant nexus" is controlling
• First Circuit - U.S. v. Johnson • Eighth Circuit – U.S. v. Bailey	• Jurisdiction may be established under either Rapanos test	• Marks rule does not apply to Rapanos and both tests are equally valid

HOW DID STATES RESPOND TO RAMPOS AND CARABELL

States rely on the Federal government for a variety of resources whenever state legislation is lacking due to insufficient resources for environmental stewardship or lack of political will due to resistance from local communities for protecting both biotic and abiotic features (Kansas, 2014). These resources include funding for various environmental protection programs and often the databases which organizations around the world rely on for current and accurate information (Baldwin, 1987).

In reaction to these various court rulings, thirty-six States, or two thirds of all states seemingly stood with the Supreme Court ruling, and passed laws which could potentially restrict local legislation being created to protect isolated wetlands. Thirteen of the thirty-six states have laws prohibiting legislation "more stringent than the Federal CWA" while the other twenty-three of these states also added a "qualified stringency provision" making it more difficult for legislation stricter than federal policies to be passed at the state level – yet does not prohibit them. Separately, twenty-two sates have passed stronger private property rights acts to protect private land-owners from government regulation (ELI, 2013).

2015 WOTUS Rule

In an attempt to clarify policy and prevent Marks being an unknown variable when decision came to the courts, the Federal government sought to create clear definitions of "waters of the United States". Rapanos was cited in the 2015 WOTUS rule as confusion created through not having clearly defined rules.

In April 2011, the EPA and USACE proposed a new set of rules based off peer-reviewed hydrological studies, interagency reviews and economic analysis before a final proposed rule on April 21, 2014. The law was signed on May 27, 2015 and became effective that August (CFR, 80 FR 37053).

On June 29, 2015 the Corps and EPA released the 2015 WOTUS Rule was an attempt to clarify terms of various waterbodies, particularly wetlands and streams allowing agencies at various levels and geographic regions the ability to cooperate on projects. Obama officials did this by keeping existing CWA law, and adding additional protections to certain watersheds with impact on downstream water quality.

The Key Provisions of the 2015 Clean Water Act WOTUS Rule include

1. A broader definition of tributaries and adjacent water that are under Federal jurisdiction, all including wetlands, ponds, impoundments and lakes which can impact chemical, biological or physical integrity of neighboring bodies of water.

2. Carries over existing exclusions from the Clean Water Act, meaning waters used in agricultural, ranching or silvicultural activities are all excluded.

3. Reduces categories of waters which are subject to case-by-case analysis.

4. Protects US “regional water treasures” meaning specific watersheds that have been shown to impact down-stream water health. Some of these include the Texas costal prairie wetlands and Carolina and Delmarva bays.

Under the 2015 WOTUS Rule, federal agencies only gained a 2.84%-4.65% increase in jurisdiction over currently regulated waters while reducing the total net amount of waters protected by the CWA (EPA Economic Analysis, 2018). The Rule created indirect costs on developers through additional permit applications including Section 404 permitting and stormwater construction permitting. Farmers also faced additional costs with pesticide discharge and confined animal feeding operations (CAFOs) permitting. Businesses including gas stations were subjected to new require-ments for oil storage and production facilities to develop and implement spill prevention control and countermeasure plans, (SPCC). All of which would result in an additional one million dollars annually on Federal and State govern-ments (EPA Economic Analysis, 2018).

The agencies projected two indirect costs associated with the economic loss caused by these regulations, ranging on the “low end” from $158 million to $307 million per year with a “high end” estimate of $237 million to $465 million per year. Contrarily, the economic analysis also projected two estimates of positive externalities created by the policies. These range from a low estimates of $339 million to $350 million per year with a high-end estimates of $555 million to $572 million (EPA Economic Analysis, 2018).

Challenge to the 2015 Ruling

In Kansas, the economy is comprised of 90% agriculture, with Western regions receiving an average annual rainfall of only fifteen inches. This leaves farmers in the western Kansas dependent on isolated water sources which would be more strictly regulated under the 2015 WOTUS Rule (Kansas, 2014). Consequently, on October 23, 2014 the Kansas Governer’s Office attempted to preempt the WOTUS rule, by issuing a letter about concerns the anticipated 2015 WOTUS Rule could adversely affect agriculture in the State. They argued that the CWA does not provide the federal circuit courts with jurisdiction over the agencies’ rule and that review is properly held in the district courts in-stead, and the classification of all ephemeral tributaries greatly decreases the ability of farmers to irrigate their crops.

Thirteen states sued to block the rule upon its initial passage, with a preliminary injunction issued by U.S. Chief Dis-trict Judge Ralph R. Erickson of North Dakota, blocking the regulation in those states on October 9, 2015. After a consolidation of claims before the U.S. Court of Appeals Sixth Circuit, National Association of Manufactures joined the plaintiffs claiming CWA policies do not allow Federal circuit courts’ jurisdiction over the agencies’ rule and that review should be left to the District courts instead (Oyez, 2018). On October 11, 2017, the case was argued by the Ninth

Circuit followed by a unanimous decision on January 22, 2018 that the appeals court do not have original jurisdiction to review challenge to the Clean Water Act and cases should be heard by District courts (SCOTUS, 2018).

The WOTUS Rule was met with opposition by conservatives who saw protection and regulation of watersheds as an impingement on property rights and economic activity. On February 22, 2017, the Business Roundtable provided a list of regulations to the Trump Administration they would like to see reviewed, including the 2015 WOTUS rule (Business Roundtable, 2017a). Jim Banks of the Western Caucus introduced an amendment to the Farm Bill on May 21st, 2018 to repeal the CWR, passing in the House 238-173 with thirteen Democrats supporting repeal (Banks, 2018). A letter sent to the Farm Bill Conferees urging the repeal of WOTUS had fifty-one legislatures sign in support (Banks et al, 2018).

Conflict between State and Federal Policies

Opponents of the ruling said it creates greater levels of uncertainty by disregarding thirty-years of regulations based off the 1986 Supreme Court Ruling. Methods have been developed to measure both ecological and economic success with a litany of legal cases creating a greater amount of certainty. The new ruling has been claimed to be an over extension of EPA jurisdiction (Kansas, 2014).

