

**ECONOMIC ANALYSIS OF THE PROPOSED REVISED DEFINITION OF *WATERS*
OF THE UNITED STATES ON NATIONWIDE PERMITTING IN WEST VIRGINIA**

by

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In March 2014, the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) collectively released a proposed rule that would revise the definition of “waters of the United States” under the Federal Clean Water Act (CWA) to the public. The proposal intends to (i) enhance protection for the nation’s public health and aquatic resources, and (ii) increase CWA program predictability and consistency by increasing clarity as to the scope of “waters of the United States”. According to the agencies, the rule would increase jurisdictional areas by approximately three percent and is intended to clarify the protections for “upstream waters and wetlands that are absolutely vital to downstream communities”. The EPA used data dating back to 2002 to predict the permitting costs of this regulatory change. These data do not appropriately represent current costs and are missing factors that should be considered. The EPA also fails to analyze the association between this regulatory change and the impacts on specific industry types, such as private landowners and small businesses. This paper analyzes the direct costs of permitting on specific markets and explores how regulatory change is associated with predictions of increased costs to West Virginia businesses.

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1.0 LITERATURE REVIEW

The Clean Water Act (CWA) is a product of revisions to the Rivers and Harbors Act of 1899. The goal of the Rivers and Harbors Act was to maintain the physical navigability and utility of the country's rivers and harbors for commerce-related purposes (EPA 2014a). It prohibited the discharge of navigation-threatening refuse into waterways without a permit and the dredging or filling of water bodies capable of supporting commercial navigation. The Rivers and Harbors Act was a commerce protection-oriented statute with secondary pollution prevention benefits ancillary to physical navigation (EPA 2014a).

In 1948, Congress enacted the Federal Water Pollution Control Act as a means to provide federal funds for investigating and cleaning water pollution after a pollution incident. Amendments to the Water Pollution Control Act in 1956 and 1965 began to shift focus to pollution prevention, not just for public health, but also for broader environmental benefits (EPA 2014a). Pollution prevention was the primary theme of 1972 amendments that reorganized the Water Pollution Control Act into the federal CWA. The CWA continued to be amended between 1977-1987 to give the government jurisdiction over “navigable waters”, defined in section 502(7) of the statute as “waters of the United States, including the territorial seas” (EPA 2014a).

Many cases throughout history helped mold the definition of waters of the United States. In the 1995 case of *United States v. Riverside Bayview*, the Court came to a unanimous opinion that streams and adjacent wetlands are “inseparably bound up” (United States 1985). The term

further developed during the 2001 case of *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*. During this case, the court determined that use of “isolated”, non-navigable intrastate ponds used by migratory birds was not, by itself, a sufficient basis for the exercise of federal regulatory authority. This ruling led to confusion and uncertainty by the regulated public and resulted in significant resource allocation to these determinations by federal and state regulators (EPA 2014a).

In the 2006 case of *Rapanos vs. United States*, the court ruled that the definition of “waters of the United States” covers some waters that are not navigable in the traditional sense, but includes “relatively permanent, standing or continuously flowing bodies of water” that are connected to traditional navigable waters, as well as wetlands with a continuous surface connection to such relatively permanent water bodies. The Rapanos group noted that its reference to “relatively permanent” waters did “not necessarily exclude streams, rivers, or lakes that might dry up in extraordinary circumstances, such as drought” or “seasonal rivers, which contain continuous flow during some months of the year but no flow during dry months”. (EPA 2014a).

The regulations that are now in place, which include the most recent amendments, define “waters of the United States” as *traditional navigable waters, interstate waters, all other waters that could affect interstate or foreign commerce, impoundments of waters of the United States, tributaries, the territorial seas, and adjacent wetlands* (EPA 2014a).

The definition is under debate yet again. On March 25, 2014, the USACE and the U.S. EPA collectively released a proposed rule revising the definition of “waters of the United States” under the Federal CWA. The proposal intends to (i) enhance protection for the nation’s public health and aquatic resources, and (ii) increase CWA program predictability and consistency by

increasing clarity as to the scope of “waters of the United States” protected under the Act. The change in regulation would redefine “waters of the United States” for all sections of the CWA to mean: *traditional navigable waters; interstate waters, including interstate wetlands; the territorial seas; impoundments of traditional navigable waters, interstate waters, including interstate wetlands, the territorial seas, and tributaries, as defined, of such waters; tributaries, as defined, of traditional navigable waters, interstate waters, or the territorial seas; and adjacent waters, including adjacent wetlands.* A change in the definition from previous versions is that waters in these categories would be jurisdictional “waters of the United States” by rule—no additional analysis would be required for “other waters” (those not fitting in any of the above categories). Previously, these additional analyses for other waters left reviewers with unguided regulatory rulings and inconsistent determinations. The rule would also offer a definition of significant nexus and explain how similarly situated “other waters” in the region should be identified (EPA 2014a).

The EPA claims the following about the proposed rule: it does not protect any new types of waters (i.e. all of these waters have already been covered in previous versions of the CWA); it is consistent with the Supreme Court's more narrow reading of CWA jurisdiction; and it does not regulate ground water. At one point, they also claimed that the rule actually proposes to reduce jurisdiction and exclude certain ephemeral and intermittent ditches. The agency stated that their goals for the definition change are to give the program transparency, predictability, and consistency and result in more effective and efficient CWA permit evaluations with increased certainty and less litigation (EPA 2014a). The public has refuted many of these claims.

Part of the process in revising the rule was to open the rule for public comment. In particular, the agencies are interested in comments that include scientific and technical data, case

law, and other information that would further clarify which “other waters” should be considered similarly situated for purposes of a case-specific significant nexus determination. The agencies sought comment on a number of alternative approaches. For example, these alternatives may potentially include determining whether waters in identified ecological regions (eco-regions) or hydrologic-landscape regions are similarly situated for purposes of evaluating a significant nexus, as well as the basis for determining which eco-regions or hydrologic-landscape regions should be so identified. The agencies also solicited comment on whether the legal, technical and scientific record would support determining limited specific subcategories of waters are similarly situated, or as having a significant nexus sufficient to establish jurisdiction (EPA 2014c).

According to the agencies, the rule would only increase jurisdictional areas by three percent and is intended to clarify the protections for “upstream waters and wetlands that are absolutely vital to downstream communities” by “strengthening the consistency, predictability and transparency of jurisdictional determinations” (EPA 2014c). If adopted as proposed, the practical implications of implementing this rule will be felt throughout the United States, particularly in the arid and semi-arid western states, such as California (EPA 2014c).

On April 27, 2011, the EPA released a report entitled “Potential Indirect Economic Impacts and Benefits Associated with Guidance Clarifying the Scope of Clean Water Act Jurisdiction”. This report included the three percent increase in jurisdiction statistic mentioned above, and is the foundation for the estimates of economic impact to this point. The report concluded that the definition of “waters of the U.S.”, by itself, imposes no direct costs. The potential costs and benefits incurred as a result of this proposed action are considered indirect because the action involves a definitional change to a term that is used in the implementation of a variety of CWA programs (EPA 2011). Each of these programs may subsequently impose direct

or indirect costs as a result of implementation of their specific regulations. One thing that the EPA did not consider was that in addition to the number of permit applications, the complexity of permit applications may increase. If agencies determine that a greater abundance of waters are jurisdictional on a project site, then the ability to avoid or minimize impacts may be reduced. The increase in waters on a site may increase impacts resulting in a change in the type of permit that will be required and possibly the type of mitigation.

Based on the 2014 economic analysis, the EPA and USACE expect that the 2014 outcome of the proposed rule change would be similar to the outcome of fully implementing the April 2011 draft guidance. The USACE estimates that the costs incurred by both the USACE and applicants (excluding costs for compensatory mitigation) will range between approximately \$7,900,000 and \$20,000,000 (EPA 2014c). In light of the data and operational limitations, as well as the inherent assumptions in each component of the analysis, the audience of the report should be cautious of these estimates (EPA 2011). These costs were based on a 2002 report that did not take into account many of the costs that are included into today's industrial and permitting processes.

The EPA assembled an economic analysis of the proposed regulatory change that was published in March 2014. The EPA study estimated permit application costs by estimating the amount of additional permit applications and the average impact per additional application. The EPA study also estimated additional Individual Permits (IP) and General Permits (GP), as well as average per permit impact to jurisdictional waters (in acres) for each permit type (EPA 2014c). These findings are presented and discussed in the research section of this paper.

To calculate permit application costs associated with the proposed rule, the agencies used a 2002 study called "The Economics of Environmental Regulation by Licensing: An Assessment

of Recent Changes to the Wetland Permitting Process” (Sunding 2002). The study failed to analyze current costs of permits or economic feasibility of the regulatory changes among private citizens, small businesses, or other specific markets.

On May 15, 2014, the Brattle Group produced the “Review of 2014 EPA Economic Analysis of Proposed Revised Definition of Waters of the United States”. This review claims that the March 2014 EPA analysis relies on a flawed methodology for estimating the extent of newly jurisdictional waters that systematically underestimates the impact of the definitional changes. They also point out that several important types of costs and the use of a flawed benefits transfer methodology, errors, omissions, and lack of transparency in EPA’s study are so severe as to render it virtually meaningless. In conclusion, they claim that the agency should withdraw the economic analysis and prepare an adequate study of this major change in the implementation of the CWA (Sunding 2014).

Economic analyses available to date have failed to properly determine a current cost for permits or investigate the regulatory change’s impacts on specific industries. The research provided below will further analyze the direct costs of permitting and take a detailed look at the increased costs to individual industries using a breakdown of current permitting costs, information provided in previous studies, and information provided by the USACE.

There are many processes, permits, and government agencies involved to receive a USACE permit. There are many varying regulations, and each state and USACE district currently requires different components in order to approve the permit activities. In order to provide specific examples, and not generalize across states, this paper focuses its analysis on permitting in West Virginia.

2.0 RESEARCH / DATA

To understand the total monetary costs of a USACE permit and its impacts on small businesses in West Virginia all components of a USACE permit must be analyzed. The government's economic analysis of potential permitting cost increase is based on the monetary values from a study done by Sunding and Zilberman in 2002. The values from this study do not take into account inflation, technology changes, economical changes, or any other changes in the permitting system. The study came to the conclusion that, in 2002, USACE general permits cost an estimated \$28,915 and took an average of 313 days to complete, while individual permits cost \$271,596 and took an average of 788 days to complete (Sunding 2002). These costs don't include the cost of mitigation or design changes, and they likely underestimate the present cost of the permitting process. As stated in the 2014 study done by the Brattle Group, "This underestimation is enhanced by the exclusion of other costs addressed in the Sunding and Zilberman study. Specifically, the EPA analysis ignores the costs of avoidance and delay, which are likely to dominate the out-of-pocket expenses for permit application and mitigation" (Sunding 2014). Due to the fact that the government based the foundation of their statistical data on numbers that are inconsistent with the modern day economy, they will be deemed inaccurate for this research paper.

2.1 METHODS

The methods for the analysis were to:

- 1) Determine permitting variables and create controls to limit them;
- 2) Determine actions and costs that would be required to obtain a NWP;
- 3) Review permitting records from 2014 and estimate increase from regulatory change;
- 4) Estimate impacts on business types and industries

1) Determining Variables and Creating Controls:

In order to determine accurate costs, previous research was reviewed to understand why the government and other agencies have difficulty estimating monetary values of permits. Previous reports indicated that the main reason is because of all the variables involved with permitting. In previous studies, the variables that were consistently determined were the state specific location, scope of the project, type of permit being done, and sources of pricing data. In order to limit these variables, this research paper will focus specifically on nationwide permits done in West Virginia. West Virginia was selected based on the location of the researcher, accessibility to resources, and funding. Nationwide permits were selected as the type of permit because they were found to be done at a higher rate than other permit types. Scope and pricing data for permits is not typically provided publically and is constantly changing due to the flexible market. In order to get accurate scope and pricing information anonymous interviews were conducted with consultants from companies who assemble permits in West Virginia. Averages of the statistics were used and results are presented throughout this paper.

Other variables that have made permitting costs difficult to predict are costs for employees, cost for equipment, cost of USACE coordination, cost of USFWS coordination, cost of SHPO coordination, cost of mitigation, and costs of coordinating with other agencies that are

requested by the USACE. In order to limit these variables, the next section will break down current requirements and costs for agencies in West Virginia.

2) Determine actions and costs that would be required to obtain a NWP:

When anticipating construction or potential environmental disturbance, a business must determine if a USACE permit is needed. To be able to understand the need for the permit, all USACE regulations and their requirements must be understood. In order to do this, time must be spent educating employees by paying for training, hiring staff with permitting expertise, or paying a permitting consultant to guide the business in this process. A study done in 2008 by the Society for Human Resource Management predicted that to recruit and hire an employee, it costs the company, on average, 6 to 9 months worth of that employee's salary (Society 2008). This study will calculate costs using an average of 7.5 months as an estimate for recruiting and training costs for employees.

