

## People's Dossier: FERC's Abuses of Power and Law

### → Public Participation Undermined

#### **FERC's Public Process Is Carefully Crafted to Frustrate Public Input and Deny Full and Fair Opportunity to Participate**

The National Environmental Policy Act (NEPA) requires that federal agencies take environmental considerations into account in their decision-making “to the fullest extent possible.” 42 U.S.C. § 4332. In addition, NEPA “guarantees that the relevant information [concerning environmental impacts] will be made available to the larger audience,” including the public, “that may also play a role in the decision-making process and the implementation of the decision.” *Robertson*, 490 U.S. at 349. As NEPA’s implementing regulations explicitly provide, “public scrutiny [is] essential to implementing NEPA.” 40 C.F.R. § 1500.1(b). The opportunity for public participation guaranteed by NEPA ensures that agencies will not take final action until after their analysis of the environmental impacts of their proposed actions has been subject to public scrutiny. *See N. Plains Res. Council v. Surface Transp. Bd.*, 668 F.3d 1067, 1085 (9th Cir. 2011)

And yet, FERC’s public meeting process is notorious for the many ways it disenfranchises the public and creates barriers to public participation. FERC ...

- frequently holds hearings at locations far from the impacted communities,
- fails to respond in a timely manner to requests for confidential information needed to inform public comment,
- ends public hearings prematurely, before all in attendance have been given the opportunity to speak
- fails to provide adequate notice of hearing venues and/or changes, and
- targets comment periods for major holidays, e.g. comment period over thanksgiving, new year’s or that end on labor day.

#### **FERC routinely denies the public access to vital information regarding pipeline projects prior to comment deadlines**

Recently, FERC refused to provide Critical Energy Infrastructure Information (“CEII”) to an environmental organization until after the scoping period for the proposed Project had closed, despite the organization’s timely filing of the request for information and its repeated efforts to secure the documents requested.

- April 29, 2016, FERC posted Confidential CEII material relating to the Millennium Eastern System Upgrade to the FERC pre-filing docket (*FERC Docket No. PF16-3*). Delaware Riverkeeper Network (DRN) submitted its request for the information on the same day.
- May 11, 2016, FERC released a request for comments with a deadline of June 10, 2016.
- DRN submitted no less than five requests for a comment period extension, to allow time to receive, analyze and comment upon the CEII data before the deadline.
- The June 10th comment deadline passed without the Delaware Riverkeeper Network having received the CEII materials.

- On July 15, 2016, DRN received a letter from FERC acknowledging, that despite Millennium’s objections, the organization had demonstrated a legitimate need for the information—“to assess the need and true nature of the project being proposed.”
- DRN finally received responsive information from FERC on July 29th, nearly two months after the comment deadline and three months after the information was requested. The responsive materials did not include the Flow Diagrams that were needed to assess the true size and scope of the project. That same day, Millennium submitted an Abbreviated Application to FERC (*FERC Docket No. CP16-486*), which included more complete CEII information, including the Flow Diagrams.
- The following business day, August 1, DRN submitted a new CEII request for the latest CEII filing.
- On December 6, over four months later, FERC sought to deny release of the CEII Flow Diagrams and Flow Diagram Data required to assess the project. FERC’s rejection of the request was in contrast with the agency’s previous practice of providing such information - no explanation was provided for the change. Delaware Riverkeeper Network filed a challenge to the denial.
- In January 2017, Millennium finally agreed to release the information to DRN.
- The information was received in January 2017, a full 8 months after the close of the scoping period.

**FERC undermines the entire purpose of public participation and fair notice by allowing for significant project alterations after public comment periods have ended**

It is not uncommon for FERC to allow a proposed pipeline route to change or to offer new viable alternatives after the filing of a formal FERC application, and after relevant comment periods have ended, but without giving the public a full and fair opportunity to comment.

New Hampshire residents struggled to understand the impacts of the Northeast Energy Direct Project (*FERC Docket No. PF14-22*) as the pipeline route was repeatedly changed during the project’s scoping period. Members of the community attempted to identify and alert new landowners on ever-changing maps when Kinder Morgan and FERC failed to do so.<sup>1</sup> As a result, the public was unable to meaningfully comment on a pipeline’s route, and impacted landowners were left unaware that a pipeline was slated to cross their property until the application process was well under way and public comment opportunities had passed.<sup>2</sup>

**FERC creates unnecessary technological barriers to participation**

When residents participate in FERC’s “public process” via written comment or intervention, they are often stymied by FERC’s website which is, at best, convoluted, and often, non functioning at critical times.<sup>3</sup> FERC could remedy this barrier by participating in The eRulemaking Program

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<sup>1</sup> Public Participation Undermined Attachment 3, Testimony of Stephanie Scherr, People’s Hearing on FERC’s Abuses of Power and Law, National Press Club, December 2, 2016.

<sup>2</sup> Public Participation Undermined Attachment 20, Email from Susan Meacham regarding PennEast route changes, June 3, 2016.

<sup>3</sup> Public Participation Undermined Attachment 27, Letter from Kingwood Township to FERC, September 11, 2016; Public Participation Undermined Attachment 25, “Draft for Maya” describing the difficulty in navigating the FERC website and Public Participation Undermined Attachment 28, Jim Levulis,

and utilizing the far more accessible commenting and notification platform available through Regulations.gov, which was created to “increase public access to federal regulatory materials,” “increase public participation and their understanding of the federal rulemaking process,” and “improve federal agencies’ efficiency and effectiveness in rulemaking development.” FERC is a Non-Participating Agency in the program, despite regular complaints regarding their e-Filing system.<sup>4</sup>

### **FERC’s lack of notice for and poor timing of public comment periods and public hearings creates barriers to participation**

It is common practice for FERC to provide short notice of upcoming hearings and to offer limited windows within which to comment on significant project proposals.

- FERC provided a mere 3 weeks public notice for scoping hearings regarding the Atlantic Coast Pipeline -- FERC announced on February 27 that it would hold a scoping meeting on March 18 to receive public testimony. Given the high interest and significant volume of information that needed to be compiled, reviewed, and addressed, 3 weeks was highly deficient.
- FERC provided only 24 days before holding public hearings on a 1,174 page EIS document for the PennEast Pipeline project. In total only 45 days was given for those who wanted to submit written comment. Neither the 24 days for verbal comment nor the 45 days for written comment was enough for such a long and detailed proposal.

FERC is known to give even less notice when there is a change in the location of a public meeting.

- Notice of a change of hearing venue for the PennEast pipeline project’s August 16<sup>th</sup> and 17<sup>th</sup> Draft EIS hearings were postmarked August 11 and in fact did not arrive in mailboxes until on or about August 16, 2016, the same day as the hearing.<sup>5</sup> The delayed notification of the change denied many concerned members of the public the opportunity and ability to attend the hearings at the new locations. *(Note, the notice itself was dated August 5, but the postmark was August 11, indicating the agency waited a full 6 days before actually getting the notice into the postal system for delivery).*

### **FERC’s public meetings are designed to discourage participation and opposition through unnecessary time restrictions and inconvenient timing and locations**

FERC public meetings are often held at a limited set of locations along a proposed pipeline route, making it difficult for many impacted community members to travel the long distances necessary to participate, particularly those that have some sort of physical limitation or significant family obligations.

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*Rosenberg: Gas Pipeline at Odds with State’s Energy Goals*, WAMC Northeast Public Radio, January 5, 2016.

<sup>4</sup> Retrieved from website: <https://www.regulations.gov/aboutProgram>

<sup>5</sup> Public Participation Undermined Attachment 26, FERC Notice of Public Comment Meeting Location Change, PennEast Pipeline, LLC., August 5, 2016.

- Residents in Buckingham County, VA were not given the benefit of a public meeting or subsequent “listening session” in their community to discuss the Atlantic Coast Pipeline (*FERC Docket No. CP15-554*) despite the fact that the county would be the site of a large compressor station, the only one in the state, and the proposed pipeline would cut through the entire length of the 584-square mile county.<sup>6</sup>
  - Residents had been told that there would be a FERC hearing in their county on the pipeline, as well as additional hearings specific to the compressor station. Instead, the public meeting was held in another county, 45 minutes to an hour’s drive away. This drastically limited Buckingham residents, many of whom are elderly and do not normally drive on a winter’s evening, from attending and expressing their concerns over the project.
  - Local public officials requested that FERC hold a meeting in the county, as did Senators Kaine and Warner on their behalf. Senator Kaine summarized in his letter to FERC, “the opportunity [to comment] was not sufficiently given.”<sup>7</sup> FERC did not respond to any of the requests.
  - Residents who were able attend the meeting later found that their comments were not transcribed accurately and were so riddled with mistakes that their testimonies seemed nonsensical on the record.<sup>8</sup>
  
- Millennium held “open house” forums on the Eastern System Upgrade project (*FERC Docket No. PF16-3*) at inconvenient times and locations that were inaccessible for impacted community members, among other problems. The public meeting that was intended to focus on the proposed Highland compressor station was held 30 miles north of the proposed site, at a time that many indicated was inconvenient for the daily realities of those affected.<sup>9</sup>

FERC public meetings include strict time limits for testimony and turn testifiers away once arbitrary time limits are met:

- FERC public hearings traditionally allow only 2 to 3 minutes of time per person for testimony. This time limit is enforced even when the number present is so few that there is clearly the ability to provide more time without reaching the scheduled end time for the hearing.
  - For example, at PennEast project hearings, a three minute time limit was imposed for the stated purpose of ensuring that everyone had the opportunity to testify, despite the fact that the number of individuals signed up to testify did not warrant the time constraint. FERC’s unnecessary time restriction was evident when all

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<sup>6</sup> Public Participation Undermined Attachment 21, Email from Lakshmi Fjord to Maya K. van Rossum regarding Atlantic Coast Pipeline, January 28, 2017.