Confusion and conflict have also been created through the change in acceptable infrastructure, leading to unintended consequences that could be detrimental to quality of waters of the United States. For example, Kansas has invested 290,000 miles of gradient terrace to reduce runoff on slopped land. This investment has cost $1.9 billion in conservation investment by public and private sectors and is listed in the EPAs best urban practices. Under CWR these terraces are not one of the 56 “exempt” practices, thus creating uncertainty if current and future gradient projects also require 404 permitting, significantly increasing the cost. By creating additional Federal oversight, a doubling of administrative efforts would be created (Kansas, 2014). Furthermore, legislators in Kansas were concerned the 2015 WOTUS Rule would create conflict between federal and state law by nullifying the EPA approved Kansas Safe Water Quality Standards. They claimed the expansion of Federal power over previously unregulated WOTUS are sufficiently protected being waters of the State. Many Kansas environmental protection programs such as the State Livestock Waste Management Program were created because many agricultural and mining operations are exempt from 404 and 402 Federal policy. Lawmakers were, therefore, concerned requiring federal oversight with lower environmental standards than state policy would decrease the overall environmental quality of the state’s water (Kansas, 2014).

The National Association of Counties (NACo) also expressed concerns about the effects the new regulation could have on ditches particularly along roadsides, flood control channels, and stormwater management structures increasing the number of county owned ditches under federal jurisdiction (EPA Economic Analysis, 2018).

Additional concerns were expressed both about the vast amounts of land under federal stewardship, and flaws in the methods the federal government used to determine wetland jurisdiction. These are both insufficient methods when many ephemeral streams (resulting from water runoff) in the state require a stricter classification than just a traditional definition of stream bed, bank and high watermark. These periodic ephemeral streams instead should also be classified on duration of inundation as many ephemeral streams are fed by rainstorms, snowmelt and groundwater (Kansas, 2014).

The Court laid out four general precepts that apply to all cases:

- Either qualitative or quantitative evidence may demonstration jurisdiction. The Court rejected the developer's argument that, because the project involved only a tiny percentage of the watershed, the nexus simply could not be "significant" to the watershed.
- Expert evidence that the nexus is not "statistically significant" to the watershed "sets the bar too high, as purely qualitative evidence may satisfy the significant nexus test."
- While a court will assess the various different wetlands functions, "the ultimate inquiry is whether the collective effect of these functions is significant."
- Finally, since the purpose of the CWA is both to "restore and maintain" the nation's waters, in a permitting context: "the ACOE exercise its jurisdiction to prevent damage and thus cannot be expected to present evidence of the actual ecological impact of the wetlands on downstream waters." (U.S. Court of Appeals, No. 13-2499, 2015).

Executive Order 13778 – Reversal of 2015 WOTUS Rule

Ultimately, on February 28, 2017, President Trump signed Executive Order 13778 'Restoring the Rule of Law, Federalism, and Economic Growth by Reviewing the `Waters of the United States' directing the EPA to review the 2015 WOTUS Rule for conflicts with economic growth (Trump, 2017b). The proposed change would exclude all waters except those that had "a continuous surface connection" to navigable waterways and those which were "relatively permanent" under Justice Scalia's more narrow definition. The new rule, released on December 11, 2018 excludes many of the sixty-percent of streams which do not flow year-round (Plumber, 2018). Likewise, an independent study from the Vanderbilt Law School found that the new rule would also decrease the amount of regulations farms are subjected to (Taylor, 2016).

**Under the new Rule (Federal Register Section G, 2018):

- The word “abut” replaces “bordering, contiguous, or neighboring” all used in the 1986 regulation in an effort increase clarity of what is under jurisdiction.
- Abut meaning to touch at least one point or side of jurisdictional water.
- The term “upland” is defined in this proposal as any land that does not meet the three-part test (*i.e.,* hydrology, hydrophytic vegetation, and hydric soils)
- A group of wetlands cannot be separated through building uplands structures such as a dyke but instead are considered abut and therefore “Waters of the US”.
- Subsurface hydrologic connection is ruled out as it is difficult to enforce.
- Waters within the 100-year flood plain would be excluded from “waters of the US”

Things the Agencies wish the public to comment on (Federal Register Section G, 2018):

- Should all three hydrologic characteristics be required for land to be considered “upland”
- The comment period wishes to know if the term upland should include any land not meeting the three hydrologic features regardless if natural or artificially created.
- Should wetlands separated by barriers such as dykes or upland but still with direct hydrologic flow still be under jurisdiction?
- Which methods are acceptable to determine if a wetland is jurisdictional considering the difficulty presented when using aerial imagery and other remote tools/
- Does “direct hydrological surface connection” include wetlands which are inundated through perennial or intermittent flow within a typical year.
- What constitutes a “direct hydrological surface connection” or if and under what circumstances subsurface water connections between wetlands and jurisdictional waters are acceptable to determine adjacency.
- What other tools are helpful in implementing of the proposed adjacent wetlands category? Should tools such as NRCS Soil Surveys (Flooding Frequency Classes), tidal gauge data and site-specific modeling such as Hydrologic Engineering Centers River System/Analysis System or HEC-RAS), historical evidence including photographs, prior delineation, topographic maps and site characteristics.

Effect of 2018 Reversal on the Wetland Mitigation Banking Industry

Mitigation banks provide designated land for biotic and abiotic environmental services to mature while being protected from residential or commercial development. These services include flora and fauna habitat and ground water recharge. The larger size of the habitat provides economics of scale for higher quality environmental services and increased efficiency compared to smaller restored acreage. This is achieved by consolidating technical expertise creating lower cost restoration.

Developers also experience lower cost by having pre-approved mitigation alternatives immediately available opposed to creating the mitigation on their own. Buying mitigation credits also transfers liability from the developers (permittee) to the mitigation banker. This allows developers to focus on their project and bankers to specialize in develop, maintain and monitor the site on long-term basis.

Banks are composed of four main components:

- **The bank site:** the physical acreage that is restored, established, enhanced, or preserved.
- **The bank instrument:** the formal agreement between the bank owners and regulators establishing liability, performance standards, management and monitoring requirements, and the terms of bank credit approval.
- **The Interagency Review Team (IRT):** the interagency team that provides regulatory review, approval, and oversight of the bank with agents from both the ACOE and EPA.
- **The service area:** the geographic area within which permitted impacts can be compensated for at a given bank.