Consultants with extensive knowledge in USACE permitting in West Virginia are in high demand by prosperous corporate companies. Therefore, these consultants can charge rates that are higher compared to many other states. A general manager wage of \$39.26 per hour will be used for calculation purposes in this report based on the West Virginia May 2013 State Occupational Employment and Wage Estimates of mean hourly wage (USDL 2014).

After paying the costs for the knowledge of the USACE permitting process, a business must determine the potential projects associated impacts. The USACE requires survey grade impact calculations, which requires additional knowledgeable professionals added to the company's expenses. A business must send out their engineers and project planners to the job site where they determine the scope of the project and what it will entail. Scientists or other trained professionals must then determine all of the jurisdictional waters that can potentially be

impacted by the project. The surveys must be completed at times when there is no snow on the ground, which can create time delays for companies. Then, jurisdictional waters must be located using survey grade equipment. Engineers, scientists, and surveyors, along with their equipment, are necessary to produce a plan before the permitting stage even begins, and drive up preliminary costs. According to the West Virginia May 2013 State Occupational Employment and Wage Estimates, the mean hourly wage for a civil engineer is \$32.81, for a biological scientist is \$33.47, and for a surveyor is \$25.53 an hour (USDL 2014). Based on interviews with environmental consultants, it was determined that biological scientists and surveyors work in pairs for efficiency and safety purposes. Working in pairs is considered a professional standard. The pair of biological scientists will therefore cost a company \$66.94 per hour and the pair of surveyors will cost \$51.06 per hour. These six employees' total training costs and annual wages add \$642,413 to a company's expenses as shown in Table 1.

Table 1 Employee costs for hiring USACE permitting staff

Employee	Wage rate per hour	Annual Salary	Number of Employees Needed	Training Cost (7.5 months salary)	Total additional salary
Biological Scientist	\$33.47	\$69,610	2	\$87,013	\$226,233
Civil Engineer	\$32.81	\$68,230	1	\$42,644	\$110,874
Surveyor	\$25.53	\$53,110	2	\$66,388	\$172,608
Manager (USACE specialist)	\$39.26	\$81,660	1	\$51,038	\$132,698
				Total	\$642,413

If a business decides to hire these staff, they will need to also obtain the proper equipment for them to perform their job. Since the equipment the staff uses varies significantly, the minimal amount of equipment will be listed for them to complete their specific task. It will be assumed that the company already has available computers, the Internet, vehicles, cameras, safety equipment, and general office supplies, such as paper, printers, etc. All of the manager and civil engineer’s supplies will be assumed covered under these categories for this study. The scientist and surveyor equipment and costs are listed in Tables 2 and 3 below to compare rental and purchasing costs, respectively. The costs of purchasing and renting this surveying equipment is not normally listed as public information and costs are constantly being adjusted due to the market. The equipment needed was determined by interviewing surveyors from multiple engineering firms in West Virginia. In order to determine the prices, five anonymous West Virginia vendors were quoted and an average of the costs are shown the tables below.

Table 2 Equipment costs for rent

Employee Type	Equipment	Cost per day	Total Cost per Employee
Biological Scientist	Survey Grade GPS	\$130	\$310
	Munsell Soil Chart	\$180	
Surveyor	Two Survey Grade GPS Receivers and Equipment Kit	\$300	\$480
	Total Station Kit: Total Station, Prism Rod, Prisms with Targets, Tripods, Tribrachs	\$95	
	Trimble Data Collector with software	\$85	
		Total	\$790

Table 3 Equipment costs for purchase

Employee Type	Equipment	Cost	Total Cost per Employee
Biological Scientist	Munsell Soil Chart	\$180	\$180
	Two Survey Grade GPS Receivers	\$51,000	
	Total Station	\$9,995	
Surveyor	Total Station Equipment Kit	\$1,253	\$70,364
	GPS Survey Grade Equipment Kit	\$2,621	
	Trimble Data Collector with software	\$5,495	
		Total	\$70,544

Instead of hiring staff, the company could elect to hire consultants. Based on interviews with environmental consultants in West Virginia, it was determined that the normal billing rate of a consultant is between 1.5 and 4 times the wage of the employee to cover their overhead costs and make a profit. This paper will assume the median of 2.75 as a base multiplier to calculate the daily cost for these consultants. The timeframe for this preliminary review can vary greatly depending on the scope of the project. Consultants generally will charge at least one full day for their services and the daily costs are expressed on Table 4.

Table 4 Estimated daily consulting charges for fieldwork associated with USACE permit

Employee Type	Wage Rate Per Hour	Consultant Rate Per Hour (2.75 multiplier)	Costs for an 8 hour day	Amount of Employees Needed	Total Consultant Costs	Estimated Equipment Costs	Total Cost Per Employee Type
Biological Scientist	\$33.47	\$92.04	\$736.32	2	\$1,472.64	\$100.00	\$1,572.64
Civil Engineer	\$32.81	\$90.23	\$721.84	1	\$721.84	\$0.00	\$721.84
Surveyor	\$25.53	\$70.21	\$561.68	2	\$1,123.36	\$150.00	\$1,273.36
Manager (USACE specialist)	\$39.26	\$107.97	\$863.76	1	\$863.76	\$0.00	\$863.76
						Total	\$4,431.60

There are additional equipment charges associated with hiring consultants for jurisdictional determinations by scientists. For jurisdictional determinations, consultants charge for equipment such as Munsell soil charts, soil probes, cameras, wooden stakes, flagging, safety equipment, and survey equipment. Most of the equipment is generally included in the overhead as part of the multiplier but the electronics are generally charged at an additional daily rate.

Due to the rural areas throughout West Virginia and the lack of cell phone service, a virtual reference station Global Positioning System (GPS) operating system would be unreliable. Therefore, a GPS system using two units, a local base and rover, are generally needed and will increase equipment cost. Additionally the use of a total station system will be needed for accuracy in much of the dense forested mountains that cover West Virginia.

For this report it will be assumed that the civil engineer and USACE specialist will have all of their equipment and materials covered under the multiplier charge due to variability of charges and unavailable data to the public at this time. These employee costs do not include vehicle mileage costs or computer programming costs that are normally charged by consultants due to the variability in charge and unavailability of data available to the public.

Table 5 Staff and equipment cost comparisons for fieldwork

Staff Cost	Equipment Cost	Total Cost
Hire Staff: Rate \$642,413.00	Purchase: \$70,544.00	\$712,957.00
	Rent: \$790.00	\$643,203.00
Hire Consultants: \$4,181.60	\$250.00	\$4,431.60

Based on the calculations shown in Table 5, hiring consultants would be the most affordable option for getting one day of fieldwork completed. According to these estimates, to make it affordable to hire staff and rent equipment, compared to hiring consultants, it would take 146 days of fieldwork. After 90 days of fieldwork, it would be more affordable to purchase

equipment than renting. The total permit cost calculation will utilize the most cost effective method for one day of permitting and therefore include the consultant charge of \$4,431.60. Based on a survey done with environmental consultants in West Virginia, the average amount of field days they had per nationwide permit was 2.5. To properly estimate the average cost of permits, we will multiply \$4,431.60 by the 2.5 days to get an average of \$11,079.00 per permit.

If it is determined that there will be no impacts from the proposed project, it is standard practice to have a report put together by professionals proving that no impacts are anticipated from the project. It is recommended to have a third party consultant do these reports because they are considered unbiased and impartial by the legal system. Based on interviews with consultants, the average charge for assembling a report that shows no impacts are done is \$7,000, which includes both equipment and employee costs. These costs are at no point mentioned in EPA's or USACE's considerations of costs to businesses or private landowners.

If there are impacts anticipated from the proposed project, then it must be determined which type of USACE permit must be used. Activities requiring a permit from the USACE under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act of 1899 may be permitted by General Permit or Individual Permit (USAC 2014).

General permits are issued nationwide or regionally for activities that are either similar in nature and cause only minimal individual or cumulative adverse impacts that would result in avoiding unnecessary regulatory control exercised by another federal, state, or local agency. General permits must result in environmental consequences that are considered individually and cumulatively minimal (USACE 2014).

A Nationwide General Permit (NWP) is a type of general permit issued nationally. The regulations that govern NWPs are found at 33 CFR 330. There are currently 50 NWPs, which

were published on February 19, 2012 and expire on March 18, 2017, with 31 general conditions (USACE 2014). When attempting to permit a project under a NWP, a business may need to complete a Preconstruction Notification (PCN). For NWPs requiring a PCN, such notification must be made in writing as early as possible prior to commencing the proposed activity.

In order to receive clearance under a NWP, businesses must receive clearance from other agencies besides the USACE. Under Section 401 of the Clean Water Act, certification of compliance with state water quality standards by the State Water Quality Agency is required for any discharge of pollutants into waters of the United States. All Section 404 permits, individual or general, require Section 401 water quality certification. A PCN to the USACE is required, even if a PCN is not otherwise required, if threatened or endangered species or its critical habitat might be affected by the activity or is in the vicinity of the project (USACE 2014). A PCN is also required if the activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing in, or potentially eligible for listing in, the National Register of Historic Places, including previously unidentified properties. In order to know if the project may affect threatened species, endangered species, or areas protected by the National Historic Preservation act, you must coordinate with the USFWS, WVDNR and West Virginia Division of Culture and History (WVDCH).

To receive clearance from the USFWS in West Virginia, you must supply them with a formal letter explaining the project with detailed maps of the limit of disturbance and shp files of the project so they can view it using ArcGIS. The USFWS will use this shp file to reference the project against their database and determine if any known protected species or habitat may be impacted.

If any known threatened or endangered plant or animal species or habitat is found within

the area of the project, a study by an approved expert will be requested in the area. The costs of this study will require the expert to re-survey the entire study area and put together a report that either comes to the conclusion that the project will or will not affect the species. If the survey determines the species will be affected from the proposed project, then the project must be changed or mitigation and species relocation must be preformed.

The USFWS in West Virginia currently requires businesses to survey and calculate the amount of tree clearing anticipated from the project to protect bat habitat. If businesses intend to clear more than 17 acres of trees or if the project is in a known threatened bat area, then they must supply them with a bat habitat conservation plan that follows the USFWS guidelines. The guidelines for a bat habitat conservation plan are included in this report as Appendix A. These guidelines set restrictions on tree clearing such as limiting the timeframe of tree clearing between November 15th and March 31st; a time when bats are in hibernation in caves and are not threatened by tree clearing. This report requires a thorough investigation done by a trained bat specialist to identify potential bat habitat. The report must include maps of potential bat habitat or roost trees within the project area and display how the project minimizes impacts and mitigates for any habitat damage. This can be costly and the time restrictions can create delays that businesses need to consider when making investments.

A mist net study can be done to prove threatened bats are not within the project location but this requires a large trained staff and costs on average more than \$100,000. A mist net study consists of a team of trained specialists who set up nets to catch bats and identify them for a set amount of nights. This can be a gamble for owners because if bats are found to be present, then they have still committed to paying the cost for the study and receive no benefit.

The USFWS is known to consult with the WVDNR on issues relating to threatened and

endangered species. Depending on the proposed project activities, the USFWS may request that businesses receive right of entry permits or water withdraw permits from the WVDNR Office of Land and Streams. These types of permits may require further studies, such as mussel surveys, and may require further restrictions on construction, such as avoiding stream impacts during trout spawning seasons.

In order to receive Section 106 clearance from the WVDCH, businesses must supply them with a formal letter, a completed application provided on their website, maps and photographs of the current project area. A copy of their application for section 106 consultations is included for reference at the end of this report as Appendix B. The agency reviews their database and if any known historic places or artifacts exist or if the project is within a floodplain of a major stream, they will require a more in-depth archeological survey. Depending on the type of survey and the findings of the survey, there can be delays that last for years or cancelation of the project, if artifacts are found. Some of these surveys require teams of archeologists, experts flown in from other parts of the country, and/or using excavation equipment.

Based on the interviews done with consultants in West Virginia, the average costs of consultation and timeframes of review with the USFWS, WVDNR, and WVDCH were determined and are listed in Table 6. To determine average costs per permit, the total estimated costs were multiplied by their percentage of projects that require that study. The estimated percentage was determined by the interviews with West Virginia environmental consultants.

Table 6 Potential USFWS, DNR, and WVDCH costs per permit

Component of project	Estimated potential cost	Review time	Percentage of projects that require component	Total average cost per project
Initial consultation letters to three agencies	\$6,000	45 days	100	\$6,000
Potential Animal Survey and Report	\$10,000	30-60 days	25	\$2,500
Potential Plant Survey Report	\$10,000	30-60 days	5	\$500
Potential Archeological Survey and Report	\$10,000	30-60 days	10	\$1,000
			Total	\$10,000

Since the initial consultation is required for all three agencies each time, it has a standard rate of \$6,000 or \$2,000 per initial coordination and database review request. The other three studies add on average an additional \$4,000 per project. The percentages for these can be highly variable along with a varying price of the study depending on the scope of the project and if threatened species or artifacts are found. The overall total of \$10,000 will be used in our total cost for additional agency coordination as an average across projects.