<sup>7</sup> Public Participation Undermined Attachment 24, Letter from Senator Kaine to FERC Asking to Revise Policies, April 7, 2015.

<sup>8</sup> Public Participation Undermined Attachment 4, Testimony of Chad Oba, People’s Hearing on FERC’s Abuses of Power and Law, National Press Club, December 2, 2016 and Public Participation Undermined Attachment 5, Testimony of Irene Leech, People’s Hearing on FERC’s Abuses of Power and Law, National Press Club, December 2, 2016.

<sup>9</sup> Public Participation Undermined Attachment 29, Delaware Riverkeeper Network letter to FERC concerning Millennium, May 15, 2016.

individuals had provided testimony by 8:30 pm and the scheduled close of the public hearing was 10 pm.

- For meetings where there is significant turnout, when the scheduled end time of the meeting is reached, people are turned away without ever getting a chance to testify -- regardless of how long or far they travelled, or how long they waited to speak. Providing an opportunity for written comment does not serve the same function as an opportunity to verbally testify for the benefit of FERC and two to three minutes is simply not enough.

### **FERC separates and intimidates commenters at public hearings**

FERC recently began implementing a new hearing format designed to take the “public” out of the concept of public hearings and deny the ability of attendees to hear the testimony offered by others in attendance; commenters are escorted individually to rooms to state their testimony, in private, to a FERC-hired stenographer out of earshot of others in attendance. The press is prohibited from hearing comments given (even if testifiers request that press be allowed to hear their testimony) and are also prohibited from taking photos and/or video for their news reporting. The public is also told that they are prohibited from taking photos of the public meeting.

- At a summer 2017 public hearing for the PennEast Pipeline, individuals who took photos were quickly admonished by FERC representatives, told that photos were prohibited and suggested they would have to leave the event if they persisted.
  - During this same faux hearing, FERC sought to use state police to intimidate a community member from sharing information and free T-shirts regarding the pipeline in the hearing “waiting room”, where testifiers were awaiting their chance to speak to the FERC-hired stenographer.
  - At this same meeting FERC employees stated that they had neither made, nor were making, any special accommodations for members of the public with sight impairment.
  - At this series of faux hearings a parent had to argue with a FERC employee for the right to sit with her minor child during delivery of the child’s testimony to the stenographer. When challenged by the FERC employee as to the need to be present the mother stated her concerns, and had to forcibly assert her right as a parent to be present.
- At a November 3, 2016 FERC public meeting in Roanoke, Virginia for the Mountain Valley Pipeline (MVP) (*FERC Docket No. CP16-10*), FERC again replaced the public meeting with one-on-one three minute individual testimonies to a FERC stenographer. The FERC Project Manager Paul Friedman took it a step further by “badgering, speaking over people and refutation of citizens’ concerns” as they attempted to give their testimony. According to residents, “Friedman, who was present for many of these recording sessions, interrupted individuals, disrupting their carefully prepared statements, disputing their concerns, and thereby (once again) whitewashed the public record.”<sup>10</sup>

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<sup>10</sup> Public Participation Undermined Attachment 8, Testimony of Russell Chisholm, People’s Hearing on FERC’s Abuses of Power and Law, National Press Club, December 2, 2016 and also supported by Public Participation Undermined Attachment 9, Testimony of Richard Shingles, People’s Hearing on FERC’s Abuses of Power and Law, National Press Club, December 2, 2016.

- At a FERC public hearing on the NEXUS Pipeline (*FERC Docket No. CP16-22*), Ohio residents attempting to voice their concerns, and to share with and gain insights from their neighbors, were instead taken into separate rooms to give their statements to FERC contractors. As a result, many people left that meeting without commenting because “they felt uneasy talking one-on-one and they wanted to hear what everyone else had to say.”<sup>11</sup>

As a result, the public is disenfranchised, confused, intimidated and angered by the wealth of hurdles and challenges they face from FERC employees and security.<sup>12</sup>

Some public participants have even been injured when exercising their rights at FERC meetings. Dr. Norris, a 73-year old man, had his shoulder severely injured when he was forcibly removed from a FERC hearing, even though Dr. Norris did not resist and force was absolutely unnecessary.<sup>13</sup>

### **FERC turns a blind eye when the public process is abused by the industry and expresses clear bias in the public process**

- For example, 347 letters were filed on the docket for the NEXUS pipeline-- supposedly on behalf of individuals by a group called the “Consumer Energy Alliance”. When FERC was informed that these letters of support were false; had been filed “on behalf of” people who had been dead for nearly 20 years, people with dementia whose and family said they could never have written such a letter, and others who stated they never filed such a letter, FERC’s response was simply that it is not the Agency’s job to investigate such issues and that they do not have the resources or a relevant protocol to investigate. One FERC staffer told concerned residents that “people who believe their signature was improperly used could file a letter in the docket to refute it, otherwise it would stay.” Even when provided with evidence of these misrepresentations on the record, FERC failed to take appropriate action.<sup>14</sup>
- At public scoping meetings for the Mountain Valley Pipeline in Elliston, Virginia on May 5, 2015, commenters complained that FERC Project Manager Paul Friedman “conducted the Elliston meeting in a highly unprofessional, partisan manner, allowing the few supporters of the MVP to exceed the three minute speaking limit, while strictly limiting

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<sup>11</sup> Public Participation Undermined Attachment 7, Testimony of Renee Walker, People’s Hearing on FERC’s Abuses of Power and Law, National Press Club, December 2, 2016.

<sup>12</sup> Public Participation Undermined Attachment 6, Testimony of Jacqueline Evans, People’s Hearing on FERC’s Abuses of Power and Law, National Press Club, December 2, 2016.

<sup>13</sup> Public Participation Undermined Attachment 19, Email from Dr. Steven Norris to FERC Director of Safety and Security Mark Radlinski detailing shoulder injury from FERC security, Sept. 21, 2016.

<sup>14</sup> Public Participation Undermined Attachment 10, Testimony of Paul L. Gierosky, People’s Hearing on FERC’s Abuses of Power and Law, National Press Club, December 2, 2016, Public Participation Undermined Attachment 1, Glenn Wojciak, *Protest Groups Claim Phony Supporters Flood FERC with Comments*, the Post, August 19, 2016 and Public Participation Undermined Attachment 2, Keith Metheny, *New Nexus Pipeline Great Idea, Says Man Who Died in 1998*, Detroit Free Press, September 12, 2016.

opponents and ordering the stenographer to erase opponents comments that ran over or he ruled out of order.”<sup>15</sup>

Often, unexplained shenanigans occur at public meetings that further impede the ability of impacted landowners and community members to testify:

- For example, Virginia residents were not given a fair opportunity to voice their concerns over the Atlantic Coast Pipeline at FERC scoping meetings because members of the public arrived at the meetings’ announced start time only to find that all speaking slots were claimed hours prior.
  - Pipeline proponents had been somehow notified that the sign up sheet for speaking slots would be available an hour prior to the official hearing start time, while pipeline opponents had not been similarly made aware.
  - In the end, 203 people signed up to speak and only 75 were allowed to do so. FERC declined to allow more time for public comment and declined to conduct additional public hearings.<sup>16</sup>

### **FERC does not fulfill its NEPA obligation to consider and address relevant issues raised in public comments**

When members of the public, and even elected representatives, participate in the public process, either in-person or in writing, their concerns and valid legal arguments fall on FERC’s deaf ears.

- For example, 22,093 people and 37 elected state officials informed FERC of their opposition to the Marc-1 Pipeline in Northeast Pennsylvania; the EPA even questioned the need for yet another pipeline in the area, yet FERC rubberstamped the project and hastily granted eminent domain authority to the pipeline company.
- Residents impacted by the Spectra AIM pipeline (*FERC Docket No. CP14-96*) watched helplessly as the pipeline company and FERC ignored the questions and objections or community members and elected officials at every level of government in the four impacted States (NY, CT, RI, and MA), including Senators and members of Congress, the New York Governor and four New York state agencies, during the scoping period and through the Draft and Final Environmental Impact Statements.<sup>17</sup>

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<sup>15</sup> Public Participation Undermined Attachment 8, Testimony of Russell Chisholm, People’s Hearing on FERC’s Abuses of Power and Law, National Press Club, December 2, 2016 paraphrasing letter submitted to FERC by Elizabeth and Scott Malbon (20150506-5104-30556806).