When originally proposed, the costs NNL imposed on developers prompted protest to the legislation. To lower building developers' cost of wetland creation, the *1990 Memorandum of Agreement* was signed between the Corps and EPA, which was an official endorsement of the wetland mitigation bank market with the intention to lower developers' risk. By establishing regulation and standards, quality wetland acreage cultivated by wetland bankers could be sold to real-estate developers when needed. Costs would be lowered as bankers develop the lowest cost credit creation methods to maximize profit.

In an attempt to decrease risk by providing more top-down guidance, the EPA and Corps released *Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks* in 1995 to assist bankers to comply with regulations and standards. In addition to outlining banks' purpose, involved agencies and approval requirements suggestions are made on how to plan, develop and maintain.

Mitigation banking was developed to compromise between the needs of ecosystems while not stunting development and economic growth. Mitigation banking has been adopted as the federally preferred method to achieve the NNL

policy goals, because of the high costs to developers to satisfy environmental regulations (Mank, 2003). The changes in WOTUS regulation proposed by the Trump Administration, however, put the four-billion-dollar restoration economy in jeopardy by making the established systems unnecessary (Wittenberg, 2019).

As of January 2010 five years prior to the Obama Rule, there were over 950 approved mitigation banks covering 960,000 acres (NMBA). Banks within the sample of eight banks used in this study have seen seventy-nine instances where government agencies have “released” or granted permission to sell more credits. These credit releases are often planned by bankers at the bank’s inception in coordination with the IART to allow time for more land to be converted or mature into functional credits. These releases are called Phases of the bank’s progression over time, with an initial release of credits allowing bankers to sell credits and gather capital to be used in the restoration or of land within the bank to meet wetland guidelines. These guidelines look for the amount of flora within the bank as well as hydrologic soil conditions showing the presence of water over a period of time. When the criteria are met, more credits can be released. The progression over the sample banks over a twenty-four-year period show these eight banks have continued to function. Of the 133 banks within Florida, only 17 have withdrawn or failed altogether since 1992, making mitigation banking a fairly safe and stable industry with a state-wide start-up success rate of over 87%.

Wetland Mitigation Banking?

Market based environmental mitigation is a strictly regulated system with multiple phases of government intervention and oversight. Like many public goods, few incentives exist for agents to act making the government provide a service. The mitigation banking market was created to shift some of the environmental benefits from public to the private sector, with the hope a profit would be made incentivizing others to join.

In the United States, three separate wetland mitigation credit markets exist, each with different ecological and economic policies and customers. These separate markets are Public Banks used for credit trade with government agencies to expedite state projects such as transportation corridor mitigation; In-Lieu Fee Banks which are privately owned third-party institutions, often conservation NGOs; or privately-owned banks set up by entrepreneurs with the intention of creating profit.

Within the privately-owned bank market, four separate credit types exist which can be sold at varying prices and for different ratios of developed to mitigated land, depending on developer needs. Creation credits, the most expensive and difficult to achieve are an attempt at manipulating an environment to create the conditions of wetlands in an area not previously to those parameters. Restoration credits consist of the reintroduction of inundated conditions to fallow agricultural or sometimes industrial lands (depending on ground toxicity levels).

Enhancement credits are when bankers improve certain components of existing wetlands while the final and least preferred of all methods. Preservation credits are the protection of existing wetlands through legal action. Because of

the NNL goals, districts often have a bias towards creation than preservation making compliance ratios considerably higher for preservation while keeping ratios low for the creation credits which have a considerably higher marginal cost.

Mitigation banks are a prime example of examining the ecological success of clearly defined market goods. For this reason, many studies have focused on the ecological success of banks in achieving their primary goal of not only maintaining area but also the quality of wetlands.

Credits from these banks can be made more valuable through improving site hydrologic function, removing invasive species and/or reintroduce indigenous diversity, all encouraging the formation of new wetlands. For this reason since the conception of mitigation bank markets in the early 1970s, the policy was vague and non-specific within districts to allow for bankers to take a bottom-up approach and allow innovation to determine best practices. Unfortunately, most potential bankers are not interested in developing new low-cost methods that may not pass IRT inspection. Instead, bankers prefer clearly defined rules and methods they can follow to achieve compliance.

The quality of wetlands used in banks is higher as bankers specialize in creating highly functional wetland habitat with a diversity of species (typically flora) and hydrologic function. Banks also provide greater ecosystem services through the aggregation of land in a single continuous habitat opposed to smaller separate on-site wetland mitigation (Yepsen, 2014). This also allows developers to focus on their projects opposed to investing in low functioning “habitat” on-site such as ponds or water features, constructed solely to meet regulation criteria (Zwich, 2018).

Challenges Faced by Mitigation Banks

Valuing Wetland Credits

Challenges faced by mitigation banks is the assessment of ecological services provided by wetlands being converted into accurate monetary terms. Despite various methods to convert environmental goods into monetary terms including WTP and hedonic pricing, an accurate assessment of both ecological damage and prices for mitigation credits plagues the banking system (Mei, 2017).

A 2014 study used an LDI (Landscape Development Intensity) to calculate mitigation credits in Florida mitigation banks. It looked at the absorptive capacity of banks to compensate for off-site anthropocentric residential, agricultural and industrial activities and concluded landscape is essential in creating credit prices (Reiss, 2014).

Regulatory Uncertainty

The mitigation banking market in the United States leads the world in such policies to encourage environmental restoration, particularly wetlands. The market has a multitude of flaws, many stemming from regulators. Eliminating

ecological externalities to wetlands is the ultimate goal of mitigation banks; yet overbearing legislation can choke off the revenue bankers need to make necessary adjustments for compliance. This can destroy the success of bankers who are capable of making ecologically and economically successful banks (Kaplowitz, 2008).

Redundancy between Federal, State and local agencies creating unnecessary “red-tape” or regulations could potentially drive up administrative costs, and ultimately credit prices. A “cookie-cutter” template could potentially be used to lower conflict between government agencies, creating higher demand for credits (Layne, 2011). Investors also face high demand for limited premium land creating high real-estate costs for land acquisition. Because of the limited market, there is a high preference for these areas. In addition, once the most ecologically preserved land has been purchased within a watershed, little room remains for the market to grow with investors not interested in expensive land near city centers or industrial areas requiring lots of restoration (Bonds, 2003).