Once businesses have the USFWS, WVDNR and WVDCH approval, the PCN is ready to be submitted with all of its components and a 45-day review period begins. If the USACE reviewer notifies the prospective permit applicant that the notification is incomplete, a new 45-day period will commence upon receipt of the revised notification. The prospective permit applicant may not proceed with the proposed activity before expiration of the 45-day period unless otherwise notified by the USACE reviewer. Based on interviews with West Virginia

environmental consultants, the average cost for preparing a PCN report was \$8,000. Some agencies charge permit application fees, which add to costs and are listed in the Table 7.

Table 7 Potential USFWS, DNR, and WVDCH costs for 1 day survey

Component of Project	Fee Cost
USACE Application	none
USFWS Database Review	\$75.00
WVDNR Database Review	\$75.00
SHPO Database Review	none
Total	\$150.00

Another fee that needed to be calculated and added to the permitting cost was the West Virginia In Lieu Fee for stream and wetland mitigation. To calculate the average mitigation cost per project, the total amount of permits was divided by the total amount of In Liu Fee costs the state received. The most recent West Virginia In Lieu Fee public report was completed for the year 2013 and showed a total of \$13,661,500.89 in fees. The total amount of permits that were approved in West Virginia was determined by requesting the amounts from the USACE Pittsburgh and Huntington Districts (WVDEP 2013). Based on the Huntington District Website 284 nationwide permits were approved in West Virginia in 2014 (USACE 2014). The Pittsburgh district does not display this statistic on their website, and when they were requested to provide this data for this study they would only provide the total amount of permits their office approved in 2014. A copy of this email is provided as Appendix C. Since the Pittsburgh district regulates territory across Pennsylvania, Maryland, Ohio and New York, this study will estimate the amount of permits done in West Virginia. This estimated statistic was calculated by dividing the total number of approved permits based on the percentage of territory per state the agency

regulates. The total number of approved nationwide permits by the Pittsburgh District in 2014 was 1,616. GIS was used to determine that the USACE Pittsburgh district covers a span of 16,611,008 acres. 3,176,663 acres, or 19%, of the Pittsburgh District was found to be in West Virginia as shown in blue in Figures 1 and 2. To estimate the amount of permits approved by the Pittsburgh District in 2014, we will assume that 19% of 1,616 were approved in WV, which equals 307 approved permits. Between the 284 permits approved by the Huntington District and the estimated 307 permits approved by the Pittsburgh District, an estimated 591 total permits were approved in the state of West Virginia in 2014. If we divide the total cost of in lieu fee mitigation costs by the 591 estimated permits, we get an average of \$23,116 mitigation fee per permit.

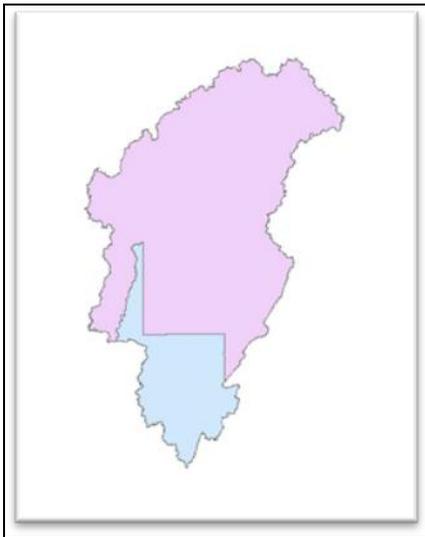


Figure 1

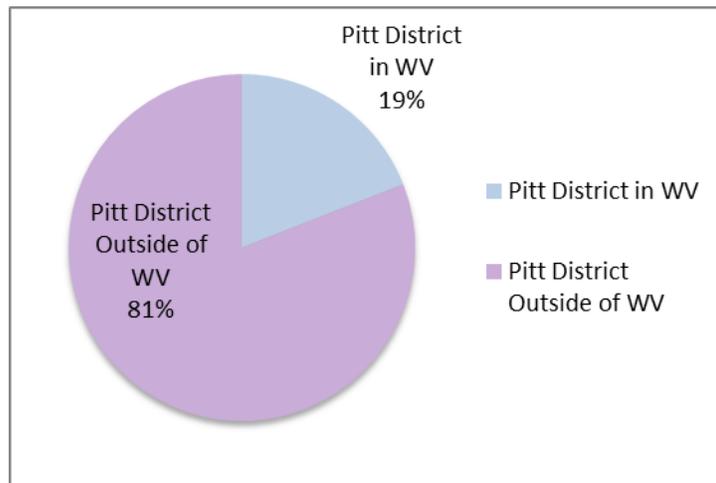


Figure 2

After a company comes to the conclusion that a permit is needed, they must determine prices and a timeframe for when tasks need to be completed to accomplish the job. If the project is delayed in any way a cost is generated. An example of a way to calculate project delay costs is by modeling using the Project Evaluation and Review Technique (PERT) (Bergantinos and

Sanchez 2002). PERT essentially calculates costs by representing normal activities to complete the job with mean durations. Once the job is completed the starting time and processing time for every activity will be known and the delays can be calculated with corresponding costs (Bergantinos and Sanchez 2002). Since these costs can vary greatly depending on the potential for revenue, we will not add in a number for this part of the equation but we will still recognize it in the equation based on the importance of this cost.

After reviewing values of all the potential costs and variables, we were able to construct a formula that can predict the total cost of a single permit for each individual company. By plugging the estimated costs for West Virginia explained throughout this section of the paper into the equation, it can be estimated that the average nationwide permitting cost is \$52,595.

$$E+EC+US+FWS+SHPO+UA+DC=PC$$

$$11,079+250+8,000+10,000+23,116+0+150= 52,595$$

E= Employee Costs
EQ= Equipment Costs
US= USACE PCN Costs
FWS= USFWS Coordination Costs
SHPO= SHPO Coordination Costs
UA= Unknown Agency Coordination Costs
MC= Mitigation Costs
DC= Delay Costs
PC= Permit Costs
PF= Permit Fees

E=	11,079.00
EQ=	250.00
US=	8,000.00
FWS+SHPO+UA=	10,000.00
MC=	23,116.00
DC=	0
PF=	150.00
PC=	52,595.00

3)Review permitting records from 2014 and estimate increase from regulatory change:

EPA’s analysis calculated a 2.7% estimate in jurisdictional increase based on a review of historical filing and made judgment calls as to which filings would be subject to the new rule (Sunding 2014). According to its analysis, the projected percent of positive jurisdiction would rise to 100% for streams and wetlands filings (up from 98% and 98.5%, respectively) and 17% for “other waters” (up from 0%) (EPA 2011). This analysis assumes that the new rule will not affect the number of total filings. It is clear that projects that were previously not thought to be subject to the new rules did not file permitting requests. Under the new rules, however, more projects likely will be required to seek permits. This means that the share of projects entering the permitting process is likely to increase, which will increase the projected number of positive jurisdictional determinations and the incremental acreage estimates. (Sunding 2014) There are many flaws to using this estimate as an accurate prediction for what permits will actually increase, but due to the lack of other available data at this time, this study will utilize this 2.7% increase.

PC= Permitting Costs
IPC=Increase in Permitting Costs
A= Amount of Permits from 2014
PWI= Percentage of Jurisdictional Increase

To be able to calculate the increase in permitting costs from this new regulation the formula below was created:

$$(PC) [(A)(PWI)]= IPC$$

PC= 52,595
IPC= 841,520
A= 591
PWI= 0.027

$$(52,595) [(591)(0.027)]= 841,520$$

Based on the estimated calculations, the average cost to receive a USACE nationwide permit in West Virginia is \$52,595. Based on this estimate, the total cost for the 591 nationwide permits in West Virginia in 2014 is \$31,083,645. The 2.7 percent increase in permits anticipated from the new regulation for West Virginia would be 16 for a total of 607 permits. These 16 additional permits would add up to \$841,520 in permitting costs. With this increase in costs, the total amount of permitting costs for West Virginia would be \$31,925,165

3.0 ANALYSIS OF RESULTS

Many points of discussion arise from the calculations in the previous section. In order to properly understand these calculations and predict economic impacts on industries, the statistics will be thoroughly analyzed through section 3 of this paper.

In order to better understand these calculations, it is important to understand the basis of where the data was obtained. After communicating with the two USACE districts that regulate the state of West Virginia, the agency provided attribute data that was formatted for this paper and is attached as Appendix D. The Huntington District provided attribute information that can help compare and analyze permit approvals by looking at the type of permits approved, who was applying for permits, and why companies were applying for permits.

The USACE Huntington District in West Virginia provided reports that show all approved Nationwide and Individual permits from 2014. Based on the data provided, there were only 9 individual permits approved by the Huntington District in 2014. This shows that 97% of permits being completed for impacts to jurisdictional waters of the US are being done through nationwide permits. This data is visually displayed in Figure 3.

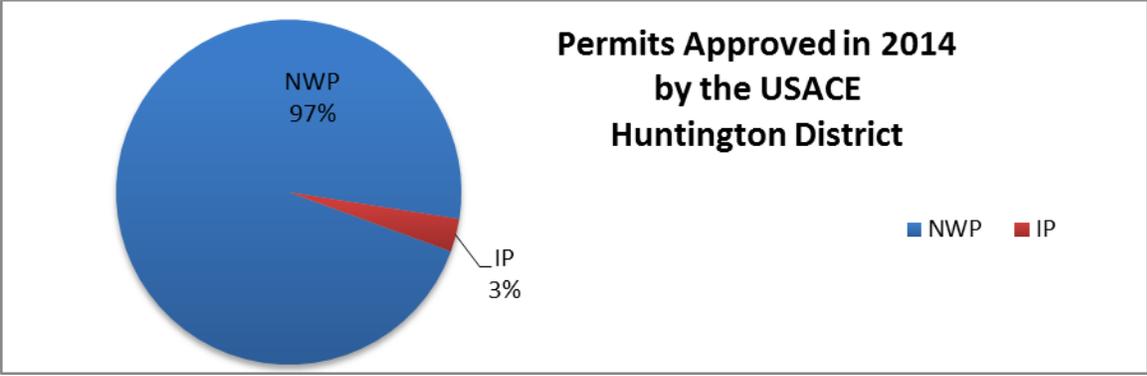


Figure 3

Based on data provided by the Huntington District, Figure 4 was created to identify which industries were applying for the nationwide permits and the percentage of permits that were completed by that industry.

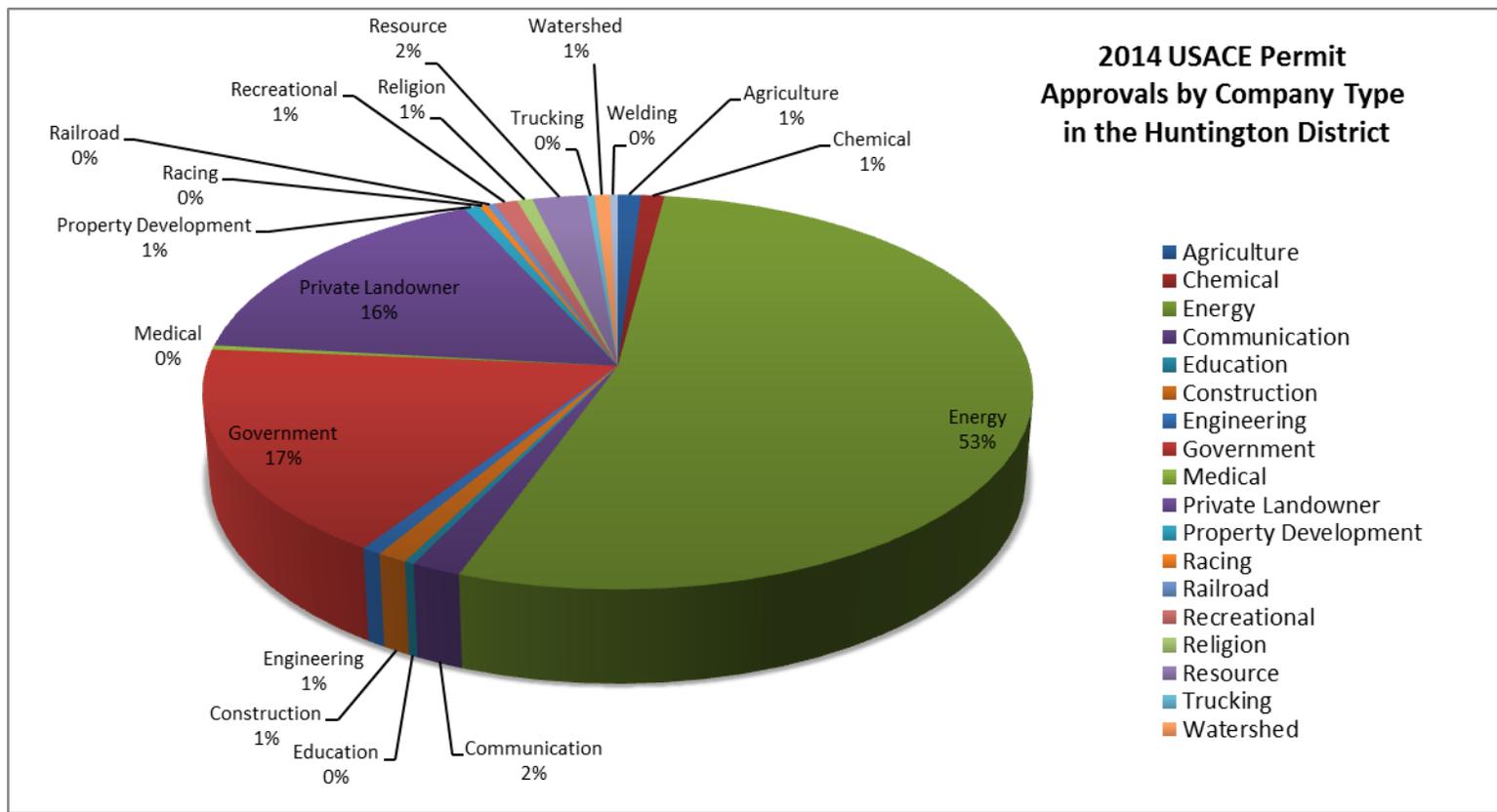


Figure 4

4) Estimate impacts on business types and industries

Figure 4 shows that the energy industry is the leader in permits, which received over half of the total approved nationwide permits in 2014. The government and private landowners completed the next tier of industries receiving nationwide permits at 17 and 16 percent, respectively. All other industry types individually accounted for two percent or less of the approved permits. Based on these statistics, energy, private landowners, and the government accounted for 86 percent of all the nationwide permits approved in 2014. These three industries are the largest stakeholders in nationwide permits and have the most potential to be impacted by regulatory change.