<sup>16</sup> Public Participation Undermined Attachment 23, Andrew Cain, *US regulators reject request for more hearings on atlantic coast pipeline*, Richmond Times Dispatch, May 14, 2015; Public Participation Undermined Attachment 24, Letter from Senator Kaine to FERC Asking to Revise Policies, April 7, 2015 and Public Participation Undermined Attachment 22, Michael Martz, *Battle escalates over extending comment period for proposed pipeline*, Richmond Times Dispatch, April 22, 2015.

<sup>17</sup> Public Participation Undermined Attachment 11, Testimony of Nancy Vann, People’s Hearing on FERC’s Abuses of Power and Law, National Press Club, December 2, 2016 and Public Participation Undermined Attachment 12, Testimony of Chris D. Gauthier, People’s Hearing on FERC’s Abuses of Power and Law, National Press Club, December 2, 2016.

This behavior is not regionally-limited. FERC has acted similarly when approving two fiercely contested pipelines in Texas; Trans-Pecos and Comanche Trail, and in countless other situations across the nation.

Key-Log Economics has undergone a thorough analysis of all comments submitted to the FERC docket during key comment periods for the Atlantic Coast Pipeline, the PennEast Pipeline, and for Millennium's Eastern System Upgrade (ESU) project. Across the board, these analyses have found that the vast majority of comments submitted to FERC express negative opinions and serious concerns about the proposed pipelines. More so, these concerns are greatest among people who would be directly affected by the proposed pipelines. Under NEPA, FERC must consider and address relevant concerns raised in public comments. These comments are important to the process as they "provide direct and clear information about the issues of concern to the people living in communities through which the pipeline would pass as well as to people who, as visitors, downstream water users, business owners, and others, use and enjoy the affected landscape. The comment letters help FERC understand the nature and extent of the effects of the proposed pipeline."<sup>18</sup> However, FERC regularly fails to meet its legal obligation to consider the full range of environmental effects raised on the record in their final EIS or EA.<sup>19</sup>

#### **FERC misleads and discourages landowners from participating in the public process**

FERC has gone so far as to actively mislead and discourage landowners who stand to lose their property to eminent domain from participating in the public process.

- William F. Limpert, who, along with his wife, stands to have his retirement property cut in half by the Atlantic Coast Pipeline (ACP) (*FERC Docket no. CP15-554*), was discouraged from participating as an intervenor by FERC staff when he inquired about the process. He was told, falsely, that "being an intervenor is very difficult because [he] would have to send letters to hundreds of other intervenors." The FERC employee made the process sound so daunting and time consuming that the Limperts decided not to intervene at the time. The ACP would cut a 3,000 foot by 125 foot path cut through the virgin forest on their property within several hundred feet of their home, taking down hundreds of old growth trees.<sup>20</sup>

#### **FERC's disregard for public concern is reckless, illegal, and appears intentional**

Members of the public have reported overhearing FERC employees disparage the public process and, when they thought they were not being overheard, laughing at the notion that the public believed that their input could have any impact on the pre-determined outcome of approval of a pipeline by FERC.

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<sup>18</sup> Public Participation Undermined Attachment 13, Testimony of Cara Bottorff, People's Hearing on FERC's Abuses of Power and Law, National Press Club, December 2, 2016.

<sup>19</sup> Public Participation Undermined Attachment 16, Key-Log Economics, LLC, *Economic Costs of the Atlantic Coast Pipeline*, February 2016, Public Participation Undermined Attachment 17, Key-Log Economics, LLC, *Economic Costs of the Mountain Valley Pipeline*, May 2016 and Public Participation Undermined Attachment 18, Key-Log Economics, LLC, *Economic Costs of the PennEast Pipeline*, January 2017.

<sup>20</sup> Public Participation Undermined Attachment 15, Testimony of William Limpert, People's Hearing on FERC's Abuses of Power and Law, National Press Club, December 2, 2016.

The public is denied any opportunity to testify before the FERC Commissioners directly before they render the final decision on a pipeline infrastructure project – and if they attempt to speak at a FERC Commissioners meeting they are forcibly removed or arrested.<sup>21</sup> And so people who are losing their lives, livelihoods, properties, protected lands and healthy environments are never even given the opportunity to be heard by the very decisionmakers who are making the decision to inflict the harm.

The steps taken by FERC to deny people their right to be heard and to participate in the public review process are particularly egregious in light of the fact that these proposed projects take their private property rights, irreparably damage natural resources and lands communities have worked hard to preserve and restore, take jobs and harm small businesses, impede farmers from being able to most successfully grow their crops, and put communities in a literal blast zone that could take their lives. This clearly frustrates provisions of the National Environmental Policy Act, the Clean Water Act, and the Natural Gas Act.

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**Attachments:**

Public Participation Undermined Attachment 1, Glenn Wojciak, *Protest Groups Claim Phony Supporters Flood FERC with Comments*, the Post, August 19, 2016

Public Participation Undermined Attachment 2, Keith Metheny, *New Nexus Pipeline Great Idea, Says Man Who Died in 1998*, Detroit Free Press, September 12, 2016.

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<sup>21</sup> Public Participation Undermined Attachment 11, Testimony of Nancy Vann, People’s Hearing on FERC’s Abuses of Power and Law, National Press Club, December 2, 2016 and Public Participation Undermined Attachment 14, Testimony of Ted Glick, People’s Hearing on FERC’s Abuses of Power and Law, National Press Club, December 2, 2016.

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**Public Participation Undermined Attachment 1**, Glenn Wojciak, *Protest Groups Claim Phony Supporters Flood FERC with Comments*, the Post, August 19, 2016.

# NEXUS Pipeline support faked?

## Protest groups claims phony supporters flood FERC with comments

[By GLENN WOJCIAK The Post staff writer](#)

Aug 19, 2016

WADSWORTH – Members of the Coalition to Reroute NEXUS have complained to the Federal Energy Regulatory Commission that more than a hundred letters in support of the proposed NEXUS Pipeline are fake.

CORN spokesman Paul Gierosky said members of his group noticed that a rash of recent letters supporting the project have appeared among the comments sections on a FERC website created for the \$2 billion pipeline project. According to Gierosky, the letters were all very similar in content and were mailed to FERC without signatures.

Gierosky said a random check of a dozen or more of those letters uncovered the people named in the letters did not actually write them. Gierosky filed a formal complaint with FERC and also brought up the matter at a public comment session FERC conducted in Wadsworth Aug. 17.

Joanne Wachholder, the environmental project manager for FERC, said she noted Gierosky's complaint, but said her agency was unlikely to take any action on the matter.

“Once a comment is put into the docket, it is never removed,” she said. “If the comments are inaccurate, the people who made them can put another comment in the record stating that.”

Jeff Van Loon, director of the Medina County Soil and Water Conservation District, did just that. He said he did not write one of the comment letters attributed to him and filed another comment on the FERC website stating so.

More than a thousand comments on the NEXUS Pipeline project have been filed with FERC, the majority of which contained objections. Wachholder said comments often appear to be form letters and the agency takes note of that in its review process.

“It's not a vote in which the highest number of comments wins,” Wachholder said. “We're more interested in specific comments about how the pipeline route impacts property, wetlands or forests.”

The hearing in Wadsworth, as well as several other hearings around the region, were scheduled specifically to hear comments about the draft environmental impact study FERC released earlier

this summer. That study recommended further evaluation of a few minor and one major route adjustment for the proposed pipeline. Property owners along the route alternatives were notified and given the chance to voice their concerns at the Wadsworth hearing.

Wachholder said many of the 60 people who registered to speak in Wadsworth had objections to the alternate route proposed by the city of Green and CORN.

Spectra Energy has proposed plans to build the 36-inch NEXUS Pipeline to carry pressurized natural gas along a 250-mile route from Kensington in eastern Ohio to a gas storage facility in Ypsilanti, Mich. from where it will be sent along existing pipelines to western Ontario.

The original route proposed by Spectra would take it through parts of Wadsworth, Guilford, Montville, Lafayette, Litchfield and York townships in Medina County. Corn worked with city of Green engineers to develop an alternative route which would carry the pipeline through the southern edge of Stark and Wayne counties and away from Summit and all but the southwest corner of Medina County.

According to Gierosky, the alternative route would have less impact on the environment and affect fewer residents than the original route proposed by NEXUS developers. The new route would also eliminate the need for a compressor station in Guilford Township, which has generated a separate wave of protests from neighboring residents.

The current comment period on the proposed route alternatives will result in a final route recommendation contained in FERC's environmental impact study. Wachholder said that report should be done in December.

Although FERC is still considering the Green alternative, Wachholder said it is too early to determine if it will be recommended in the final environmental impact study. Even if it is, that still does not guarantee that the pipeline will be moved to the new route.

The impact study will be presented to FERC commissioners who have the final word on the project and issue the certificates required to allow construction.

"They usually follow our recommendations, but they could decide contract and economic issues take precedence over the environmental issues and approve the original route," Wachholder said.

Gierosky is frustrated with the process.