As standards increase, the potential for a more efficient market arises, when standards change completely investing in wetlands banks becomes high-risk driving potential bankers away (Dearen, 2018). The EPA has released a document calculating forgone costs if the 2015 CWA definitions are eliminated. The study included ramifications on CWA 401, 402 and 404 estimating a low and high avoided annual cost. For CWA 404 Wetland Mitigation of wetlands and Permit Application fees, an estimated $85.1 to 337.6 million annually would be saved in combined costs between landowners, property developers and bankers. Of those costs, $29.4 to 82.2 million, or about 52.81 percent of overall costs will go to application costs. This large number could be a significant flaw in the 404-system preventing crucial investments in both wetland management and maintenance (EPA Economic Analysis, 2018).

Land Value

Land potentially available for the mitigation market, but not invested in because of high risk to meet current credits can become valuable, highly demanded parcels of land. This specialization of different sequestration techniques further promotes the mitigation bank market and allows for further revenue (Bendor, 2014).

Through integrated more pieces into the potential avenues a banker can invest in, the success of the banks in the multitude of specifics sites can fundamentally improve the incentives for bankers and ultimately improve the environment (Baldwin, 1987).

Ecological Quality

Doubt also lies in the ability of bankers to restore systems which have often taken centuries to develop in a matter of years. Studies have shown banks often lack the diversity of flora and fauna found within naturally occurring wetlands (Costanza, 1997). Geographic distance from impacted areas is also a cause for concern, the standard of having

banks located within an impacted watershed might create a NNL but does not fully compensate for destroyed wetlands (Bonds, 2003).

Social Justice

The EPA mentions potential economic burden on economically disadvantaged communities, yet sites no figures referencing only studies showing that minorities and underprivileged communities are often subjected to greater environmental pollutants. Studies have shown an increase in health and wellbeing in communities exposed to green spaces (Beyer, 2014). Unfortunately, mitigation banks are often located outside the communities they are mitigating for, with policies only requiring them to be within the same watershed (Kaza, 2013). It seems no federal or state policies yet exist requiring banks to provide access to underprivileged communities. This in most regions would be economically infeasible with financial strains already high on banks (EPA Economic Analysis, 2018).

The potential for banks to become social capital, allowing people to congregate would require two major investments currently not budgeted for. The first is access into the banks not only through buses and other potential mass transit options like light rail, but the access and parking for passenger vehicles. The second and crucial investment would be the infrastructure onsite to provide safety and accommodations for guests. Mitigation banks would become part park under this model, perhaps defeating the environmental benefits the banks were originally intended to create. The social benefits created could potentially outweigh the costs but only where population density would encourage such growth.

Interest Rates and Risk

In a situation where a bank is offering a high-interest rate (IR), individuals will be discouraged from spending on long-term investments (fuel-efficient water boiler or car) and instead deposit money into the bank to make the higher interest rate. Profit is determined by money invested minus credit sales price but is also dependent on the market value of development (demand) and quality of other banks around. A bank which is first established will most likely have the lowest IR because it is seen those credits are most likely going to be sold once they mature before all others and developers want to build within the water.

Materials and Methods

This study used peer review sources for background information and data from the RIBITS database where wetland mitigation bank data for all thirty-six U.S. districts is made available to the public. Price information for eight banks in the Jacksonville District were collected from The Mitigation Banking Group, Inc.

Background research was conducted on wetland mitigation banks and subsequent Supreme Court cases challenging the legality and scope of the legislation directly influencing the wetland mitigation banks and markets.

It was determined Florida with its large amount of wetlands and high rate of development was a good regional market to analysis. The entire Jacksonville Mitigation District was collected into a single excel spreadsheet. A Google search on Florida wetland mitigation prices was queued, turning up a list of twelve banks with individual credit prices for each classification. Of these twelve, eight banks were selected based off available credit price data.

Each bank had a percentage of acres available by calculating the number of sold credits and creating a percentage using the provided Total Acres provided by RIBITS. A column was added and for each bank, the type of wetland was matched with the appropriate credit price. Each bank had a summation performed on the number of potential credits available to the bank (denoted in the “Type” column as Rel or Released by the government to the banker) and the the number of credits sold by bankers to developers (buyers). The percentage of available credits and percentage of Credits sold was then calculated using withdrawn (sold) and released (potential) credits. For each bank the revenue was calculated using withdrawn credits and their correlating prices, as well as potential revenue the bank could make using released credits and their corresponding prices.

The minimum, maximum and average sales price for each bank was determined querying the appropriate rows and performing Microsoft Excel functions. Using the “Count If” function, the number of sales in each bank were also determined. It was important to use “Count If” to be sure ‘Rel’ or Released Credits were not included in the numbers but only ‘Wdr’ or Withdrawn (sold) sales.

The number of Average Acres Sold Per Sale and the number of Credits Sold Per sale were also calculated to give a sense of how much buying power each individual transaction had in the overall success of sales. This data was coupled with Total Acres and Total Credits sold to determine what that buying power was, with all graphs created using Microsoft Excel.

Results

This study analyzed data from eight of the one hundred thirty-three mitigation banks, the average credit price is $123,421 with a maximum sales price of $64,777,050 and a minimum sale of $640. Of the eight banks sampled $1,233,898,250 of potential sales revenue is still available. In total, the banks sold six individual classifications of credits, each with bank specific prices. These credits can be classified as a State, Federal, State/Federal, Freshwater Forested and Depression Marsh Sate Only, Freshwater Forested and Depression Marsh Dual, Saltwater Tidal Marsh. The variation in credit type allow developers the ability to buy according to their specific needs.

As illustrated in Figure 1 the eight banks in this study varied in size from 151 acres (CGW) to 24,323 acres (Farmton) with a standard deviation of five-thousand-six-hundred-eight (σ =5,608) and a mean four-thousand-six-hundred sixty-four ($\sigma_{\bar{x}}$ =4,664). The largest bank, Farmton services seven separate counties while the other banks only have access to development in one or two counties.