Using the total cost per permit calculated in this paper of \$52,595, the total costs for permits by industry were calculated in Table 8 below. Based on a 2.7 percent increase of regulatory change, listed by the EPA, the table below lists estimated costs for each industry based on the increase in jurisdictional waters.

Table 8 2014 Permit Costs by Industry

Industry	Percentage of Permits Approved in 2014	Estimated Amount Spent by Industry on Permits in 2014	Estimated Increase Amount	Estimated Total After Increase
Agriculture	1	\$310836.45	\$8392.58415	\$319229.0342
Chemical	1	\$310836.45	\$8392.58415	\$319229.0342
Energy	53	\$16474331.85	\$444806.96	\$16919138.81
Communication	2	\$621672.9	\$16785.1683	\$638458.0683
Education	0.333	\$103612.0464	\$2797.525252	\$106409.5716
Construction	1	\$310836.45	\$8392.58415	\$319229.0342
Engineering	1	\$310836.45	\$8392.58415	\$319229.0342
Government	17	\$5284219.65	\$142673.9306	\$5426893.581
Medical	0.333	\$103612.0464	\$2797.525252	\$106409.5716
Private Landowner	16	\$4973383.2	4134281.3464	\$5107664.546
Property Development	1	\$310836.45	\$8392.58415	\$319229.0342
Racing	0.333	\$103612.0464	\$2797.525252	\$106409.5716
Railroad	0.333	\$103612.0464	\$2797.525252	\$106409.5716
Recreational	1	\$310836.45	\$8392.58415	\$319229.0342
Religion	1	\$310836.45	\$8392.58415	\$319229.0342
Resource	2	\$621672.9	\$16785.1683	\$638458.0683
Trucking	0.333	\$103612.0464	\$2797.525252	\$106409.5716
Watershed Group	1	\$310836.45	\$8392.58415	\$319229.0342
Welding	0.333	\$103612.0464	\$2797.525252	4106409.5716
	Total	\$31,083,645	\$841,520	\$31,925,165

From the data provided by the Huntington District, the size of businesses receiving approved permits was assessed. The United States Small Business Association uses a widely

accepted standard size of small business as less than 500 employees (SBA 2014). Figure 5 below compares the amount of permits received by private companies with greater than 500 employees, private companies with less than 500 employees, and the government.

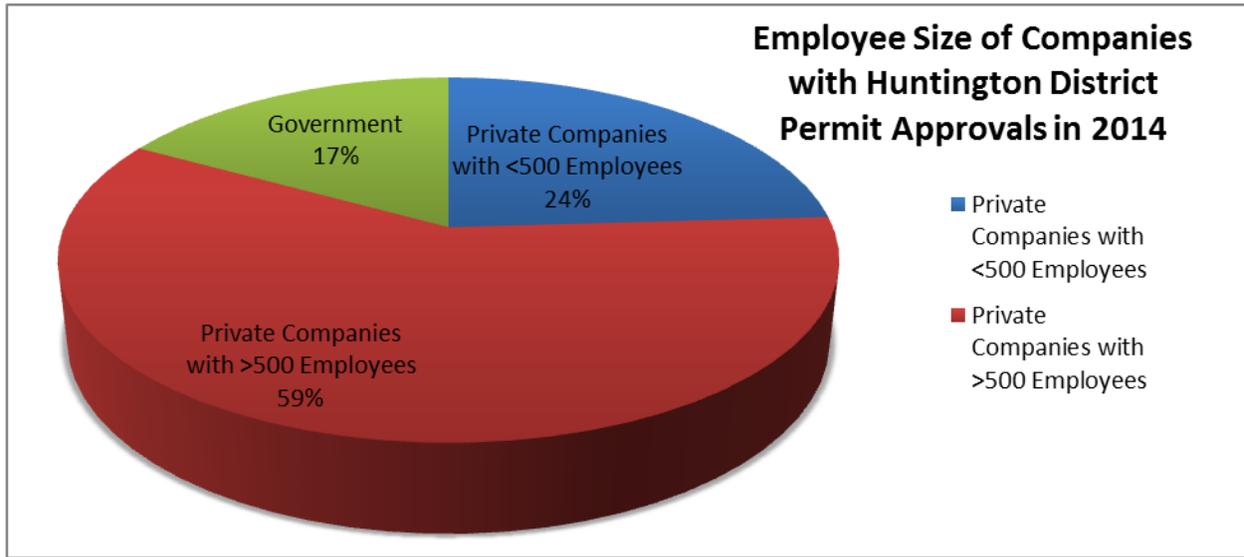


Figure 5

The government had 50 (17%) permit approvals in 2014. The private companies with greater than 500 employees received 174 approved permits (59%) in 2014. A majority of the energy companies have over 500 employees, which explains why these large companies had a large proportion of the total approved permits. Private companies with less than 500 employees totaled 71 (24%) approvals. Based on these findings, large companies made up a majority of the permits approved in 2014. Using the permitting cost calculations determined in this research paper, Table 9 presents the estimated cost increase for small business, big businesses, and the government.

Table 9 2014 permit costs by industry

Industry Type	Percentage of permits approved in 2014	Estimated amount spent by industry on permits in 2014	Estimated increase amount	Estimated total after increase
Government	17	\$5,284,219.65	\$142,673.9306	\$5,426,893.581
>500 Employees	59	\$18,339,350.55	\$495,162.4649	\$18,834,513.01
<500 Employees	24	\$7,460,074.8	\$201,422.0196	\$7,661,496.82
Total		\$31,083,645	\$841,520	\$31,925,165

Based on these estimates, small business owners in WV could see a potential increase of \$201,422 in permitting costs. These additional costs have the potential to directly affect small businesses depending on their financial stability. According to the West Virginia Small Business profile created by the West Virginia Small Business Association, there were 118,040 small businesses in WV in 2014 (SBA 2014C). From the data provided by the USACE districts, we can determine that approximately 24 percent of the permits were done by small businesses for a total of 142 permits (SBA 2014C). This shows us that only 0.12% of small businesses ended up needing to apply for nationwide permits. As an industry, these additional costs may seem insignificant to the small business community as a whole. Though, when you consider that an individual small business may be responsible for \$52,595 in additional costs, the potential impact becomes clearer. When considering the costs of these applications to small businesses, it is important to understand what activities are driving small businesses to spend all of this money on permitting.

By reviewing the permits that were submitted in 2014, we were able to determine the actions that were triggering the need for permits. The approved permits consisted of the need to

impact jurisdictional waters for activities such as commercial development, construction, mining activities, stream bank stabilization, transportation, utilities, maintenance, mitigation, and installing recreational facilities. Figure 6 below shows the quantity of approved permits for each of these activities.

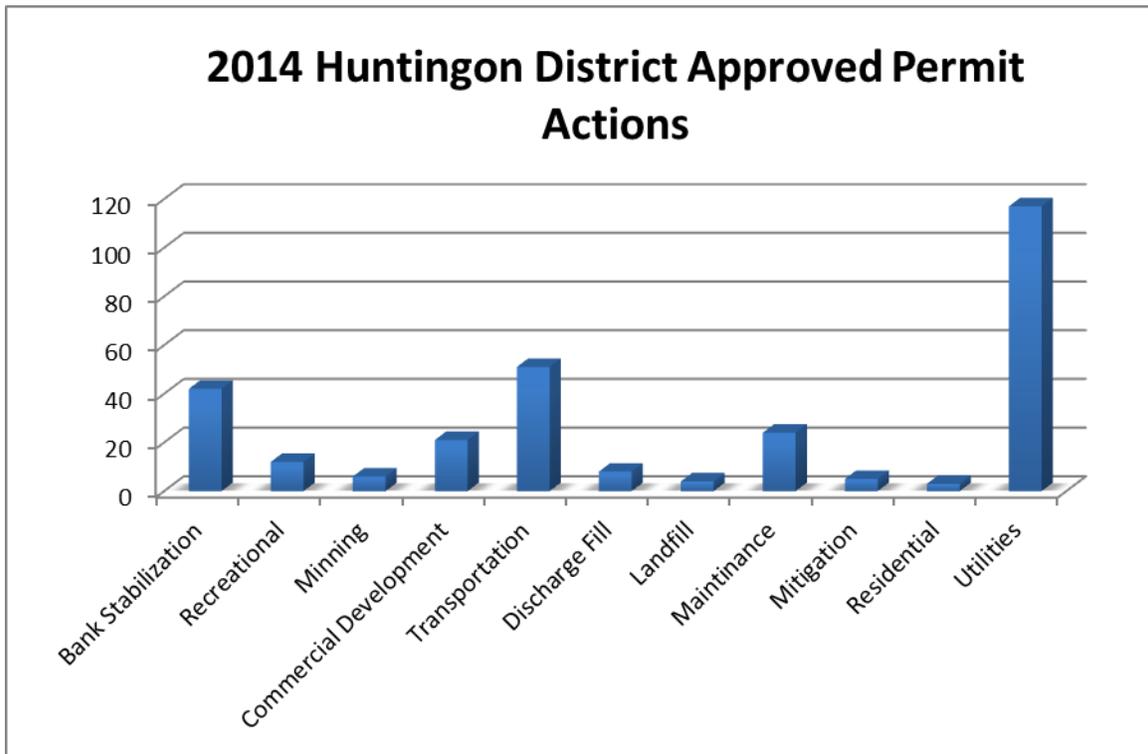


Figure 6

The large energy companies dominated the utilities installation, mining, and transportation categories. The small businesses varied in their actions, but they consisted of land maintenance, bank stabilization, and recreational impacts, such as building boat docks. Private landowners that had determined it acceptable to spend the permitting costs for actions such as land maintenance and recreation received 16% of the nationwide permits. According to the United States census, the average median household income in WV between 2009 and 2013 was \$41,043 (USCB 2015). Based on this statistic alone, it would cost, on average, more than a median annual income to receive a nationwide permit in West Virginia. In order to better

understand how West Virginia compares to the rest of the country, it would be interesting to compare how these actions relate to other states across the country. Future research needs be completed to help predict what types of companies are permitting what types of actions in relation by state. This knowledge may help state regulators better communicate with certain target markets that would ultimately help better regulate the population and overall water quality.

Table 10 Comparison of NWP cost

Study	Cost per permit	Total cost in WV
Sunding and Zilberman 2002 Study	\$28,915	\$17,088,765
Calculated Cost from this Reseach Paper	\$52,595	\$31,083,645

Based on the calculations determined in this paper, the current total average estimated permitting costs in WV is \$23,680 more than what was estimated by Sunding and Zilberman’s 2002 Study. Since the EPA’s report “Potential Indirect Economic Impacts and Benefits Associated with Guidance Clarifying the Scope of the Clean Water Act Jurisdiction” was based on Sunding and Zilberman’s study, it could have greatly underestimated current impacts to the United States, and more specifically, West Virginia’s current economy. The factors that have changed since Sunding and Zilberman’s study are inflation, technology advances, market price, current demand, mitigation costs, and the detailed look into specific agency costs. If we were to use the Sunding and Zilberman’s cost of \$28,915 for the 591 permits in West Virginia, it would cost applicants a total of \$17,088,765 (Table 10). This would underestimate the total cost by \$13,994,880.

In the 2011 economic analysis done by the EPA, the USACE estimates the costs incurred by both the Corps and applicants (excluding costs for compensatory mitigation) to range between approximately \$7,900,000 and \$20,000,000 (EPA 2011). Based on West Virginia alone, we have predicted that the regulation has cost applicants approximately \$31,083,645. The USACE 2011

prediction totals range between \$4,800,000 to \$8,700,000 in Corps costs (incremental increase in workload related tasks, low and high end estimates for HQ review of more JDs and additional time to conduct a SN for isolated waters) and a range of \$3,100,000 to \$11,300,000 in applicant costs (not including compensatory mitigation costs) for permit and JD associated costs (EPA 2011). If our study were to add the prediction of Corps costs to our total cost, it would increase the cost to \$35,883,645 - \$38,783,645. Considering the estimated costs predicted for WV, these price ranges underestimate the total costs of the country.