"The system is corrupt; it's just broken," he said. "It's pretty clear that all those letters are frauds and it doesn't seem to matter. This is another example of how NEXUS will use any means possible to press their point of view."

Asked to comment about the veracity of the letters sent to FERC, NEXUS spokesman Adam Parker released the following statement: "NEXUS has received support for the current proposed route and the many economic benefits for schools, local governments and residents in Ohio and

Michigan. Supportive testimony continues at the FERC hearings recently held along the route and letters being submitted directly to the docket.

“NEXUS is currently supported by numerous individuals and organizations who share our mission of building the necessary infrastructure to support the growing demand for clean-burning natural gas. For many of these organizations, such as the Ohio Chamber of Commerce, the Ohio Manufacturers Association and the Consumer Energy Alliance, NEXUS has been a key advocacy issue. Throughout the permitting process, project proponents have voiced their support in addition to encouraging other supporters to advocate for the approval and construction of the NEXUS project.”

**People's Dossier: FERC's Abuses of Power and Law  
→ Public Participation Undermined**

**Public Participation Undermined Attachment 2**, Keith Metheny, *New Nexus Pipeline Great Idea, Says Man Who Died in 1998*, Detroit Free Press, September 12, 2016.

[freep.com](http://freep.com)

# New Nexus pipeline great idea, says man who died in 1998

Keith Matheny , Detroit Free Press 11:30 p.m. ET Sept. 12, 2016

A sign of opposition to the proposed Nexus natural gas pipeline was placed by project opponent Jonathan Strong on his property near Medina, Ohio last year. In the foreground is a surveyor's stake marking the proposed route of the pipeline.(Photo: Courtesy of Jonathan Strong)

Glenn England's Aug. 15 letter makes clear that the Risingsun, Ohio, resident is a big supporter of the proposed Nexus pipeline, a multistate, natural gas transmission line that DTE Energy is a major partner in developing.

But there's a slight problem with his letter to the regulatory agency that will decide whether the pipeline gets the go-ahead.

"He's been dead for 18 years," said Mr. England's widow, Mary England. "He died in 1998 at the VA hospital in Ann Arbor."

England's letter is one of several to the Federal Energy Regulatory Commission in support of the Nexus pipeline that an opposing citizens group says it has determined are false or fraudulent — either not sent by the people named in the letter, or sent without their permission. The story was first reported by the Cleveland Plain Dealer and Toledo Blade on Sept. 9.

► **Schuette:** [Enbridge violating Straits of Mackinac pipeline agreement](#)

The Nexus pipeline would move up to 1.5 billion cubic feet of natural gas per day from Kensington, Ohio, to the MichCon City Gate, a vast gas storage facility in southeast Michigan, and then on into Ontario. DTE is a 50% owner in the proposed line, whose other partners include Enbridge and Spectra Energy — which Enbridge is now seeking to buy.

DTE officials have said the pipeline will provide an affordable means of delivering natural gas from the productive fields of western Pennsylvania and Ohio to Michigan and other markets, particularly as DTE and other utilities transition more and more to natural gas for power generation.

Critics, however, say the project is redundant to other major transmission lines, including the new, interstate Rover pipeline. Some question whether costs from DTE's pipeline project will ultimately fall on electric ratepayers.

"The audacity of these people" who filed the letters, said Jonathan Strong, a resident of Guilford Township in Ohio's Medina County. He's a founding member of the grassroots group Citizens to Reroute Nexus and helped to uncover the letter discrepancies.

Strong said he gets an alert in his e-mail whenever a new filing is made to FERC on the proposed Nexus project.

"All of a sudden, in a day, you'd just get 50 or 60 e-mails in a row, just filling your inbox," he said.

► **Enbridge:** [Restoration work planned for Kalamazoo River](#)

Several things raised red flags about the sudden pile of letters of support filed in the case, Strong said: They were repetitive, like form letters; all had a printed name, but none were signed; and they all were sent via the mail — none were filed electronically.

Strong said it was "maybe divine intervention" that he and colleagues saw a name from a resident they knew in their local community, "and we thought, 'There's no way he would write what that says.'" They contacted the friend, and he confirmed that he did not send the letter to FERC, or authorize that it be sent.

"That was kind of the thread that started to unravel the sweater," Strong said.

Following up on the submitted letters, he said they found "dozens and dozens" of people who said they didn't send the letters.

"In every single case, it was the same story: 'I never filed that; I don't even know what that is about,'" Strong said.

The letters — 347 of them — were filed by a Houston-based group advocating for the Nexus pipeline and other energy projects, the Consumer Energy Alliance. The group has more than 400,000 individual members nationwide, representing energy providers, businesses and other sectors of the U.S. economy.

► **Related:** [DTE gas supply line may cost customers](#)

In a Sept. 2 filing with FERC, the alliance disputed the citizen groups' allegations about fraudulent support letters. The letters were generated as a result of automated telephone surveys seeking to gauge support for the Nexus pipeline project, they said. The automated message told recipients that if they participated in the survey they were authorizing Consumer Energy Alliance "to pass that view onto the Commission."

"On behalf of those respondents who indicated their support for the project and authorized CEA to forward that viewpoint to the Commission, CEA then generated the letter for the 347 individuals that were filed," the alliance stated in its filing.

But Strong said a number of people he spoke to said "they couldn't remember taking a call like that" at all. Two others remembered the call, but said they were never told the alliance was going to write a letter to FERC on their behalf, Strong said.

"As a resident of Wood County and a supporter of the Nexus pipeline, I would like to encourage you to approve the Nexus project," the late Glenn England purportedly stated in his letter to FERC secretary Kimberly Bose. "This project will help us create new jobs, generate affordable electricity, protect our environment, and keep energy prices low.

"It is very important to me that the environment be protected, and pipelines have been proven to be the safest, most environmentally friendly way to transport natural gas," the letter added.

Mary England, 80, said she did not participate in a telephone survey related to the pipeline.

"I think it's pretty disgusting," she said. "But then people do all kinds of weird things."

Consumer Energy Alliance President David Holt said his organization has "meticulous records of every phone number that was contacted" as a part of the survey.

"All of the surveys took place over a month ago," he said. "So when these opponents follow up with these people, I can understand they may have forgotten they took a 2-minute survey five or six weeks earlier."

The "flaw in the system," Holt acknowledged, is that the letter of support is tied to whatever name is listed in the phone records — regardless of whoever may have actually taken the survey at the other end of the line.

"We are reviewing our protocols there and fixing that," he said. "This is a method other groups have used in the past. It's widely used."

But it could be problematic from a legal standpoint, said Wylie Christopher, an inspector with the U.S. Postal Inspection Service based in Detroit.

► **Related:** [President Obama signs bill with Great Lakes pipeline protections](#)

Without speaking about the FERC letters specifically, Christopher said any situation where a third party is submitting a letter to a government proceeding in someone's name, and that person specifically has not given their permission to do so, "that could be something that would potentially be prosecuted ... under the mail fraud statute." Penalties could include a fine, up to 5 years in prison, or both, he said.

The Inspection Service, however, is not at present investigating the FERC letters, he said.

A DTE spokesman referred the Free Press to a statement by Spectra Energy spokesman Adam Parker.

"Based on (Consumer Energy Alliance's) explanation, it is plain that any erroneous filings were unintended consequences of an imperfect telephonic outreach effort," Parker stated. "As Nexus understands the process that gave rise to those letters, it is possible that there were miscommunications, misunderstandings, or errors based on the method in which some of these statements of support were gathered and conveyed. If that is the case, while inadvertent and unfortunate, they should not obscure the significant and sustained support for the project and the demand for the transportation services and access to natural gas that the project would provide."

Strong said his group isn't opposed to the pipeline, just its route. They want to see it moved from more densely populated communities in Ohio to a slightly longer, more southerly route that would go through primarily agricultural areas. The line would run through Lenawee, Monroe and Washtenaw counties in Michigan before connecting to existing infrastructure.

"FERC tells you it's not a popularity contest, that they don't add up how many letters are for and how many are against," he said. "But it's a subjective process. I would think volumes of people in favor of it would have some sway — it's human nature."

"How many other filings on this document have been falsified? The whole thing is muddled."

Anne Woiwode, conservation chairwoman for the nonprofit environmental group Sierra Club's Michigan Chapter, expressed dismay.

"This attempt by industry to manipulate the regulatory oversight process with the proposed Nexus pipeline is part of a larger issue involving a broken federal pipeline regulatory system that has been rigged in the industry's favor for years," she said.

*Contact Keith Matheny: 313-222-5021 or [kmatheny@freepress.com](mailto:kmatheny@freepress.com). Follow him on Twitter @keithmatheny.*

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**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 3,**  
Testimony of Stephanie Scherr, People's Hearing on  
FERC's Abuses of Power and Law, National Press Club,  
December 2, 2016.

## **NORTHEAST DIRECT PF14-22**

**Stephanie Scherr**

**Fitzwilliam, New Hampshire**

**12/2/16**

My name is Stephanie Scherr, the founder of ECHO Action NH. I have a master's degree in Environmental Science and Communications and I'm a certified science educator. I feel that I now have an honorary degree in community organizing, social media storming and political lobbying.