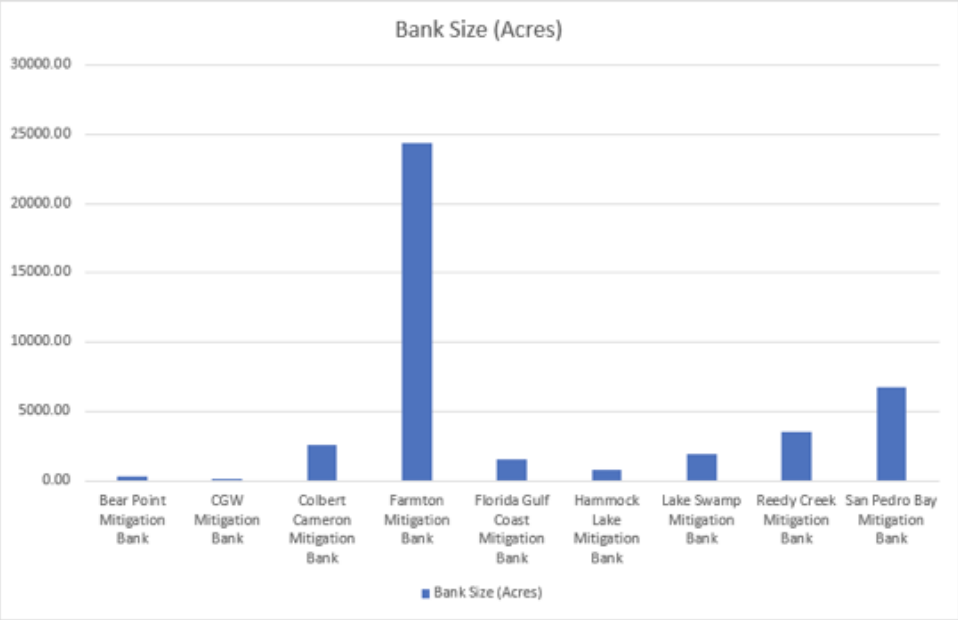

Figure 1. Mitigation Bank Size Range

Figure 2 makes plane that as the largest bank, Farmton Bank has also sold the most sales (n=192) followed by Reedy Creek (n=148) yet Farmton has been in existence for fourteen years ten years less than the twenty-four years Reedy Creek. Farmton has sold an average of seventeen credits per year while Reedy has only sold an average of six credits per year. Farmton is a larger plot of land being 24,323 acres compared to Reedy's 3,520 acres but San Pedro has been in existence for sixteen years, five more than Farmton is 6,745 acres, 3,225 acres larger than Reedy. Reedy encompasses two counties, San Pedro services one county while Farmton sells credits to seven counties.

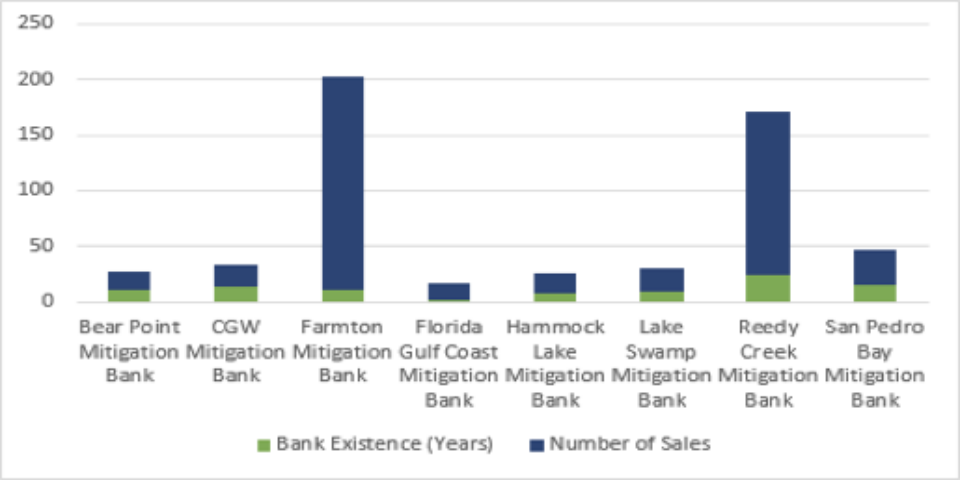

Figure 2. Bank Age and Number of Sales Since Operations Began

As seen in Figure 3, the sales rate varies greatly between banks with a range of 1.36 sales per year (CGW) to 17.45 sales per year (Farmton). The average sales rate is 5.07 sales per year. Farmton sells one credit type which combines state and federal developers into one sales market. Florida Gulf the bank with the second highest sales rate sells three credit types all habitat specific ranging in price from $120,000 to $330,000. Reedy, the bank with the third highest sales rate sells a two credit types, a state/federal market for $135,000 and a federal credit for $25,000. The demand for the federal credit has only comprised 11 sales where the majority of sales Reedy has sold (137) is in the much higher priced state/federal credit category. CGW has the lowest sales rate offering two equally priced credits.