The 2011 Economic Analysis by the EPA states that while potentially incurring additional costs to process additional permits and potentially having a short-term backlog of actions as the federal government transitions to implementing new guidance, the proposed guidance may reduce some permitting costs and speed the permit review process in the long-term by clarifying jurisdictional matters that have been time-consuming and confusing for field staff and the regulated community (EPA 2011). Based on the report produced by the EPA, the total costs for the USACE permitting process would be \$4,800,000 to \$8,700,000. From the data provided by the Huntington District, 17 percent of the approved permits were approved for government agencies. Based on the estimated permit cost, this would total \$5,426,893.58 in permitting costs for these government agencies in applications in West Virginia. From the newly proposed regulation, the government would expect an additional \$142,673.93 in application expenses. The total cost of what the government is spending in permit applications needs to be compared to the total of what is being saved by decreasing the uncertainty in determinations. If that cost does not match the benefit, then the government may just be creating a shift in expected work and responsibility between government agencies. The main argument for changing the regulation by the EPA was to reduce uncertainty surrounding jurisdictional questions while

decreasing the paperwork, costs, and time for government employees. Since this will create work for other areas of government the ends may not justify the means.

A cost that is not considered in the regulatory change is the additional construction costs in order to protect jurisdictional features. The USACE and other agencies that require consultation to receive a nationwide permit have the authority to require specific construction methods as well as erosion and sediment controls to protect their resources. Even if companies are to avoid resources that would be considered jurisdictional features after the regulatory change, they could still end up costing companies money by having construction avoidance and increased control measures. Although these practices seem to have benefit in protecting the resource, the costs need to be considered when determining total costs of regulatory impact on permit applicants.

An area that needs to be considered when predicting total permitting costs is violations. Every violation of impacts to jurisdictional waters of the United States that was received in West Virginia should be considered a potential permit that should have been received. In order to properly estimate the total permitting costs for the state, the total amount of permits and the total amount of violations should be added together. This quantity should be multiplied by the average price of permit to get a better understanding of the total permitting costs that should be occurring in the state. Due to the lack of currently available data, this amount will be left to future researchers to conclude.

Another cost that is omitted from the total permitting cost to industries is for documentation to prove no impacts to jurisdictional waters have occurred. As noted in the calculation section of this paper, consultants, on average, charge \$7,000 for assembling a report that shows no impacts are done. These costs are at no point mentioned in USACE's

considerations of costs to businesses or private landowners. Since these costs are not reported to any agencies, it is difficult to estimate the total amount spent by companies and landowners to prove that wetland and streams are not going to be impacted. One way to consider these costs is by looking at the total amount of building permits approved in West Virginia. Based on the 2013 US Census Bureau, 2,575 building permits were approved (USCB 2015). Since it was determined that approximately 591 nationwide permits were done in West Virginia, it leaves 1,984 building permits without nationwide permits. If we were to assume that all of these building permits were to avoid impacts to jurisdictional waters, it would still cost applicants a total of \$13,888,000 for third party professional documentation to show that they are following regulatory standards in court. If we were to include these expenses in total permitting cost, it would total \$44,971,645 for West Virginia.

There are many calculations drawn from this research paper that are based on costs that are still in question. In order to properly estimate the increased percentage in permits, this research paper based its calculations off of the USACE estimate of 2.7% increase in jurisdictional waters from the regulatory change. Previous analyses by the Brattle group and other organizations have attempted to prove that this number is inaccurate in predicting the increase in jurisdictional waters. More research must be completed to fully understand the average costs of nationwide permits that could not be taken into account due to a limited timeframe and funding. The estimated costs of equipment and employees are constantly shifting due to fluctuating changes in the market. The instabilities in regulations and certain requirements are often left up to interpretation of the USACE reviewer or district. These changes and requirements can drastically affect costs for a project and must be considered a fluctuating cost.

4.0 CONCLUSIONS

Many conclusions can be made from this study. The first being that the cost of permits and the markets that control these costs fluctuate so greatly that it is difficult to accurately identify an average or specific total cost for a permit. From current market costs and regulations it was determined that the current average rate for a nationwide permit in West Virginia is \$52,595. Compared to the estimated costs calculated in this paper, the EPA and USACE underestimate the costs of nationwide permits in West Virginia. Based on the fact that they are underestimated for West Virginia, it is possible that they are also underestimated in other states across the country. Additional research should be conducted to compare costs for every state and to calculate an estimate of total permit costs in the United States.

From the information provided by the USACE districts that regulate West Virginia it was estimated that 519 permits were approved in 2014. A majority of the companies getting nationwide permits were by the energy industry. The other major factions that are getting nationwide permits are government agencies and private landowners, which when combined with energy companies total 86% of approved permits. A majority of the actions were found to be from utility installation, stream bank stabilization, transportation, and maintenance to existing projects. Businesses that have greater than 500 employees were responsible for 59% of the approved permits. These industries and actions should be taken largely into account when considering regulatory changes to jurisdictional waters of the US.

The proposed regulatory change has the ability to increase costs for all industries that get nationwide permits. The estimated total costs of permit applicants for West Virginia in 2014 were \$31,083,645. The estimated increase from the regulatory changes proposed would cost permit applicants and additional \$841,520 for a total of \$31,925,165. Although big businesses may have the additional funds to cover these costs, these additional costs have the potential to impact spending for all industries. Private landowners and government agencies must take into account the additional costs associated with the regulatory change to anticipate how it may impact their business and actions. Businesses must also take into account the additional costs to construction and for proving that they are documenting avoiding impacts to jurisdictional waters of the US.

Ultimately, the USACE appears to be claiming to adjust the regulation in hopes that the proposed guidance might ultimately reduce net costs for people seeking CWA permits, and increase consistency, predictability, and timeliness of the permitting process. Based on the increase in additional jurisdiction, they will create more costs to all businesses including small business, private landowners, and government agencies. The cost for the regulatory change appears to be enough for a debate and there are many additional areas of research that should be explored to determine the vast influences and reach that this regulation can impact.

APPENDIX A

U.S. Fish and Wildlife Service West Virginia Field Office

Guidance on Developing and Implementing an Indiana Bat Conservation Plan

Various land development and land use activities can cause the loss, degradation, and fragmentation of Indiana bat habitat. Significant habitat impacts can result in the death or injury of Indiana bats by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Within its legal authorities under the federal Endangered Species Act (ESA; 16 U.S.C. 1531-1543), the U.S. Fish and Wildlife Service (Service) is often in the position of providing technical assistance to project proponents to assist them in determining if potential adverse effects on Indiana bats are likely to occur and, if so, how they can avoid, minimize, and/or compensate for those adverse effects. In many cases, potential adverse effects can be avoided or greatly reduced by early project planning that incorporates the measures outlined below.

This guidance consolidates and memorializes technical advice currently provided on a project-by-project basis. Frequently, these project-by-project reviews include considerable explanation of Indiana bats needs and responses to habitat. To provide similar context for this document, Appendix A provides summary background information concerning Indiana bats.

Rationale for Plan Development

The unauthorized “take” of federally listed species is prohibited pursuant to section 9 of the ESA. “Take” is defined in the ESA as: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. “Harm” is further defined to include significant habitat modifications or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. “Harass” is further defined as actions that create the likelihood of injury to listed species to such an extent to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering.

Where there is a risk of take occurring (e.g., due to effects caused by the proposed loss of forest habitat), this guidance details specific measures that can be taken to avoid, minimize, and compensate for potential adverse effects on the Indiana bat, and significantly reduce the likelihood that take will occur. In some cases, application of this guidance may be sufficient to determine that effects on Indiana bats are insignificant or discountable. In other cases, this determination may be met through different or greater measures built into project design. In any instance where project design and Indiana Bat Conservation Plan implementation successfully avoid potential adverse effects on Indiana bats, it would preclude the need for take exemption or authorization, and project proponents would be able to forego the lengthy regulatory process associated with seeking “take” authorization under the ESA.

The development and implementation of an Indiana Bat Conservation Plan does not itself confer incidental take exemption or authorization. Consequently, if implementation of a Plan is not sufficient to avoid potential adverse effects, incidental take would be exempted or authorized only via the issuance of biological opinions pursuant to Section 7 of the ESA, or incidental take permits pursuant to Section 10 of the ESA.

Plan Development and Implementation

To avoid or minimize potential adverse effects on Indiana bats, project proponents should develop and implement an Indiana Bat Conservation Plan when a project will affect forests, woodlots, forested fencerows, riparian areas, or trees within areas that are known or potential Indiana bat habitat. Known Indiana bat habitat includes habitat located 1) within 5 miles of an Indiana bat female (reproductive or non-reproductive) or juvenile capture record without an identified maternity roost tree; 2) within 2 1/2 miles of an Indiana bat maternity roost or male bachelor colony record; and 3) within 10 miles of a priority 1 or 2 hibernaculum or 5 miles of a priority 3 or 4 Indiana bat hibernaculum.

Potential Indiana bat habitat includes all suitable foraging and roosting habitats and travel corridors where surveys have not been conducted to determine if bats are present, but presences is being assumed. The Plan should consider the various sources and types of effects on Indiana bats due to project development, and incorporate measures to avoid, minimize, and offset potential effects¹. It is important to note that “project” includes all project features, not just the portion of the project prompting the submittal of a permit application (e.g., to WVDEP or the Corps). For example, a residential development would include all features of the development, including all forest or wooded areas to be affected or encroached upon by roads, utility lines, houses, driveways, septic areas, detention basins, stormwater basins, yards, lots, etc. An oil or gas project would include not only the well and well pad, but also the roads, staging areas, impoundments and holding pits, and oil and gas lines associated with the well or well field.

The Indiana Bat Conservation Plan becomes an integral part of the proposed project, and as such, is something the project proponent or applicant commits to implement. The Plan must be incorporated as a required condition in any permits or authorizations issued for the project. Prior to initiation of any project construction, send the Indiana Bat Conservation Plan to the Service for review². The Service will evaluate the proposed project, along with its Indiana Bat Conservation Plan, to determine whether or not the combined effects of the project and Plan will result in insignificant or discountable effects on the Indiana bat and its habitat, or whether further consultation and

¹ This approach is sequential, meaning all reasonable efforts should be taken first to avoid adverse effects on Indiana bats and their habitat. Then, minimization measures should be implemented to the maximum extent practicable. After both avoidance and minimization measures have been fully integrated into project design, include measures to offset or partially offset any remaining adverse effects on Indiana bats and their habitat.

² **Note that ALL tree removal within known Indiana bat habitat – regardless of the amount – is subject to the appropriate seasonal restriction.** We recommend that even projects with relatively small-scale forest impacts (e.g., less than seventeen acres) consider developing and implementing an Indiana Bat Conservation Plan, because in doing so, the cumulative forest losses from a multitude of such projects would be reduced. Nevertheless, when total forest impacts are expected to be less than seventeen acres, the associated Indiana Bat Conservation Plan does not require Fish and Wildlife Service review and approval.

coordination would be necessary due to continued adverse impacts or the likelihood of take of Indiana bats.

Plan Content

Provide a detailed project description and map, including all project features. Include project name and company, area size (acres), acres and location of forest in the project area that would be removed and that would remain undisturbed, timing of forest removal, and any measures proposed to avoid, minimize or mitigate lost forest habitat or permanently protect forest habitat off-site for Indiana bats.

Provide a listing of all avoidance, minimization, and compensation measures that will be implemented, explaining how each measure will be implemented for the particular project. The plan at a minimum must include a description of how impacts have been avoided and minimized to the maximum extent practicable and must include seasonal clearing for all trees greater than 5 inches DBH that will be removed. Recommendations of potential conservation measures can be found in Appendix B.

An on-site assessment of the quality and quantity of suitable bat habitat present in the vicinity of the project should be performed by qualified biologists with knowledge and experience with Indiana bat habitat requirements, such as those listed in the List of Surveyors Qualified to Conduct Indiana Bat Surveys in West Virginia.. This assessment should include a detailed analysis of potential roost trees that may be affected by the project as well as a description of potential foraging and commuting areas present within the project area. A table for recording potential roost trees is available in Appendix D.

Due to the large amount of tree clearing and overlapping projects occurring across the state of West Virginia, the Service is now requiring that you list past and future projects proposed by your agency/company in the last 5 years that have/will occur inside your buffer area (2-mile buffer from centerpoint of non-linear projects and 1/4-mile buffer from centerline of linear projects) of your project. This data will help us to better conserve Indiana bat resources, evaluate cumulative impacts, and better implement recovery efforts for the Indiana bat. A table for recording past/future projects is available in Appendix E.

The number of acres existing within 2-miles from the centerpoint of non-linear projects, and within 1/4-mile from the centerline of linear projects should be included. The number of forested acres in this buffer area (either 2-mile area or 1/4-mile area) pre- and post-construction should also be included.