I live in Southern NH where Kinder Morgan tried to literally blast their way through the Granite State in relentless pursuit of the Northeast Energy Direct (NED) pipeline. The pipeline would have transported fracked gas through a 32" pipeline from the Marcellus Shale deposit through pristine wetlands, woodlands, aquifers and fragile wildlife habitat. Historic homes, a church and an elementary school were all within the incineration zone.

The antics of the Blue Man Group, Kinder Morgan, had us begging FERC to halt scoping hearings as the pipeline route kept changing, adding more affected land owners. While we frantically searched maps and located the newly impacted land owners, Kinder Morgan published reports with thousands of "to be determined" labels, apparently acceptable to FERC. It was like signing a blank check and hoping not to have your account drained.

Kinder Morgan's people would swoop into communities like vultures, negotiating deals with uninformed citizens and towns promising lucrative deals or perks like a fire truck and pressuring citizens with promises of safety. We didn't buy it.

When Kinder Morgan uploaded a draft of their Environmental Report on a Friday afternoon, leaving just days to sort through the enormous document before scoping, land owners called FERC. Their calls were met with incredibly rude, disrespectful, condescending responses.

The following comments were made by FERC employees **Sarah McKinley** &

**Marcia Lurensky** at the **FERC Landowner Helpline** to NED pipeline affected landowners.

Sarah told one caller, "Compressor stations are just big chemical plants. There is no pollution. I don't know what you're worried about. I have worked on gas pipelines for FERC for over 30 years and never heard the term blowdown. You have been sold a bill of goods. You need to get off YouTube!" Then she hung up. This was the second person at FERC to tell her blowdowns do not exist.

Sarah told another caller, "You and your folks can take as long as you want to process and digest this information. You do not need it for scoping. Your FERC comments sent in to us are the same as testifying at scoping. Kinder Morgan pushed your buttons and there's no need for your buttons to be pushed."

A caller who spoke to Marcia stated, "Not one of my questions have been answered. She's beating around the bush. She wouldn't stop talking until I told her that it was my turn to talk now. She tried to tell me that there would be no tariffs on our electric bill, that the noise wouldn't be THAT disruptive, and that any information that I may get from protest groups is biased."

Marcia told another caller that she talks to Kinder Morgan on the phone. They're wonderful people. They don't want to hurt anyone. She said that she'd be at work until 7:00 tonight "donating her time to FERC" talking to people to make them feel better. She was told she should not be so upset.

**Believe me, this kind of response doesn't make anyone feel better.**

Living in NH has afforded me the opportunity to speak with many presidential candidates. I told Jeb Bush he was standing in a community fighting the NED pipeline and asked if he'd give back the \$2M he received from his friend Richard Kinder of Kinder Morgan or call for a no-build of the NED pipeline. Without flinching, he said, "neither". He incorrectly told us pipeline siting is a local issue.

C-Span filmed me telling Hillary Clinton that I had concerns about the oil & gas industry backed FERC and that when candidates came through the region, they would incorrectly tell us pipeline permitting is a local issue. I asked what she could do to help us, She said FERC doesn't pay enough attention to local issues. I followed up again stating that FERC is funded by the fossil fuel industry. She said "no" and went on to explain why I was wrong. People running for the highest office in the land often don't know or deny the connections between FERC and the fossil fuel pushers. Everyone's in on the game and we're the pawns.

The FERC game is rigged to promote old, outdated, filthy energy technology. The leaks in existing pipelines need to be sealed and FERC needs to put the brakes on the desperate push for pipelines as the industry panics, fearing the end of the fossil fuel era.

The public outcry and increasing activism is empowering. STANDING ROCK will have far-reaching impacts and we stand in solidarity with the First Nations who have been unjustly impacted.

Hillary Clinton sold fracking to the world and FERC helped her cover our nation in explosive, leaking, polluting, chronic illness, disease and death causing fossil fumes. When Sarah McKinley said we should get off YouTube, she meant we should stop watching videos FLIR cameras that document unseen toxic methane leaks, incineration zones, explosions, tap water and rivers bubbling with fracked gas and families.

We will not allow FERC and the fossil fuel industry to intimidate us and to cover up the greatest tragedy of our time. Exxon knew, BP knew, Shell knew. The all knew, and you know what? FERC knew. FERC does not take climate and health impacts into account when siting pipelines. We want FERC to know, that we know, there is no safe place for them.

We value clean air, clean water, wildlife, scenic vistas, outdoor recreation, state parks, conservation lands, historic homes and small town culture. The environmental racism that favors pipelines through rural communities or depressed urban areas is unjust and abusive. I had the opportunity to personally thank Bernie Sanders for being the only presidential candidate to oppose the NED pipeline. All others seem to be on board with the frackus quo.

We have clean energy solutions already in use, exploding in popularity. The energy field labor force already possesses the skills to transition to safer, healthier, clean energy jobs with bright futures. In surpassing 400 ppm CO<sub>2</sub>, we have reached a critical point and FERC needs more than revision, they need to completely change their direction to siting only renewable energy projects. The United States is embarrassingly behind other nations. The world is watching and we can't wait for FERC to come around to the realities of the climate emergency we are already facing.

**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 4,**  
Testimony of Chad Oba, People's Hearing on FERC's  
Abuses of Power and Law, National Press Club,  
December 2, 2016.

Chad Oba- Friends of Buckingham  
Testimony - People's Hearing  
Washington DC  
December 2, 2016

My name is Chad Oba, the co-founder of Friends of Buckingham a citizen's organization located in Buckingham county, Virginia. The Atlantic Coast Pipeline, FERC docket # 15-554, is a proposed 600 mile 42" gas pipeline running from the fracking sites in the marcellus shale regions of North Central West Virginia through several West Virginia counties and then running through western and central Virginia and southeasterly to North Carolina. Twenty five miles of the proposed line would run through Buckingham. We are the proposed site of the only compressor station in Virginia. A compressor station that has been increased in size three times to the current 53,515 HP capacity, almost triple the originally proposed size.

We were told by FERC, we would have a FERC hearing in our county and an additional one specific to the compressor station. The National Environmental Policy Act emphasizes the importance of the public participation process directing that each Federal Agency shall provide opportunities for commentary input in the process.(see C.Oba public comment to FERC- NEPA policy). We did not get a FERC meeting in our county. The meeting was held in another county, 45 minutes to an hour's drive away. Many of our residents are elderly and do not normally drive on a winter's evening let alone to a location so far away. Local public officials (see Buckingham's letter to FERC) requested of FERC a meeting in the county, as did Senators Kaine and Warner on our behalf. Senator Kaine in his letter to FERC: "In short, simply having a public comment process is insufficient if that process is not easily accessible to the public"( see Kaine letter to FERC). We received no reply from FERC. Later we found that our comments were not transcribed accurately with many mistakes that made large portions of our testimonies seem nonsensical. It seemed the FERC representatives did not take our comments seriously.

We are also especially concerned about historic resources located in Buckingham and the seemingly inadequate consideration they have received during the Section 106 process leaving them in a particularly threatened position. In effect our existence as a viable historic site has been erased from the FERC docket.

The 68-acre parcel purchased for this compressor station was once part of the Variety Shade Plantation in Buckingham County and lies in the middle of the historic African-American community of Union Hill. The existence of this plantation and the 92% post-Emancipation African-American community would indicate that historic sites exist in this area; however, at this point in the process, we are unable to obtain reliable, official information about the compressor station site and its potential impact on historic resources.

Briefly our concerns are: ( see Union Hill comment and LF FERC letter)

#### **CONCERN #1: CONSULTING PARTY STATUS**

Preservation Virginia, the nation's oldest historic preservation organization, was denied consulting party status for Section 106. Representatives for the Yogaville Historic District and the Union Hill/Woods Corner Historic District also were denied consulting party statuses by FERC.

#### **CONCERN #2: INCOMPLETE HISTORIC RESOURCE SURVEYS IN BUCKINGHAM COUNTY AS COMPARED WITH OTHER ACP-IMPACTED COUNTIES IN VIRGINIA**

Fairly large gaps (up to 4 miles) exist where no sites appear to have been recorded (see Attachment 7: VCRIS Map of Buckingham County Historic Resources).  
on the Buckingham County side.

#### **CONCERN #3: ADVERSE EFFECTS ON PLANTATION-ERA SLAVE AND POST-EMANCIPATION AFRICAN-AMERICAN HISTORIC RESOURCES BY COMPRESSOR STATION SITING**

Most recent FERC "supplemental filings" that pertain to Buckingham's cultural resources reveals no historic resources for the compressor station site and its environs. (see Attachment 13: Union Hill comment June 2, 2016).

#### **CONCERN #4: YOGAVILLE HISTORIC DISTRICT AND THE SECTION 106 PROCESS**

The Virginia Department of Historic Resources deemed the Yogaville Historic District (the non-profit spiritual community Satchidananda Ashram Yogaville ) eligible for nomination as a National Register Historic District. This internationally recognized yoga community and its historical designation has not been considered in the section 106 process.