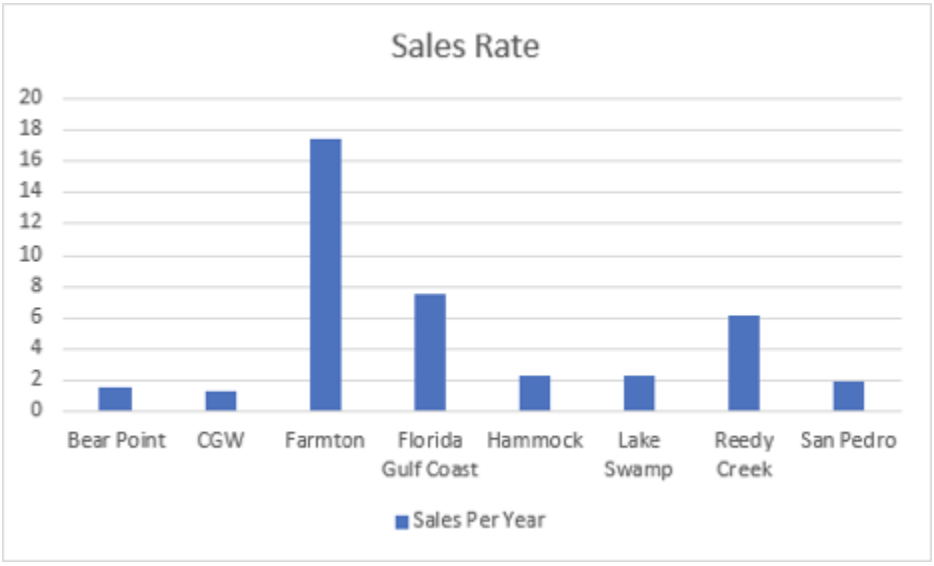

Figure 3. Sales Rates of Each Mitigation Bank

Figure 4 demonstrates how the credit prices ranged from $25,000 for a Federal Credit in the Reedy Mitigation Bank to a Maximum of $330,000 for Estuarial Intertidal Emergent in the Florida Gulf Coast Mitigation Bank The average credit price is $123,421 dollars. Only one of the eight banks (BPM) sold state and federal credits separately - these two credits were sold at equal price of $160,000. Five of eight banks chose to sell a combination of federal/state credits - two banks (Hammock and Lake Swamp) presented state developers a larger market allowing them to buy either credit, two banks (Reedy and CGW) gave federal developers a larger market and one bank (Farmton) sold a single state/federal credit option but was the only one to include a wetland type (palustrine) of which they sold two other palustrine credits (emergent and forested). The price of the combination credit Farmton sold is $145,000, more expensive than the palustrine emergent credit they sold valued at $120,000 but less expensive than the $180,000 palustrine forested credit they sell. This would give developers building on forested wetlands within the seven counties serviced by the large Farmton watershed an incentive to buy the combination credit. This combination credit could potentially leave a gap in quality of wetland mitigation if money is not being used to restore forested wetlands.

Figure 4. Credit Price Range for Mitigation Banks.

Figure 5 illustrates the average number of total sales for the sample is seventy-two (n=8, $\sigma_{\bar{x}}$ =72.43). Of these sales, an average minimum price of seventeen-thousand six-hundred-twenty-seven ($17,627) a maximum average sales price of eight-million nine hundred thirty-nine-thousand-nine-hundred-ninety-six ($8,939,996). Average sales price of a sale was five hundred eighty-four nine hundred sixteen ($584,916), adding nearly half a million in sales costs to developers. This cost to developers is still lower than the cost of on-site development, creating an incentive for both developers to budget mitigation credits into their projects and bankers to enter the market and create wetland mitigation credits.

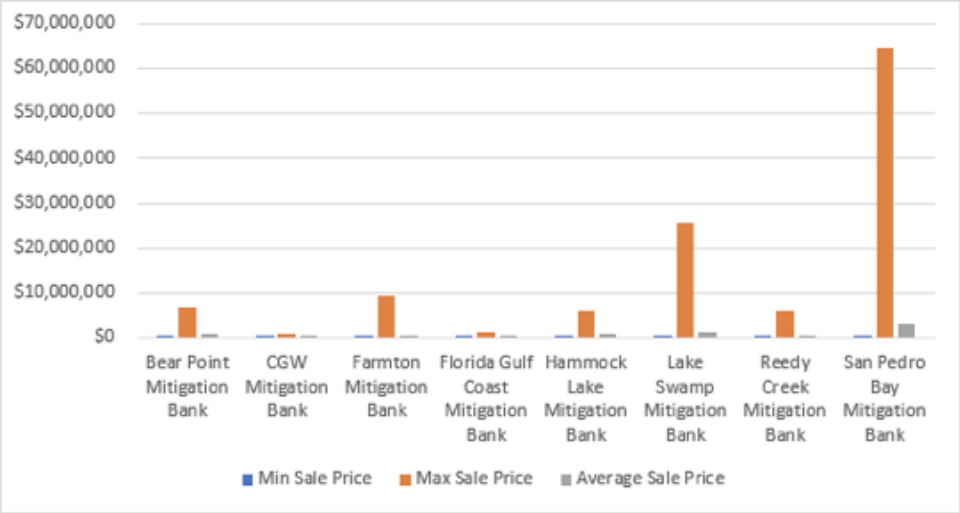

Figure 5. Average Sales Price For Each Mitigation Bank

Figure 6 highlights these eight banks have a combined remaining potential sales value of $1,997,563,150. Potential sales includes all credits which have been approved by government agencies for sale to developers, or the net worth of these banks. This potential sales indicates the amount of potential revenue or incentive available to bankers by selling wetland mitigation credits alone. The potential of selling additional credit types could increase this number and the incentive for bankers to create high quality wetland habitats. It is also an indication the wetland mitigation market is robust and potentially profitable to those able to get past barriers to entry such as the initial purchase of land and investments to create viable credits.

Figure 6. Outstanding Sales Still Available

On average, banks still have 82% of sales available with Farmington having the lowest available sales at 55.5% and San Pedro having the greatest potential sales left at 99%. As Figure 7 highlights, The high amount of sales potential left with San Pedro could be a result of the wetland specific credits sold there, shrub bog credits being particular to this bank out of the eight sampled. Farmington being the largest bank out of the sampled banks has the lowest available sales, it is also the only bank to service seven separate counties. This large market could be the result of the hight number of sales Farmington has experienced.