Additionally a cave and mine portal search within the vicinity of the project should be performed in accordance with the Phase I Cave/Mine Portal Survey Data Sheet should be completed for each opening found. This data sheet is enclosed and results should be compared against the criteria listed in the Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use

A summary sheet of all of this information is included on the following page. This summary sheet should be included at the beginning of your submitted Indiana Bat Conservation Plan. Appendices A through F provide additional information and forms to aid in your submittal of your Indiana Bat Conservation Plan.

If you have further questions that have not been addressed within this document or its appendices, please check our Frequently Asked Questions document at the following link:

http://www.fws.gov/westvirginiafieldoffice/PDF/WVFO_FAQs.pdf

If your question was not answered through any of these methods, please contact our office at 304- 636-6586.

Indiana Bat Summary Sheet for Option 1: Assumption of Presence

Project Name: _____ Project Location: _____
County: _____

Project type: linear / non-linear (2-mile **buffer** from centerpoint for non-linear; **1/4-mile buffer** around centerline for linear)

acres within Limits-of-Disturbance (LOD): _____ # acres forest in LOD prior to project construction: _____
acres forest in LOD following to project construction: _____

Total # acres in buffer area: _____ (2-mile **buffer** from centerpoint for non-linear; **1/4-mile buffer** around centerline for linear) (2-mile *buffer area is always 8,042 acres for non-linear projects*)

forested acres in buffer area prior to project construction: _____ # forested acres in buffer area after project construction: _____

Caves/mine portal presence? Yes / No *If yes, suitable habitat?* Yes / No

Potential Primary Roost Trees within clearing limits: _____ # Potential Primary Roost Trees to be avoided: _____ #
Potential Secondary Roost Trees within clearing limits: _____ # Potential Secondary Roost Trees to be avoided: _____

Avoidance and Minimization Measures to be Applied on Project

- Seasonal tree clearing (all trees greater than 5" DBH) **REQUIRED**
- Avoid cutting potential roost trees
- Minimize limits of disturbance (narrowed LOD or ROW)
- Minimize impacts (clearing) around suitable swarming and summer habitat and wetland/riparian zones
- 50-foot or greater forested buffer left along both sides of streams
- Collocate project features with previously disturbed or cleared areas
- Phase tree clearing over multiple years
- Reforest disturbed areas
- Restore or enhanced riparian/wetland areas
- Strong erosion and sedimentation best management practices
- Pollution control plan in place
- Suitable habitat acreage permanently preserved within or adjacent to the project site
- Other: _____
- Other: _____
- Other: _____
- Other: _____ **Compensation Measures to be Applied on Project**
- Girdling trees on a 1:1 ratio for each potential roost tree that is lost during project development

- Erecting bat boxes, artificial bark, or other artificial roosting structures on a 1:1 ratio
- A 2-year minimum monitoring plan of artificial structures
- Preservation of suitable Indiana bat habitat off-site
- Creation of watering areas, wetlands, or ponds
- Other: _____
- Other: _____
- Other: _____

APPENDIX A *Indiana bat – Background and Overview*

The Indiana bat is listed as “endangered” under the federal Endangered Species Act. It is a migratory species that hibernates in caves and mines during the winter. During the summer months, Indiana bats use a variety of forest habitats for foraging, roosting, and raising their young. Summer habitat may range from a few miles to over 300 miles from their hibernacula. Potential summer habitat occurs throughout West Virginia, while winter habitat coincides with geographic areas having natural cave systems, abandoned coal mines, or abandoned limestone mines. Both males and females return to hibernacula in late summer or early fall to mate and store up fat reserves for hibernation, during which time they forage and roost in forest habitat near their hibernacula (swarming habitat). By mid- November, male and female Indiana bats have entered hibernation. They typically emerge in April, at which time they again migrate to summer habitat.

Reproductive females form maternity colonies (typically of 50-100 bats) and give birth to a single offspring annually. Their colonial roosting behavior is thought to provide thermoregulatory benefits that increase survival and reproductive success. Males and non-reproductive females may remain solitary during the summer or may also form colonies. Summering Indiana bats (males and females) roost in trees in riparian, bottomland, and upland forests, and they forage in the same types of habitat. Maternity roost trees generally have exfoliating bark which allows the bats to roost between the bark and bole of the tree. Cavities and crevices in trees also may be used for roosting.

The primary threats to Indiana bats in West Virginia are white-nose syndrome, and habitat losses due to a wide variety of land development and land use practices that remove forest. White-nose syndrome is causing significant mortality at numerous bat hibernacula, with Indiana bat mortality rates exceeding 60%. At the same time, forest habitat losses occur due to coal mining, wind power development, oil and gas development, commercial and residential development, and various forestry practices.

Forest habitat loss is of particular concern when it occurs in occupied swarming or summer habitat, because bats may be killed or injured when trees are felled. Habitat loss may also have adverse effects on Indiana bats even when they are not present at the time of tree removal. Indiana bats depend on swarming habitat in the vicinity of their hibernacula for foraging and roosting. The presence of these forests and their insect populations is essential to ensuring Indiana bats store up sufficient fat reserves before entering hibernation, so they are able to survive until the spring migration.

Indiana bats also depend upon and exhibit fidelity to their summer habitat, returning to the same foraging and roosting areas each year. Loss of summer habitat forces all displaced bats (including Indiana bats) to find other suitable habitat, and this may result in reduced survival and reproduction. It is not known how long or how far female Indiana bats will search to find new roosting or foraging habitat if their traditional habitat is lost or degraded. If they are required to search for new habitat in the spring, it is assumed that this effort places additional stress on pregnant females at a time when fat reserves are low or depleted and they are already stressed from the energy demands of migration and pregnancy. It is not known how long it takes for the colony to attain the same level of roosting cohesiveness that it experienced prior to the loss of a primary roost tree, but that roosting cohesiveness is critical to survival and reproductive success. Until the bats from the colony locate another desirable

primary roost tree and reunite, it is likely that individual members of the colony will be subject to increased stress resulting from 1) having to search for a replacement primary roost tree(s); 2) having to roost in alternate trees that are less effective in meeting thermoregulatory needs; and 3) having to roost singly, rather than together, which decreases the likelihood of meeting thermoregulatory needs, thereby reducing reproductive success.

APPENDIX B . Recommendations for Avoidance and Minimization Measures

All projects must include seasonal clearing

- Avoid impacts to potential roost trees (e.g., avoid cutting these trees).
- To minimize impacts on foraging and roosting Indiana bats, avoid or minimize impacts (on forests, woodlands, and forested fence rows. Configure projects to avoid and/or minimize impacts on suitable summer and swarming habitat, particularly in and around wetlands

and riparian areas.

- Minimize the right-of-way (ROW) by narrowing or rerouting the ROW around high quality Indiana bat summer habitat.
- Retain at least a 50-foot forested buffer (but preferably a 100-150 foot buffer) on each side of streams and around wetlands.
- Co-locate project features (e.g., roads and utility lines) and cluster project features (e.g., houses) to reduce forest clearing.
- Phase tree clearing over multiple years, if applicable to the project. Indicate the rate at which forest will be cleared, as well as the total duration of this effect (e.g., 5 acres/year for 10 years).
- Reforest temporarily cleared areas with tree species preferred by Indiana bats, in accordance with Appendix C. Ensure soils are segregated during earth disturbance activities and ensure soils are not compacted, to allow for successful tree establishment.
- Restore or enhance degraded riparian areas or wetlands by planting native trees and shrubs.
- Avoid use of invasive, exotic plant species when re-foresting and when stabilizing soils.
- Develop and implement stringent erosion and sedimentation controls to protect water (quality and the Indiana bat prey base in streams and wetlands).
- Develop and implement a pollution prevention plan with strong erosion and (sedimentation best management practices to ensure hazardous materials and storm runoff (do not contaminate soils, wetlands, or waterways).
- Set aside protected suitable habitat within or adjacent to the project area to ensure that (undisturbed bat habitat will remain on the landscape.
(Recommendations for Compensation Measures When Impacts are Unavoidable)
- Girdling trees on a 1:1 ratio for each potential roost tree that is lost during project development
- Erecting bat boxes, artificial bark, or other artificial roosting structures and monitoring these structures, or combination of structures, for a minimum of two years.
- Preserve suitable Indiana bat habitat off-site permanently.
- Create watering areas for bats such as wetlands or ponds.

APPENDIX C. Preferred Tree Species

Planting plans should include at least six of the tree species listed below, one of which must be shagbark hickory. To promote diversity, do not include more than 15 percent of any one tree species in planting plans.

Acer rubrum *Acer saccharum* *Carya cordiformis* *Carya glabra* *Carya laciniosa* *Carya ovata* *Carya tomentosa* *Fraxinus americana* *Fraxinus nigra* *Fraxinus pennsylvanica* *Platanus occidentalis* *Populus deltoides* *Quercus alba* *Quercus coccinea* *Quercus prinus* *Quercus rubra* *Quercus velutina* *Robinia pseudoacacia* *Sassafras albidum* *Ulmus americana* *Ulmus rubra*

red maple sugar maple bitternut hickory pignut hickory shellbark hickory shagbark hickory mockernut hickory white ash black ash green ash sycamore eastern cottonwood white oak scarlet oak chestnut oak northern red oak black oak black locust sassafras American elm slippery elm

APPENDIX B

West Virginia SHPO Information Sheet for Section 106 Review Projects

The following information is needed for SHPO staff to be able to complete a review of a federal or state funded or permitted project (undertaking):

I. General Information regarding all project submissions:

Is this project a new submission or supplemental information relating to a previously submitted project?

If this is supplemental information, please identify the project FR# (our project file number). a.

Project Name

b. Federal Agency, if applicable (agency providing funds, permit, license or assistance)

c. Federal Agency Contact Person: Name, Street Address, Phone Number, email

d. State Agency, if applicable

e. State Agency Contact Person: Name, Street Address, Phone Number, email

f. Project Contact Person: (individual(s) who are knowledgeable of project activities). Name, Street Address and Phone Number, email

g. Project Street Address, City, County, Zip Code

h. Project Location: Please attach the appropriate USGS Topographic Quadrangle Map indicating the location of the project. If applicable, attach a street map indicating the location(s) of specific addresses. If providing UTM coordinates, please specify whether the projection is NAD 27 or 83. For DEP projects, it is required that a 1"-500' scale (Engineering Map) be submitted in addition to the USGS Topographic Map. All maps must clearly depict the project boundaries.

g. Project Description: Describe the activities proposed within the defined project area and provide any available information regarding past land use of the project area. Provide the project size, including acres or project right-of-way length and width. If applicable, describe proposed construction depths. If the project will involve building rehabilitation or renovation, please identify materials and provide any available drawings, plans and specifications. If demolition is proposed, please provide cost comparison of repair vs. demolition, explanation of alternatives considered or justification as to why structure cannot be rehabilitated. This may include copies of building inspection or engineering reports.

h. Project Photographs: These should document the project area showing general views, known disturbances, any rock outcrops, and buildings and/or structures (50 years or older) within

and adjacent to project area. All photographs should be clear, concise, clearly labeled and keyed to a project map.

Photographs of buildings should incorporate the entire building. These may include photographs of the front, back and sides of the building. It is important that you provide photographs that show the entire building as well as photographs of any particular areas where any alterations will occur (e.g., a change in the windows, doors, lighting, etc.).

i. Date of Construction for existing buildings that will be directly or indirectly impacted by the project.

II. Identification of Cultural Resources

Please provide any information regarding the following within or adjacent to project area: a. Known archaeological sites

b. Cemeteries

c. Structures

d. Historic Structures or Districts

If there are standing structures within or adjacent to the project area, please provide photographs. You may be asked to submit an WV Historic Property Inventory Form for any structure 50 years or older within the project area or if with the line of sight of the project. Forms and instructions can be found at <http://www.wvculture.org/shpo/forms.html>. Information regarding National Register listings may be found at <http://www.wvculture.org/shpo/nr.html>

This information can be mailed to:

Review and Compliance Staff

State Historic Preservation Office WV Division of Culture and History 1900 Kanawha Boulevard East Charleston, WV 25305

The office has 30 days to review a project. Please insure that all information is provided; missing information may delay the completion of review.

36 CFR 800 outlines the steps of the review process.

The activity that is the subject of this publication has been financed in part with Federal funds from the National Park Service, Department of the Interior. The Division of Culture and History receives Federal funds from the National Park Service. Regulations of the U.S. Department of the Interior strictly prohibit unlawful discrimination in the departmental Federally Assisted Programs on the basis of race, color, national origin, age, or handicap. Any person who believes he or she has been discriminated against in any program, activity, or facility operated by a recipient of Federal assistance should write to: Office of Equal Opportunity, National Park Service, 1849 C Street, NW, Washington, D.C. 20240.