Thank you for this opportunity to share these concerns.

**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 5,**  
Testimony of Irene Leech, People's Hearing on FERC's  
Abuses of Power and Law, National Press Club,  
December 2, 2016.

Irene E. Leech, Ph.D.

Virginia Citizens Consumer Council

I have dealt with FERC for nearly 30 years as a consumer advocate working on consumer pocketbook issues. The consumer community has sought a consumer focused FERC office to balance public and energy industry influence. We have become increasingly frustrated with FERC's structure and procedures and the revolving door between it and the industry.

Currently, I am in the fight of my life to protect our heritage in the form of the farm we have operated for over 100 years. My husband and I seek to pass this historical business to the next generation and have planned to retire there. However, a 42 inch high pressure pipeline is proposed to bisect our business for over a mile. Almost all of our farm buildings and 1804 farm house with historic outbuildings will be in the Blast or "high consequence" Zone, just three miles after one of the largest Compressor Stations built. That station will change the historic Virginia free slave community to an industrial center, ignoring requests to protect history. Likewise, attempts to move the line to our property edge have been ignored due to our unwillingness to sign an easement prior to FERC's certificate approval.

It will not be safe to live the rest of my life within the Blast Zone of infrastructure that is primarily governed by corporate profit incentives. The history our property represents is at risk of total loss. There are lower government and company investments in rural safety and higher rates of explosion in rural areas. Gas will be under highest pressure through the middle of our historic business. An accidental explosion would completely erase almost all our structures and lives of people and animals.

The surveys of historic and cultural attachments FERC accepts are extremely superficial and allow destruction of history. Staff doing archeological studies have been fired for looking too closely for historical significance.

People facing taking of or impact on historic property feel totally unheard by FERC. Public meetings are planned with corporate, but not citizen, involvement. The only public meeting held in Buckingham County for the Compressor Station 3-4 miles from our property was held the night after a large snowstorm. We repeatedly asked for rescheduling but the company refused and was thrilled that only 30 people attended. FERC cannot learn about citizen concerns about historic properties when citizens cannot safely attend meetings.

I am also fighting the MVP proposed near the 1797 house built as a stagecoach wayside in southwest Virginia where we have lived for over 30 years. The unannounced but planned (a landowner has been approached and tap planned) compressor station will be within about five miles. Its pollution and explosion risk will affect us. FERC's recent DEIS public hearing used an extremely slow, private, individual process for testimony that prevented citizens and the media from hearing and many, including me, gave up testifying after three hours.

In short, FERC is designed to approve industry requests and inherently almost completely ignores consumers/ landowners. Pending law would further streamline this. FERC forces us to pass on historic property with liability and risks that threaten heritage, earning potential, and asset value. FERC is broken for all but the industry.

**People's Dossier: FERC's Abuses of Power and Law  
→ Public Participation Undermined**

**Public Participation Undermined Attachment 6,**  
Testimony of Jacqueline Evans, People's Hearing on  
FERC's Abuses of Power and Law, National Press Club,  
December 2, 2016.

December 2, 2016

Comments of Jacqueline Haut Evans

My name is Jacqueline Evans. I am an intervener in the PennEast Pipeline application to FERC and a directly impacted property owner. I am a single mother of 3 young children living on a Certified Organic farm in Delaware Township, NJ., which is threatened by this project. I am a founding member of Homeowners Against Land Taking (HALT-PennEast) made up of 300 homeowners committed to stopping PennEast, because we will not tolerate FERC's abuse of power in rubber stamping incomplete applications that will result in the misuse of eminent domain to steal our homes, farms and children's future for corporate gain and no benefit to our community.

FERC is funded by those it regulates and is shirking its duties to follow regulations and federal laws to protect us. This leaves me facing condemnation of my farm thereby making them impossible to sell. My freedom and well being of my family put in peril, while FERC ignores my questions and concerns. FERC held public hearings where interveners were made to go into a room one by one to speak behind closed doors, driving the point home that we aren't really part of this and that we are merely the cost of doing business in America. My friend and neighbor Maryann Plesher lost her husband to the stress of trying to save their farm from the pipeline. A week after his death, she received a call from PennEast threatening her to make a deal with them now, or things would be worse for her later. She wrote to FERC about this, however loyalty to the gas companies seems more important than the abuse of a widow a week after losing her husband. The Pleshers were offered \$5,000,000.00 in 2009, realtors advised her with the pipeline the price was now \$1,500,000.00, but when an offer came in after she listed her farm it was withdrawn upon hearing about the PennEast Pipeline. PennEast has already stolen thousands of dollars from us, as we watch property values plummet in our community and properties on the line not able to be sold.

What does FERC's eminent domain for corporate gain look like? It is not being able to move across country to take care of my aging mother. It is not being able to take a mortgage out on my home to pay for my children's college. It is not knowing how I will be able to afford a new home when there are no buyers for my farm, which I can no longer live on. Its relocating goats, sheep, chickens, ducks, honey bees and dogs, because I will no longer have paddocks. Its having the Federal government tell me that my children should live in an "incineration zone". It is also the loss of feeling safe in our homes, which is one of the most profound losses of all. FERC is threatening everything we hold sacred through its coorruption and must be investigated.



**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 7,**  
Testimony of Renee Walker, People's Hearing on  
FERC's Abuses of Power and Law, National Press Club,  
December 2, 2016.

Good morning. My name is Renee Walker and I live at 2933-3 Swanton, Ohio. I'd like to thank you for this opportunity to be heard about my family's struggles with the Nexus pipeline project and Ferc during the last two years.

In 2014 several neighbors came to us about a proposed pipeline that would encroach on many properties in our township. We became involved in a movement to stop the pipeline or at least move it to a less populated area. Our group, Fulton County Common Sense Energy Coalition succeeded in getting a reroute from the Oak Openings Region and the very populated area which moved it right on our property. Our group has worked tirelessly in appealing to local, state, and federal politicians, the Ohio Farm Bureau, FERC, OEPA and even Nexus themselves for a common-sense solution to this project. This has all been to no avail. We personally have been harassed multiple times by Nexus representatives via letters, unsolicited, unannounced visits, trespassing on our property even though we have signs posted, and insisting we let them in to discuss a lease agreement. When that didn't work, we were served with papers from Nexus via the court that we were being served with a TRO for surveying purposes. This has happened 2 times in the last 2 years. The surveying took place in July during a critical growing period for our crops causing damage and loss of yields.

We have had numerous visits from the Sheriff department because of complaints from Nexus employees stating that we were threatening them and falsely accusing us of using guns in the confrontations. Luckily, we have a Go Pro camera with us for most encounters with any Nexus employees. After reviewing the video the Deputy dismissed the surveyor's accusations and lectured them about unnecessary calls.

For the last 2 years, we have someone from our family stay home to

watch over the farm and protect our property from unwanted trespass from Nexus employees. I feel this is a huge burden that my teenage kids have been shouldering and I worry continuously about the effects this is having on them.

I have also been given the finger by a surveyor when I stopped to help an elderly neighbor that has dementia when I saw that she was very agitated. She was afraid to leave for an appointment because the surveyors wouldn't leave her property. This and many other instances are what we have been dealing with the last 2 years. We have had at least 5 different Nexus land agents contacting us about signing a lease and everyone promises something different or reminds us of an eminent domain possibility. There is no continuity yet we are supposed to trust them.

We feel Ferc does not listen to our concerns. We cannot get any responses to our questions and feel that Ferc is just going through the motions and this project will be rubber stamped. At the last FERC hearing we were all taken into separate rooms to give our statements and I had to remind the recorder to take ours. It was very disheartening to learn that we weren't even talking with an actual FERC employee, they were contractors. When my husband asked for a written response to our questions he was told that they didn't have time to answer anyone personally, we would have to wade through page after page of statements and responses to those statements. Many people left that meeting because they felt uneasy talking one on one and they wanted to hear what everyone else had to say. We were told this new format was requested by Nexus and allowed against the peoples protest.

We asked FERC to find out why Nexus bypassed a wooded property which added 1 mile of pipeline to the route and took the line closer to people's homes instead of going through the wooded area. Coincidentally, this property is owned by the Fulton County Prosecutors

brother. We also asked Nexus employees and have not received an answer from either group. Yet we are supposed to trust this company.

This last 2 years have seen neighbors, family and friends at odds with each other and we expect this to escalate if Ferc gives Nexus the permits to proceed with this project. Several neighbors have had to hire lawyers because the stress of dealing with this has worsened health issues and as one lady said her husband's health and life are worth more than a piece of dirt. This farm has been in their family for generations. I find it appalling that citizens must choose between their health and fighting for the right to keep their property as they wish because of the greed of the oil and gas companies and the politicians that support them. The worst part of this ordeal for us personally is when our kids told us to sell the farm if the pipeline comes through. 40 years of working, blood, sweat and tears could be for naught.

In closing I'd like to state as US citizens our family will continue to fight for our way of life even though we do so under unimaginable stress and duress. Thank you for this opportunity to voice our concerns.