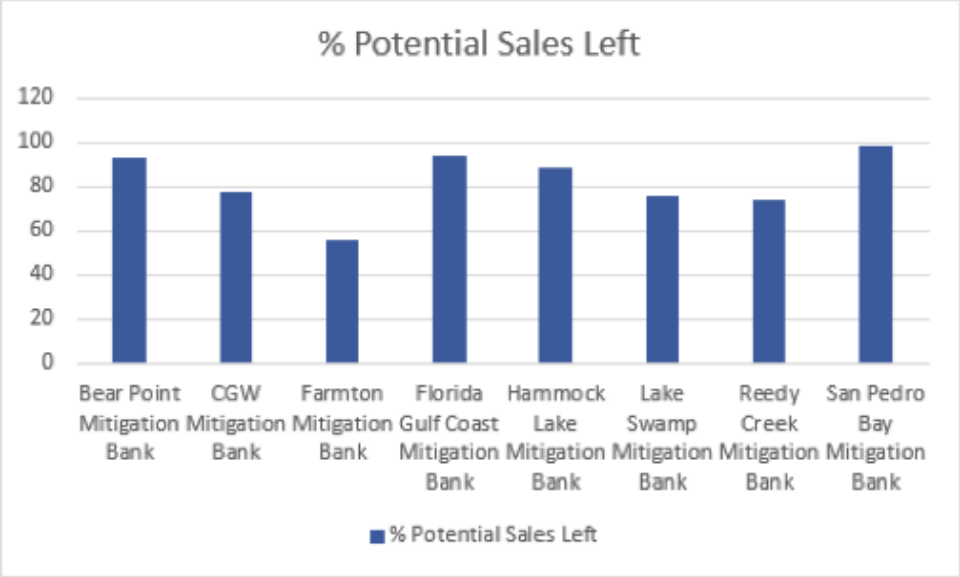

Figure 7. Total percentage of sales remaining in each Mitigation Bank.

The remaining total potential sales of these eight banks is $1,233,898,250 or 62% of potential revenue still available. Figure 8 Illustrates that of the mitigation banks, Farmton has the greatest potential sales mainly because of its vastly larger size. Reedy the third largest bank has the second greatest amount of potential revenue remaining followed by the second largest bank, San Pedro. San Pedro has unique habitat specific credit types which have the lowest credit price out of the eight banks sampled. This could explain why although San Pedro has the greatest percentage of potential sales left shown in the figure above, it does not have the highest potential revenue of the sample banks.

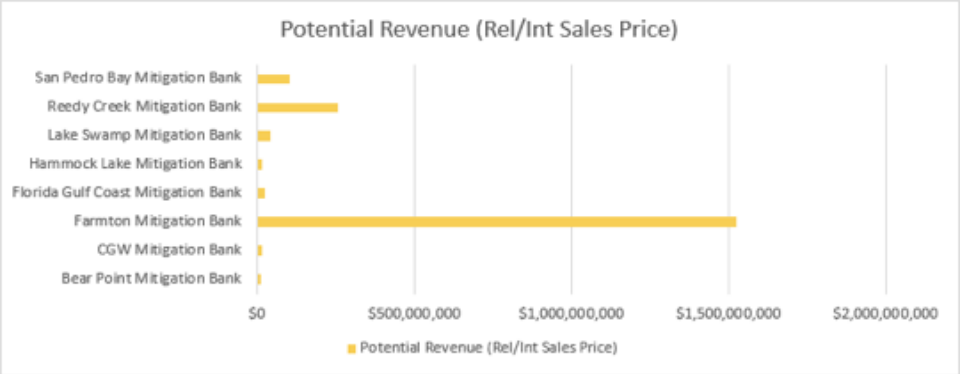

Figure 8. Total relative amount of sales available.

Based on the sample, mitigation banks have been consistently selling credits and have ample room to continue doing so. Despite an additional average cost of half a million dollars to developers found in this sample, Figure 9 shows that the economics of scale available to mitigation banks make it a more cost-effective option than on-site mitigation. The same study presents the option of leveling the playing field by increasing the standards on-site mitigation are subjected to, creating more incentive for the sale of mitigation credits (Silverstein, 1994).

Figure 9. Average Price per sale.

When looking at average sales price for the different types of wetlands constructed, the average price of $270,154 is too small to be noticed on a barograph. This also includes the BPM State credit of $48,091. According to the data, San Pedro has high demand for their two types of credits with Shrub Bog credits averaging over five million dollars and their other forested sales credit being $984,500. The only other two credit types with higher demand according to price are Reedy's federal credit at $1,730,250 and Lake swamps state credit at $1,268,610.

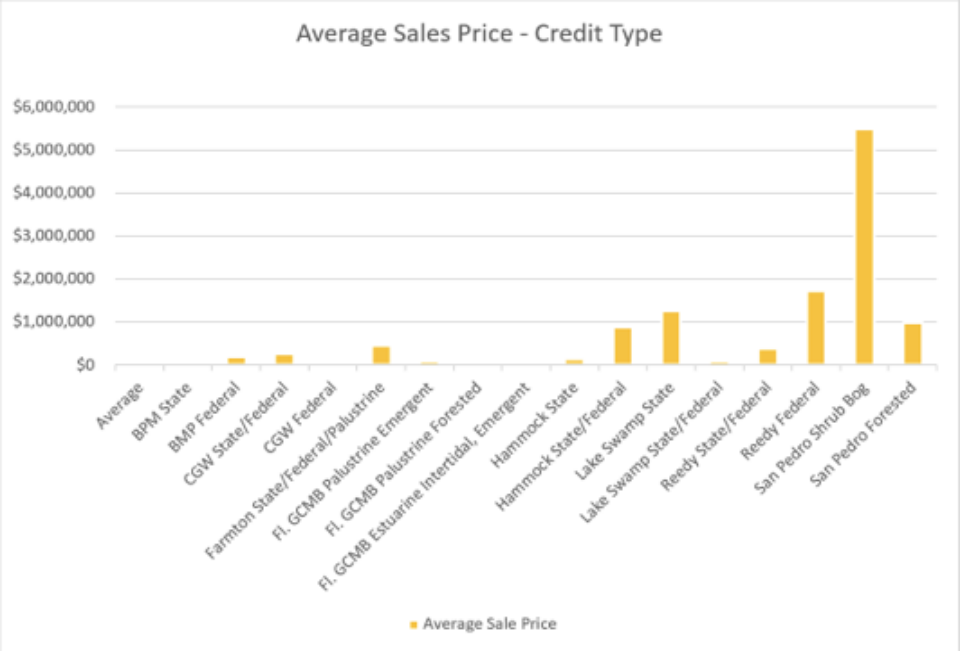

Figure 10. The average Sales Price for Each Habitat Type Constructed.

The average credits sold per sale exceed the average number of acres per sale regardless of the credit type. As seen in Figure 11, Lake Swamp has the largest average number acre sold with its palustrine forested credits. This could be an indication of higher rates of deforestation in the watershed survived by Lake Swamp as are other palustrine forested wetland credits for sale that do not have such high average acres sold per sale.