APPENDIX C

Classification: UNCLASSIFIED
Caveats: NONE

Mr. White:

In response to your requested attached, the Corps tracks permit actions by Fiscal year, so for the period beginning Oct 1, 2013 to Sept 30, 2014, LRP completed:

- 4311 General Permits (which included 1616 Nationwide), and
- 49 Individual Permits

Thank you,

Patricia Schwirian
Paralegal/FOIA Officer
Office of District Counsel
USACE - Pittsburgh District
Office: [412-395-7407](tel:412-395-7407)
Fax: [412-644-4113](tel:412-644-4113)

Classification: UNCLASSIFIED
Caveats: NONE

APPENDIX D

2014 Huntington District Approved Permits					
Company Type	Company Size (> or < 500)	Application #	Permit Type	Dates	Activity
Energy	>500	2014-711-LKR	NWP	12/4/14	Commercial development
Energy	>500	2014-00989-OHR	NWP	12/4/14	Utilities
Energy	>500	2013-1079-TUG	NWP	12/4/14	Minning Activities
Resource- Steel	>500	2006-2257-OHR	IP	12/5/14	Maintenance
Recreational	<500	2014-445-OHR	NWP	12/8/14	Boat Dock
Government		2014-343-OHR	NWP	12/8/14	Boat Dock
Government		2014-638-OHR	NWP	12/10/14	Outfall and intake structures
Private landowner	<500	2014-888-OHR	NWP	12/11/14	Bank stabilization
Agriculture	<500	2014-1037-GBR	NWP	12/12/14	Bank stabilization
Energy	>500	2014-685-LKR	NWP	12/15/14	Utilities
Government		2010-1019-BCR	NWP	12/15/14	Utilities
Energy		2011-44-GUY	IP	12/15/14	Minning Activities
Government		2014-776-LKR	NWP	12/15/14	Transportation
Government		2014-780-GAU	NWP	12/15/14	Transportation
Medical	>500	2006-113-ELK	NWP	12/16/14	Maintenance
Energy	>500	2014-1003-BCR	NWP	11/20/14	Maintenance
Energy	>500	2010-240-NEW	IP	11/20/14	Minning Activities
Government		2014-946-WFR	NWP	11/24/14	Utilities

Government		2014-779-POT	NWP	11/25/14	Maintenance
Energy	>500	2012-00860-OHR	NWP	11/26/14	Construction
Resource- Alloy	>500	2011-778-GUY	NWP	11/26/14	Maintenance
Energy	>500	2014-928-OHR	NWP	11/26/14	Utilities
Government		1999-1023-KAN	NWP	11/26/14	Maintenance
Government		2014-925-LKR	NWP	12/2/14	Utilities
Energy	>500	2014-913-BSR	NWP	12/3/14	Utilities
Government		2014-1006-LKR	NWP	12/3/14	Utilities
Energy	>500	2014-00906-LKR	NWP	12/3/14	Utilities
Energy	>500	2014-921-LKR	NWP	11/6/14	Transportation
Energy	>500	2014-00885-OHR	NWP	11/6/14	Transportation
Energy	>500	2014-850-KAN	NWP	11/7/14	Transportation
Energy	>500	2014-00877-LKR	NWP	11/10/14	Transportation
Energy	>500	2014-192-OHR	NWP	11/13/14	Utilities
Energy	>500	2014-1002-UNT	NWP	11/14/14	Maintenance
Government		2014-1001-NEW	NWP	11/18/14	Utilities
Energy	>500	2014-00677-GUY	NWP	11/19/14	Utilities
Energy	>500	2014-00678-GUY	NWP	11/19/14	Utilities
Private landowner	<500	2014-890-BSR	NWP	10/10/14	Construction
Energy	>500	2013-1046-LKR	NWP	10/23/14	Transportation
Energy	>500	2014-00608-OHR	NWP	10/27/14	Utilities
Government		1996-376-GUY	IP	10/28/14	Transportation
Private landowner	<500	2014-949-GBR	NWP	10/29/14	Mitigation
Private landowner	<500	2014-950-GBR	NWP	10/29/14	Mitigation
Energy	>500	2014-292-NEW	NWP	10/30/14	Utilities
Energy	>500	2014-00831-TUG	NWP	10/30/14	Transportation
Energy	>500	2014-757-LKR	NWP	11/3/14	Utilities

Energy	>500	2014-00693-LKR	NWP	11/4/14	Utilities
Private landowner	<500	2014-963-GBR	NWP	11/4/14	Utilities
Government		2014-391-KAN	NWP	11/4/14	Maintenance
Watershed Group	<500	2014-726-GUY	NWP	11/4/14	Mitigation
Energy	>500	2014-957-OHR	NWP	11/5/14	Utilities
Energy	>500	2014-00801-OHR	NWP	11/5/14	Transportation
Energy	>500	2008-72-BCR	IP	10/14/14	Discharge fill material
Government		2014-714-KAN	NWP	10/14/14	Outfall and intake structures
Energy	>500	2014-00782-GUY	NWP	10/14/14	Utilities
Energy	>500	2014-00614-OHR	NWP	10/14/14	Utilities
Recreational	<500	2014-887-GBR	NWP	10/15/14	Bank stabilization
Energy	>500	2014-837-OHR	NWP	10/16/14	Utilities
Government		2012-816-OHR	NWP	10/17/14	Utilities
Private landowner	<500	2012-432-KAN	NWP	10/20/14	Bank stabilization
Private landowner	<500	2014-724-BCR	NWP	9/25/14	Boat Dock
Government		2014-174-KAN	NWP	9/26/14	Recreational Facilities
Government		2014-848-TUG	NWP	9/26/14	Utilities
Energy	>500	2011-753-OHR	IP	9/26/14	Landfill
Government		2014-868-TUG	NWP	9/30/14	Bank stabilization
Government		2014-867-TUG	NWP	9/30/14	Bank stabilization
Government		2014-866-TUG	NWP	9/30/14	Bank stabilization
Agriculture		2014-832-OHR	NWP	10/1/14	Transportation
Welding	<500	2014-833-OHR	NWP	10/1/14	Transportation
Property	<500	2013-920-KAN	NWP	10/1/14	Commercial

Development					development
Railroad	>500	2014-818-OHR	NWP	10/1/14	Transportation
Energy	>500	2014-00683-OHR	NWP	10/3/14	Utilities
Private landowner	<500	2014-773-GUY	NWP	10/6/14	Maintenance
Property Development	<500	2014-839-GUY	NWP	10/8/14	Residential Development
Energy	>500	2014-762-OHR	NWP	10/8/14	Utilities
Energy	>500	2014-761-OHR	NWP	10/8/14	Utilities
Energy	>500	2014-00456-OHR	NWP	10/8/14	Utilities
Government		2012-816-OHR	NWP	10/8/14	Utilities
Energy	>500	2014-00650-LKR	NWP	9/11/14	Utilities
Resource- Water	>500	2014-389-KAN	NWP	9/12/14	Utilities
Energy	>500	2014-668-OHR	NWP	9/17/14	Utilities
Energy	>500	2014-669-OHR	NWP	9/17/14	Utilities
Government		2014-730-NEW	NWP	9/17/14	Bank stabilization
Energy	>500	2014-00583-OHR	NWP	9/18/14	Transportation
Energy	>500	2014-266-GUY	NWP	9/19/14	Transportation
Private landowner	<500	2014-436-GBR	NWP	9/22/14	Mitigation
Government		2014-853-TUG	NWP	9/22/14	Bank stabilization
Government		2014-852-TUG	NWP	9/22/14	Bank stabilization
Private landowner	<500	2014-840-BCR	NWP	9/23/14	Maintenance
Private landowner	<500	2012-618-OHR	NWP	9/24/14	Bank stabilization
Tucking Company	>500	2014-864-KAN	NWP	9/24/14	Discharge fill material
Private landowner	<500	2014-664-KAN	NWP	9/24/14	Discharge fill material
Government		2014-855-TUG	NWP	9/24/14	Bank stabilization

Energy	>500	2014-263-KAN	NWP	8/28/14	Utilities
Government		2014-765-OHR	NWP	9/2/14	Outfall and intake structures
Energy	>500	2014-00623-OHR	NWP	9/2/14	Utilities
Energy	>500	2014-00750-BCR	NWP	9/2/14	Transportation
Energy	>500	2014-00732-TUG	NWP	9/2/14	Utilities
Government		2014-718-NEW	NWP	9/2/14	Utilities
Chemical	>500	0-43631-KAN	NWP	9/2/14	Maintenance
Energy	>500	2014-528-OHR	NWP	9/4/14	Utilities
Energy	>500	2013-90-TUG	NWP	9/5/14	Coal Mining activities
Energy	>500	2014-704-GUY	NWP	8/14/14	Transportation
Energy	>500	2014-705-GUY	NWP	8/14/14	Transportation
Energy	>500	2014-706-TUG	NWP	8/14/14	Transportation
Private landowner	<500	2014-281-LKR	NWP	8/15/14	Bank stabilization
Energy	>500	2014-264-OHR	NWP	8/15/14	Bank stabilization
Energy	>500	2014-627-OHR	NWP	8/15/14	Maintenance
Communication	>500	2014-699-OHR	NWP	8/15/14	Maintenance
Energy	>500	2014-710-GUY	NWP	8/15/14	Transportation
Energy	>500	2014-696-OHR	NWP	8/18/14	Transportation
Energy	>500	2014-598-OHR	NWP	8/21/14	Utilities
Energy	>500	2014-734-KAN	NWP	8/21/14	Transportation
Private landowner	<500	2007-715-GBR	NWP	8/27/14	Bank stabilization
Energy	>500	2014-680-OHR	NWP	8/27/14	Utilities
Energy	>500	2014-326-OHR	NWP	8/27/14	Transportation
Government		2014-624-LKR	NWP	8/22/14	Transportation
Energy	>500	2014-585-OHR	NWP	7/31/14	Maintenance

Energy	>500	2014-649-LKR	NWP	7/31/14	Commercial development
Energy	>500	2014-455-OHR	NWP	8/1/14	Utilities
Private landowner	<500	2013-322-GBR	NWP	8/4/14	Discharge fill material
Energy	>500	2014-451-OHR	NWP	8/4/14	Utilities
Energy	>500	2014-269-OHR	NWP	8/6/14	Commercial development
Energy	>500	2014-584-LKR	NWP	8/7/14	Transportation
Energy	>500	2014-674-GUY	NWP	8/8/14	Maintenance
Energy	>500	2014-544-OHR	NWP	8/8/14	Utilities
Energy	>500	2014-325-OHR	NWP	8/12/14	Commercial development
Energy	>500	2014-679-OHR	NWP	8/13/14	Utilities
Government		2014-609-OHR	NWP	7/17/14	Utilities
Government		2014-546-GAU	NWP	7/17/14	Utilities
Energy	>500	2014-617-OHR	NWP	7/18/14	Utilities
Private landowner	<500	2014-541-OHR	NWP	7/18/14	Transportation
Energy	>500	2014-463-OHR	NWP	7/18/14	Utilities
Energy	>500	2014-305-LKR	NWP	7/18/14	Utilities
Private landowner	<500	2014-613-OHR	NWP	7/22/14	Bank stabilization
Energy	>500	2014-521-LKR	NWP	7/23/14	Transportation
Energy	>500	2012-862-OHR	NWP	7/23/14	Transportation
Energy	>500	2014-525-OHR	NWP	7/23/14	Utilities
Private landowner	<500	2008-328-GBR	NWP	7/23/14	Bank stabilization
Construction	<500	2013-986-KAN	NWP	7/23/14	Bank stabilization
Private landowner	<500	2014-539-GMR	NWP	7/23/14	Maintenance

Energy	>500	2014-604-OHR	NWP	7/24/14	Utilities
Energy	>500	2014-641-OHR	NWP	7/30/14	Utilities
Energy	>500	2014-492-LKR	NWP	7/30/14	Transportation
Government		2014-497-NEW	NWP	7/10/14	Utilities
Energy	>500	2014-381-OHR	NWP	7/10/14	Commercial development
Energy	>500	2012-649-OHR	NWP	7/10/14	Construction
Private landowner	<500	2013-69-GUY	NWP	7/10/14	Bank stabilization
Energy	>500	2004-511-OHR	NWP	7/11/14	Utilities
Energy	>500	2014-557-ELK	NWP	7/14/14	Bank stabilization
Private landowner	<500	2014-574-KAN	NWP	7/14/14	Bank stabilization
Energy	>500	2014-579-LKR	NWP	7/14/14	Utilities
Government		2014-499-NEW	NWP	7/15/14	Utilities
Communication	>500	2014-544-OHR	NWP	7/15/14	Utilities
Energy	<500	2009-696-KAN	NWP	7/16/14	Residential Development
Government		2004-761-NEW	NWP	7/3/14	Transportation
Energy	>500	2014-540-LKR	NWP	6/19/14	Utilities
Energy	>500	2014-452-OHR	NWP	6/19/14	Utilities
Energy	>500	2014-362-OHR	NWP	6/19/14	Commercial development
Energy	>500	2014-461-OHR	NWP	6/20/14	Commercial development
Energy	>500	2011-578-OHR	NWP	6/23/14	Bank stabilization
Recreational	<500	2013-351-KAN	NWP	6/23/14	Residential Development
Private landowner	<500	2014-519-KAN	NWP	6/25/14	Bank stabilization