**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 8,**  
Testimony of Russell Chisholm, People's Hearing on  
FERC's Abuses of Power and Law, National Press Club,  
December 2, 2016.

Stripping the “Public” out of Public Comment Sessions for the MVP  
by Russell Chisholm, Vice Coordinator of Preserve Giles County  
(Testimony to the People’s Hearing December 2, 2016)

Thesis: The Public’s Voice has been stripped from public scoping meetings for the Mountain Valley Pipeline that were conducted by FERC MVP Project Manager Paul Friedman in Elliston Virginia on May 5, 2015 and Roanoke Virginia on November 3, 2016.

In both sessions there was a the common pattern in Friedman’s behavior of circumventing and converting “public hearings” for the purpose collecting citizens' concern and information to a systematic effort by Friedman to manipulate public opinion, dissuade opposition to the MVP and cloud any public record of that opposition.

According to a letter submitted to FERC by Elizabeth and Scott Malbon (20150506-5104-30556806), Friedman conducted the Elliston meeting in a highly unprofessional, partisan manner, allowing the few supporters of the MVP to exceed the three minute speaking limit, while strictly limiting opponents and ordering the stenographer to erase opponents’ comments that ran over or he ruled out of order.

He also repeatedly peppered his captured audience with “news flashes” consisting of half-truths and flat out lies which were intended to refute the opposition’s comments, pacify the audience and whitewash the official transcript. For example, he dismissed unease that the gas transported by the pipeline would be exported. That claim has been flatly contradicted by a partner in the MVP, WGL Midstream (Roanoke Times, June 25, 2015).

In Roanoke this year, Friedman continued the same strategy and, to be even more effective, avoided public hearings altogether by replacing a public meeting with one-on-one three minute individual testimonies to a FERC stenographer. However, the badgering, speaking over people and refutation of citizens's concerns continued. Friedman, who was present for many of these recording sessions, interrupted individuals, disrupting their carefully prepared statements, disputing their concerns, and thereby (once again) whitewashed the public record.

Example 1: The proposed Mountain Valley Pipeline will transect the center of Newport Village, in Giles County, coming within 65 feet of an elderly couples home, just across the street from the Mt. Olivet United Methodist Church. The couple Fern and Earl Echols used their three-minutes with the stenographer to register their fear that they would be forced from their home. Friedman interrupted to assure them that “No home will be taken... You will never be removed from your home.” He continued: “Thousands of people live near millions of miles of pipeline in the United States... sometime right next to houses and “nothing ever happens.” The Echols reported that MVP’s local project manager disagreed, volunteering that he personally had relocated other people (Roanoke Times, Nov. 27 2016).

Example 2: Ray Roberts, a resident of Craig County, started his remarks to the stenographer by listing his concern for properties along the proposed route, including the Newport Methodist Church when Paul Friedman interrupted to disqualify his statement and instructed the stenographer to erase it.

Conclusion: This is not the behavior of an impartial manager, but the manipulations of a partisan. They make a mockery of the “public comments” in the FERC scoping process.

**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 9,**  
Testimony of Richard Shingles, People's Hearing on  
FERC's Abuses of Power and Law, National Press Club,  
December 2, 2016.

Bias and Abuse in FERC's management of the MVP Application  
by Richard Shingles, Coordinator of Preserve Giles County  
(Testimony to the People's Hearing December 2, 2016)

My name is Richard Shingles. I am the Coordinator of Preserve Gilles County in southwest Virginia, proposed to be transected by the Mountain Valley Pipeline (MVP).

Earlier, my colleague Russell Chisholm, spoke of the unprofessional, blatantly partisan behavior of FERC MVP Project Manager, Paul Friedman, at the Elliston Scoping meeting in May, 2015 and again in Roanoke last month. In both instances, Friedman turned "public" input in the scoping process upside down, using the proceedings to cloud the record of public opposition. Friedman has lied repeatedly. Two of the lies described by Russell are documented in the *Roanoke Times* (June 25, 2015 and Nov. 27, 2016).

That is not the full extent of Friedman's duplicity. Here are two more examples:

First Example: Citizens along the proposed MVP route commissioned a professional engineering geologist, Dr. Ernst Kastning, to write a detailed 89 page report (submitted to FERC on July 13) on geological hazards in our region that pose a threat to our communities by the construction of the MVP and to the very integrity of the pipeline itself.

At the Roanoke hearings, Kastning used his 3-minute comments to a stenographer to urge FERC to examine his report. A third person present, Mr. Friedman, interrupted to state the report had been examined and referenced in FERC's Draft Environmental Impact Statement (September, 2016). *In truth*, the Kastning Report was referenced only once, to document a minor fact made by MVP that had nothing to do with Kastning's main conclusion: that because of its unique geology, our region should be a "no build" zone for interstate gas pipelines.

Second Example: Another expert report, by cultural anthropologist Dr. Thomas King, was submitted to FERC on August. 30. It documents the threat to "cultural attachment" in the historic communities on Peters Mountain and the Greater Newport Historic District posed by the MVP to Giles County. However, the DEIS fails to take seriously a threat to cultural attachment, even though King's findings were supported by a second report (Applied Cultural Ecology) commissioned by FERC.

The author of second report, Cultural Anthropologist Dr. Rebecca Austin, was excluded from participating in writing the DEIS. Only one of those writing has an advanced degree beyond the B.A. and that person is an Archeologist (not a cultural anthropologist). One of them was Paul Friedman, who has a B.A. in Anthropology. In explaining during a phone conversation why he rejected "cultural attachment," Friedman stated he had never heard of the term and though it was "made-up."

Perhaps, Mr. Friedman is unfamiliar with the term because he earned his undergraduate degree some thirty years ago and has no professional training in cultural anthropology?

Not only did Friedman exclude a professional cultural anthropologist and author of a FERC

commissioned report from participating in writing a cultural effects analysis for the DEIS, he instructed her firm (Applied Cultural Ecology) not to include measures of mitigation of negative impacts of the MVP on cultural attachment in their report.

Conclusion: These examples convey the image of an arrogant, incompetent, partisan man who has no business managing this review process. His behavior in public scoping meetings and the DEIS assessment of geological hazards and of cultural attachment lie at the core of *bias and abuse* in FERC management of the MVP application.

**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 10,**  
Testimony of Paul L. Gierosky, People's Hearing on  
FERC's Abuses of Power and Law, National Press Club,  
December 2, 2016.



## FRAUD ON THE FERC DOCKET

I am Paul L. Gierosky, cofounder of The Coalition to Reroute Nexus (CoRN). CoRN germinated in Medina County, Ohio in late 2014. Nexus is a proposed 36" diameter 250 mile long natural gas export pipeline, a joint venture of Houston-based Spectra Energy and Michigan-based DTE, designed to carry 1.5 billion cubic feet per day of Utica and Marcellus shale gas through Ohio and Michigan to Canada.

The Mission of our organization has been to persuade Nexus to take a more southerly route largely avoiding the densely populated counties of northeastern Ohio already well-served by natural gas supplies and infrastructure.

The latest tactic employed by Nexus in consort with the Consumers Energy Alliance (CEA), an energy industry front group, is the use of fraudulent comment letters filed with the Federal Energy Regulatory Commission (FERC) to sway public opinion in favor of the Project.

This occurred between August 10th and August 23rd of this year when the docket was inundated with letters from residents of Michigan and Ohio unaware their identity had been stolen.

One letter allegedly in support of the pipeline came from a man who died in 1998. Another came from a woman who suffers from dementia and whose son said she would have been unable to write such a letter.

It is a federal felony to knowingly make false representations to a federal agency.

919 East Turkeyfoot Lake Road, Suite B, Akron, OH 44312; plgierosky@gmail.com; 216-469-5206

[www.facebook.com/MedinaNoNexus](http://www.facebook.com/MedinaNoNexus)

As a result of our investigation we filed complaints with:

- U.S. Department of Energy Office of Inspector General
- EPA Inspector General
- Division of Investigations Federal Energy Regulatory Commission
- U.S. Postal Inspection Service

In addition we filed on the FERC Docket a protest of the submission of falsified DEIS comment statements under CP16-22 at

[http://elibrary.ferc.gov/idmws/file\\_list.asp?document\\_id=14491227](http://elibrary.ferc.gov/idmws/file_list.asp?document_id=14491227)

In its response, the Alliance called our allegations of fraud "wildly overblown." However, the Alliance admitted to filing 347 comment letters after "signatures" were collected by means of robo-calls.

What did FERC do about this? A FERC staffer I spoke with said people who believe their signature was improperly used could file a letter in the docket to refute it, otherwise it would stay. This is another example where FERC's silence is a betrayal of the democratic process. This is an example of allowing Corporate America to dictate the tactics, like so much else found in the FERC process.

We all need to be concerned that the docket is being treated as a ballot box and it is deliberately and fraudulently being stuffed by persons or entities for the purpose of boosting the seeming public support.

After the Alliance admitted to filing these letters of support on the docket, we did some more research. What you found was not surprising.

In 2014, the Alliance's attempt to influence a Wisconsin utility rate case was investigated after 2,500 Wisconsin signers supporting the rate increase were unaware their names were being used.