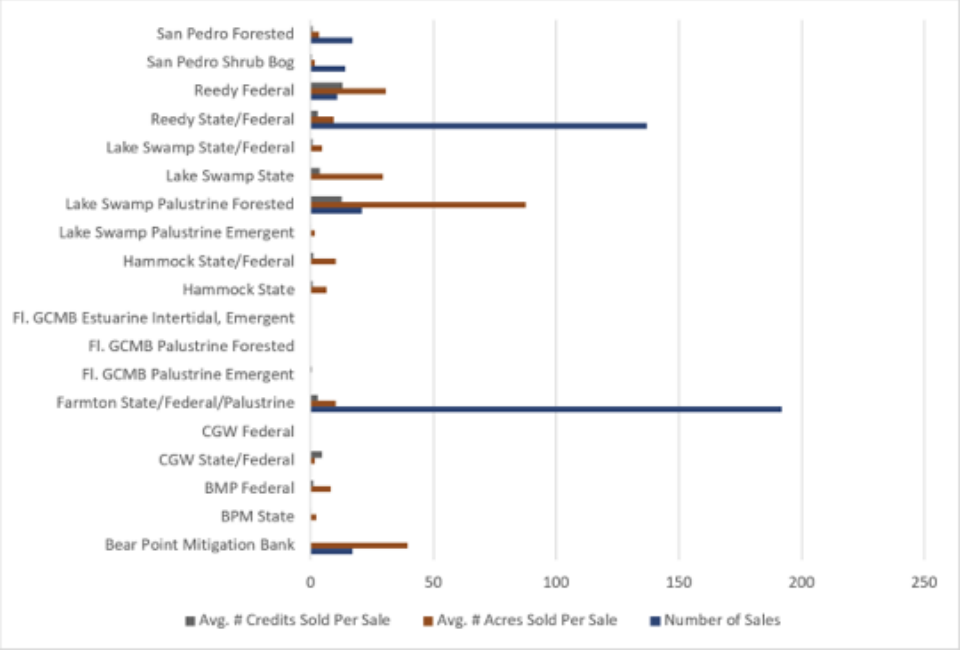

Figure 11. Number and Size of Mitigation Banking Credits Sold

Discussion

Contrary to claims made by opponents to federal wetland regulation, our data shows a growing mitigation market where developers are actively participating. This market has grown despite increased guidance and regulation from the inception of the initial market and has endured the tumultuous confusion imposed by periods of judicial inquiry, Ninth Circuit rulings creating voids of clarity and unscrupulous public opinion. According to the challenges the wetland mitigation market has faced over the past twenty-five years, we feel the market will weather another storm of legislation being created and recanted, despite the wide scope of the 2015 WOTUS Rule.

Changes to the legislative frame work and rules of the game players in the mitigation market must follow creates uncertainty and increased risk for mitigation bankers. The opening of novel markets can help mitigation bankers to protect their investment by keeping creating a broader market for their goods (restored wetland habitat) to be sold. These new markets include carbon sequestration through the sale of GHG reduction credits to point-source carbon polluters based, utilizing the forgone cost of monitoring on the success of the bank's vegetation as a hedonic pricing tool. Even if the 2015 WOTUS Rule does not disrupt the wetland mitigation credit market, wetland banks can become more valuable through taking a multi-market approach.

Multi-Market (Credit-Stacking)

By creating incentives such as tax breaks for specialization within geographic regions mitigation bank market thickens, increasing both potential bank profitability and bankers' incentive to continue investing. Two large potential markets exist in the western United States where drought has become an increasing problem. Wetlands provide water retention and purification essential and can act as wildfires buffer zones, areas of relatively high moisture retention through low infrastructure costs (proper vegetation) around areas of a high-density population could be an option.

Another potential untapped market for mitigation banks can be in the use of land for carbon sequestration. Bogs and other swamp lands trap 1800 – 2700 kilograms of carbon per hectare per year, higher than comparable references wetlands and boreal peatlands (Mitsch, 2012). This results in the extensive root-networks found under the surface, allowing wetlands to also be a more effective carbon sink than forested areas. (Erwin, 2009) These markets have already been used by environmental entrepreneurs in other States knowing a willingness to pay for carbon capture exists. A mature wetland mitigation bank could have expanded market value if the bank is allowed to sell carbon capture credits, increasing the value and incentive for bankers. Since carbon capture is not limited to one particular watershed, it opens the market of potential buyers beyond the traditional limits imposed on wetland mitigation banks

With more avenues to possibly invest in, bankers have more incentive to develop methods which would be in many different parts of wetland mitigation. Instead of having everyone trying to do the same things depending on specific wetland because it is the only profitable venture in the wetland mitigation banking scheme, each banker can decide what they want to develop and improve their bank. Eventually, they can improve the more expensive and difficult sections of their specific bank. The ultimate goal of the wetland mitigation credits are the same, but by partitioning the legislation to create a more free market, better practices can be developed and more potential bankers will want to invest.

Conclusion

Mitigation banking is a system where liability is transferred from developers to specialized personnel (bankers) with the goal of minimizing development costs while sustaining ecological integrity of developed land.

Wetland mitigation markets were created by government agencies to address issues only discernible through collective scientific research, up until recently wetlands held little value at all and were drained only realized after aggregate and set up by agencies is not a naturally occurring phenomenon, it was created to satisfy a problem people are trying to solve.

Compensating damages caused by development through market-based solutions such as wetland mitigation banking provides both economic and other potentials. Through a clearly defined rule of law with the elasticity between districts, proper management can provide quality wetlands within a watershed.

With the pending 2020 repeal of the 2015 WOTUS Rule, less information will be available to analyze if Federal clarification lowers costs and increases wetland protections or if a local State level approach is best.

The regional regulation allows for thicker markets and increased banker confidence. To maximize ecosystem services provided by wetlands, market forces provided through the hedonic pricing of wetland functions can be used to give wetland bankers incentive to set up ecologically successful banks at costs for developers.

Further study is needed in the amount of projects canceled because of the claim of significant nexus and to what degree federal wetland policy has slowed building development or unjustly impinged on the rights of citizens. Ultimately how affective was the 2015 CWR at achieving NNL, a question perhaps impossible to answer considering the legislation was repealed before it was fully implemented.

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