Private landowner	<500	2014-504-GUY	NWP	6/25/14	Bank stabilization
Resource- Water	>500	2014-505-KAN	NWP	6/25/14	Utilities
Energy	>500	2014-447-LKR	NWP	6/25/14	Transportation
Energy	>500	2014-480-LKR	NWP	6/27/14	Utilities
Private landowner	<500	2014-476-KAN	NWP	7/1/14	Boat Dock
Private landowner	<500	2014-572-GUY	NWP	7/1/14	Maintenance
Communication	>500	2014-495-ELK	NWP	6/6/14	Utilities
Construction	<500	2014-336-KAN	NWP	6/6/14	Transportation
Energy	>500	2012-649-OHR	NWP	6/6/14	Transportation
Energy	>500	2014-454-LKR	NWP	6/6/14	Transportation
Energy	>500	2014-377-TUG	NWP	6/10/14	Transportation
Private landowner	<500	2014-477-KAN	NWP	6/17/14	Maintenance
Government		2002-570-GAU	IP	6/11/14	Discharge fill material
Energy	>500	2014-349-OHR	NWP	5/22/14	Utilities
Energy	>500	2014-326-OHR	NWP	5/22/14	Transportation
Agriculture	<500	2013-1060-KAN	NWP	5/28/14	Utilities
Energy	>500	2014-276-OHR	NWP	5/29/14	Utilities
Private landowner	<500	2014-458-OHR	NWP	5/29/14	Bank stabilization
Private landowner	<500	2013-929-OHR	NWP	5/29/14	Recreational Facilities
Energy	>500	2014-383-TUG	NWP	5/29/14	Transportation
Government		2014-356-TUG	NWP	5/30/14	Bank stabilization
Energy	>500	2014-462-LKR	NWP	5/30/14	Utilities
Private landowner	<500	0-54292	NWP	5/30/14	Maintenance
Government		2014-459-NEW	NWP	5/30/14	Utilities
Energy	>500	2014-457-KAN	NWP	6/2/14	Transportation

Government		2014-288-POT	NWP	5/23/14	Maintenance
Private landowner	<500	2013-695-KAN	NWP	5/8/14	Boat Dock
Private landowner	<500	2014-265-KAN	NWP	5/8/14	Boat Dock
Energy	>500	2014-67	NWP	5/8/14	Utilities
Resource- Water	>500	2014-389-KAN	NWP	5/9/14	Utilities
Private landowner	<500	2013-798-KAN	NWP	5/9/14	Boat Dock
Energy	>500	2014-271-OHR	NWP	5/12/14	Commercial development
Energy	>500	2014-349-KAN	NWP	5/13/14	Utilities
Religious	<500	2013-731-TUS	NWP	5/14/14	Commercial development
Energy	>500	2014-102-LKR	NWP	5/14/14	Utilities
Private landowner	<500	2011-252-KAN	NWP	5/14/14	Bank stabilization
Private landowner	<500	2013-272-OHR	NWP	5/14/14	Bank stabilization
Energy	>500	2013-453-GUY	NWP	5/15/14	Transportation
Racing	<500	2014-390-GUY	NWP	5/16/14	Commercial development
Energy	>500	2013-936-OHR	NWP	5/16/14	Bank stabilization
Private landowner	<500	2010-511-NEW	NWP	5/16/14	Bank stabilization
Religious	<500	2010-915-GBR	NWP	5/19/14	Bank stabilization
Energy	>500	2014-360-OHR	NWP	5/19/14	Utilities
Private landowner	<500	2008-18-TUG	NWP	5/19/14	Bank stabilization
Government		2014-437-GUY	NWP	5/20/14	Utilities
Private landowner	<500	2010-14-ELK	NWP	5/21/14	Bank stabilization
Government		2014-281-NEW	NWP	5/13/14	Construction
Government		2013-1014-NEW	NWP	5/15/14	Bank stabilization
Government		2014-291-ELK	NWP	5/16/14	Transportation

Resource- Water	<500	2014-320-BCR	NWP	4/10/14	Utilities
Energy	>500	2011-753-GMR	IP	4/15/14	Discharge fill material
Private landowner	<500	2013-722-KAN	NWP	4/16/14	Transportation
Energy	>500	2014-245-OHR	NWP	4/17/14	Utilities
Communication	>500	2014-75-LKR	NWP	4/18/14	Utilities
Energy	>500	2014-146-OHR	NWP	4/21/14	Utilities
Government		2014-289-BCR	NWP	4/21/14	Utilities
Government		2014-194-TUG	NWP	4/21/14	Transportation
Government		0-55356-KAN	NWP	4/22/14	Maintenance
Chemicals	<500	2014-324-KAN	NWP	4/22/14	Utilities
Energy	>500	2014-243-KAN	NWP	3/27/14	Transportation
Energy	>500	2014-241-GUY	NWP	3/27/14	Transportation
Private landowner	<500	2012-637-OHR	NWP	3/27/14	Boat Dock
Private landowner	<500	2013-619-ELK	NWP	3/27/14	Boat Dock
Private landowner	<500	2014-259-NEW	NWP	3/27/14	Transportation
Construction	<500	2013-927-ELK	NWP	3/28/14	Commercial development
Government		2014-143-GUY	NWP	4/4/14	Minning Activities
Energy	>500	2014-148-OHR	NWP	4/8/14	Utilities
Energy	>500	2014-75-OHR	NWP	4/8/14	Utilities
Energy	>500	2014-19-OHR	NWP	4/9/14	Utilities
Government		2004-761-NEW	NWP	4/1/14	Transportation
Private landowner	<500	2005-1140-TUG	NWP	3/14/14	Bank stabilization
Energy	>500	2014-186-LKR	NWP	3/14/14	Utilities
Energy	>500	2012-597-GUY	NWP	3/14/14	Transportation
Watershed Group	<500	2013-1067-KAN	NWP	3/17/14	Mitigation

Chemical	<500	2014-244-OHR	NWP	3/18/14	Utilities
Energy	>500	2010-846-TUG	NWP	3/19/14	Transportation
Private landowner	<500	2014-210-GUY	NWP	3/21/14	Bank stabilization
Private landowner	<500	2014-247-OHR	NWP	3/21/14	Maintenance
Government		2014-213-OHR	NWP	3/21/14	Utilities
Private landowner	<500	2013-613-KAN	NWP	3/24/14	Boat Dock
Energy	>500	2013-215-ORH	NWP	3/24/14	Commercial development
Energy	>500	2013-1045-OHR	NWP	2/28/14	Utilities
Energy	>500	2014-44-LKR	NWP	3/4/14	Utilities
Private landowner	<500	2014-130-LKR	NWP	3/5/14	Bank stabilization
Energy	>500	2013-1096-OHR	NWP	3/5/14	Utilities
Energy	>500	2013-1086-LKR	NWP	3/5/14	Commercial development
Energy	>500	2013-1095-OHR	NWP	3/7/14	Utilities
Energy	>500	2014-152-OHR	NWP	3/10/14	Utilities
Private landowner	<500	2010-383-NEW	NWP	3/10/14	Bank stabilization
Energy	>500	2014-102-LKR	NWP	3/12/14	Utilities
Energy	>500	2013-430-OHR	NWP	3/12/14	Utilities
Energy	>500	2013-743-OHR	NWP	1/17/14	Utilities
Energy	>500	2014-35-OHR	NWP	1/17/14	Commercial development
Government		2014-11-TUS	NWP	1/22/14	Utilities
Energy	>500	2014-42-LKR	NWP	1/23/14	Utilities
Energy	>500	2013-1104-LKR	NWP	1/23/14	Bank stabilization
Energy	>500	2013-63-KAN	NWP	1/23/14	Discharge fill material

Energy	>500	2014-1074-OHR	NWP	1/24/14	Utilities
Energy	>500	2013-1108-OHR	NWP	1/28/14	Utilities
Energy	>500	2013-1017-OHR	NWP	1/28/14	Transportation
Energy	>500	2013-956-LKR	NWP	1/2/14	Utilities
Energy	>500	2013-936-OHR	NWP	1/2/14	Bank stabilization
Energy	>500	2013-1029-OHR	NWP	1/6/14	Utilities
Resource- Water	>500	2014-15-OHR	NWP	1/6/14	Utilities
Education	<500	2014-16-GUY	NWP	1/6/14	Bank stabilization
Energy	>500	2013-804-GUY	NWP	1/8/14	Utilities
Energy	>500	2013-1046-LKR	NWP	1/6/14	Utilities
Energy	>500	2013-596-KAN	NWP	1/6/14	Construction
Energy	>500	2013-1040-LKR	NWP	1/8/14	Utilities
Energy	>500	2012-710-LKR	NWP	1/9/14	Utilities
Energy	>500	2011-753-OHR	NWP	1/10/14	Utilities
Energy	>500	2013-10097-GUY	NWP	1/10/14	Maintenance
Energy	>500	2009-802-NEW	NWP	1/13/14	Utilities
Engineering	<500	2009-748-KAN	NWP	1/13/14	Utilities
Energy	>500	2013-1085-LKR	NWP	1/14/14	Utilities
Energy	>500	2013-993-LKR	NWP	1/15/14	Commercial development
Energy	>500	2013-98-GAU	NWP	2/13/14	Minning Activities
Communication	>500	2014-132-LKR	NWP	2/18/14	Utilities
Energy	>500	2014-134-LKR	NWP	2/18/14	Transportation
Energy	>500	2014-17-OHR	NWP	2/19/14	Utilities
Private landowner	<500	2009-826-TUG	NWP	2/19/14	Bank stabilization
Energy	>500	2013-1058-OHR	NWP	2/20/14	Utilities
Engineering	<500	2014-43-OHR	NWP	2/21/14	Utilities

Energy	>500	2013-501-OHR	NWP	2/21/14	Transportation
Energy	>500	2014-67-NWR	NWP	2/21/14	Utilities
Energy	>500	2014-93-MUS	NWP	2/21/14	Utilities
Energy	>500	2014-18-OHR	NWP	2/24/14	Utilities
Government		2014-803-GBR	NWP	2/24/14	Maintenance
Energy	>500	2014-46-KAN	NWP	2/26/14	Utilities
Energy	>500	2014-45-LKR	NWP	2/26/14	Utilities
Government		1996-827-GUY	IP	2/19/14	Discharge fill material

BIBLIOGRAPHY

- Bergantinos, G., & Sanchez, E. (2002). How to distribute costs associated with a delayed project. *Annals of Operations Research*, 109(1), 159. Retrieved from <http://proxying.lib.ncsu.edu/index.php?url=/docview/214508761?accountid=12725>
- Liebesman, Lake and Meldrum. 2014. United States: Obama Administration Releases Proposed Rule On ‘Waters of the United States.’ April 7, 2014. Holland & Knight <http://www.mondaq.com/unitedstates/x/305094/Clean+Air+Pollution/Obama+Administration+Releases+Proposed+Rule+On+Waters+Of+The+United+States>
- McCan, B. (2014). Waters of the united states, up for grabs. *The Cattleman*, 101(2), 79. Retrieved from <http://proxying.lib.ncsu.edu/index.php?url=/docview/1545644395?accountid=12725>
- Munson, Greg. 2014. Defining the Waters of the United States. April 17, 2014.. Live Science. <http://www.livescience.com/44896-defining-american-waters.html>
- Rapanos v. United States, 547 U.S. 715 (2006)
- Rivers and Harbors Appropriation Act of 1899 (33 U.S.C. 403; Chapter 425, March 3, 1899; 30 Stat. 1151)
- Society for Human Resource Management. 2008. Retaining Talent. A Guide to Analyzing and Managing Employee Turnover. SHMR Foundation’s effective Practice Guidelines Series. <http://www.shrm.org/about/foundation/research/documents/retaining%20talent-%20final.pdf>
- Solid Waste Agency of Northern Cook County (SWANCC) v. U.S. Army Corps of Engineers, 531 U.S. 159 (2001)
- Sunding, David & David Zilberman. 2002. The Economics of Environmental Regulation by Licensing: An Assessment of Recent Changes to the Wetland Permitting Process,” <http://are.berkeley.edu/~sunding/Economcs%20of%20Environmental%20Regulation.pdf>
- Sunding, David. 2014. Review of 2014 EPA Economic Anlysis of Proposed Revised Definition of Waters of the United States. The Waters Advocacy Group.

<http://www.keepingtexasfirst.org/can_do/resources/pdf/WOTUS-Economic-Report-FINAL.pdf>

United States Army Corps of Engineers. 2014. Permitting Overview. General permits.
<http://www.swf.usace.army.mil/Missions/Regulatory/Permitting.aspx>

United States Department of Agriculture (USDA). 2014. Census of Agriculture 2012 Census Highlights.
<http://www.agcensus.usda.gov/Publications/2012/Online_Resources/Highlights/Farm_Economics/>

United States Department of Labor (USDOL). 2014. Bureau of Labor Statistics. Stat Occupational Employment and Wage Estimates. West Virginia.
http://www.bls.gov/oes/current/oes_wv.htm

United States v. Riverside Bayview Homes, Inc. (1985) 474 U.S. 121