In April 2016 more than 38,000 individuals submitted letters to the Bureau of Land Management a day before the deadline for comments on the proposed "Venting and Flaring" rule. These letters were orchestrated by the Consumer Energy Alliance.

CORN

The Mission of the **Coalition to Reroute Nexus** is to educate and persuade NEXUS to choose a route that avoids the higher density counties in northeastern Ohio already adequately served with natural gas and infrastructure and the ecologically unique and environmentally sensitive Oak Openings Region in western Ohio.

CEA's recently launched a national campaign, "Pipelines for America," focused on telling consumers about the increasing importance of U.S. energy infrastructure – and how more is needed.

You need to stay vigilant regarding filings on the dockets that affect you, because FERC will not censor or police attempts to influence the proceedings.

Our greatest defense against home-grown tyranny has always been our strength in numbers as a citizenry. It is not important that we see eye-to-eye on every issue but whether we can agree that we should not be treated in such a fashion by our own government.

We could all benefit by uniting our groups and communicating frequently sharing information and strategies. This forum is or should be the beginning of that process.

Paul L Gierosky

CORN

The Mission of the **Coalition to Reroute Nexus** is to educate and persuade NEXUS to choose a route that avoids the higher density counties in northeastern Ohio already adequately served with natural gas and infrastructure and the ecologically unique and environmentally sensitive Oak Openings Region in western Ohio.

**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 11,**  
Testimony of Nancy Vann, People's Hearing on FERC's  
Abuses of Power and Law, National Press Club,  
December 2, 2016.

## Testimony of Nancy S. Vann at the People's Hearing

Washington, DC - December 2, 2016

My name is Nancy Vann and I live in Peekskill, New York. I'm a retired Wall Street lawyer. And for the last three years, I've had an unexpectedly 'close encounter' with a pipeline. The Spectra AIM pipeline (FERC docket CP14-96). It's kept a low profile so not everyone knows about it. Not low physically of course. It's 42-inches in diameter, about the height of a 5-year old child. It's used eminent domain to take property we own - cutting down 313 trees and wrecking a wetland - all without independent review. From the outset I was told we probably wouldn't be able to stop the project. After all the Federal Energy Regulatory Commission ("FERC") has only turned down one application in 40 years. But I was determined to try.

There are many reasons fracked gas pipelines shouldn't be built. But the most important reason for stopping this pipeline is its proximity to the Indian Point nuclear power plant - a mere 25 miles north of NY City on the banks of the Hudson River. You'll hear about the plant's potential 50-mile fallout radius from nuclear expert Paul Blanch. But we know that the AIM pipeline greatly increases the probability of a 'Fukushima-on-the-Hudson' catastrophe that could make NY City uninhabitable for millennia.

So why *did* FERC approve the AIM project?

First they relied on an environmental review by a company with a serious conflict of interest you'll hear about later. Then they failed to even plausibly evaluate a risk assessment from the Nuclear Regulatory Commission, an agency with no expertise in pipeline safety.

And FERC ignored all of our objections: during the 'scoping' period and to the Draft and Final Environmental Impact Statements. They also ignored letters from our Senators and Members of Congress. They ignored letters from our Governor and four NY State agencies. In fact, FERC ignored letters and submissions from elected officials at every level of government in the four impacted States (NY, CT, RI, and MA). The Commissioners weren't even willing to listen to my remarks about the pipeline's dangers as I was forcibly dragged out of a nominally 'public' FERC meeting just for trying to explain.

True to form, FERC rubber stamped the AIM approval.

Then the City of Boston, the Town of Dedham, Riverkeeper, and our own coalition of 28 groups and individuals filed Rehearing Requests. FERC ignored them all - for more than eight months - while the pipeline construction proceeded rapidly.

No one is even allowed into court to challenge the validity of an approval until FERC has responded to a Rehearing Request. And of course FERC eventually said "no." Our Federal lawsuit is finally proceeding but the AIM project is nearly finished. So three unelected FERC Commissioners have enabled the destruction of life, land, and safety across the U.S. without any accountability. FERC must be investigated before it's too late - not just for us in New York - for our country, our world, and our very survival.

**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 12,**  
Testimony of Chris D. Gauthier, People's Hearing on  
FERC's Abuses of Power and Law, National Press Club,  
December 2, 2016.

FERC Testimony  
Christopher D Gauthier

Three years ago, my family and I moved to Rehoboth to fulfill a dream, to build the horse farm that my wife and step-daughter could only envision at that point. I work full-time and, for 3 years, spent every day off, working on the property; clearing land, building the barn, constructing a riding ring, etc. So it is near and dear to my heart, as my hands built it, and being an accountant, these things are out of my normal comfort zone. My family was living a dream until Sept. 26.

Spectra came to my town on Sept. 26 2016, and that day changed my life since. Prior to that date, Spectra had laid out a confusing and exceptionally vague plan to put a 10,320 horsepower fracked gas compressor station behind my home and horse farm.

Residents had gathered an impressive list of questions which were presented to Spectra for the meeting on Sept 26. They were logical, for example; are all gas leaks reported to residents, are there toxins released from the compressor, what are those toxins? Approximately 82 questions were presented. Only two questions were answered satisfactorily. Spectra said they would get back to our town. Months went by and we noticed that Spectra had marked the requirement to talk with the town of Rehoboth on FERCs pre-filing application as complete.

The state of Massachusetts has put a 10 year moratorium on fracking, sighting pollution and health risks as the reason for this. However, FERC is able to move forward with the approval process for projects that move fracked gas through our state and release the same toxins through compressor stations that caused MA to put the moratorium in place to begin with. FERC doesn't seem to care about my voice, my family's voices, resident's voices, or the state's voice.

Furthermore, there is the question of *need* for the project. Studies have shown, namely the study communicated by MA Attorney General Maura Healey, that there is evidence that we do not need the gas from this project. In my opinion, it should be an ethical requirement for FERC to put further emphasis on *need* for these projects, as countless residents of our town and surrounding communities are sacrificing their quality of life.

Seemingly, there is a lack of an appropriate fact checking mechanism built into FERCS application process. Companies like Spectra can present skewed data to weasel through the process. While on one hand, hundreds of forms are required, on the other hand FERC tilts the entire process toward the applicant and subsequently allows for a process that can effectively shut out any education or dialog with a town, like what's happened in Rehoboth.

Residents of our town have filed 230+ complaint letters with FERC regarding the underhanded dealings from Spectra. As of 11/30, none of those letters has received a response.

We the people have no voice, no vote, and a difficult road ahead to protect our community, in my case my home, my horses, my dream.

**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 13,**  
Testimony of Cara Bottorff, People's Hearing on FERC's  
Abuses of Power and Law, National Press Club,  
December 2, 2016.



*Research and strategy for the land community.*

**Statement of Cara Bottorff**  
**to the**  
**People's Hearing Investigating FERC**  
**Washington, DC**  
**December 2, 2017**

My name is Cara Bottorff, and I am an ecological economics consultant. My colleagues and I have investigated multiple natural gas pipeline proposals. We analyzed all scoping comments submitted to FERC for the Atlantic Coast Pipeline,<sup>1</sup> and we are working on a similar analysis for the PennEast Pipeline.

“Scoping” or “the scoping period” is a key part of any National Environmental Policy Act process. At that stage any person with an interest in the proposed federal action - in this case the approval or denial of approval for a pipeline - has a chance to tell the lead agency - in this case FERC - what concerns them about the proposed action and what they think the lead agency should include in its ensuing environmental review.

During the scoping period for various pipelines FERC receives thousands of individual comments in the form of written letters, entries to FERC’s online eComment site, petitions circulated by groups for or against the proposed pipeline, and verbally at a series of scoping meetings held in communities along the pipeline’s proposed route. These comments include excellent information about the economic and other effects that citizens, scientific experts, and various stakeholders expect to see, or are already seeing, as a result of proposed pipelines.

The content of these letters is critically important for two reasons.

- First, the letters provide direct and clear information about the issues of concern to the people living in communities through which the pipeline would pass as well as to people who, as visitors, downstream water users, business owners, and others, use and enjoy

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<sup>1</sup> Bottorff, C., & Phillips, S. (2016). *Citizen Input Regarding the Proposed Atlantic Coast Pipeline*. Key-Log Economics, LLC.

the affected landscape. The comment letters help FERC understand the nature and extent of the effects of the proposed pipeline.

- Second, the letters provide a benchmark for evaluating the quality of FERC's NEPA review. Under NEPA, FERC must cover relevant issues raised in the scoping phase. Our independent review can therefore help ensure that what citizens have said during scoping does not get lost on the way to a Draft Environmental Impact Statement and that FERC meets its legal obligation to consider the full range of environmental effects of proposed pipelines.

FERC does not have good track record in this regard, so let's consider today what the people most likely to suffer the ill effects of pipelines have to say about the proposals:

- The vast majority of comments submitted to FERC express negative opinions and serious concerns about the proposed pipelines.
- These concerns are greatest among people who would be directly affected by the proposed pipelines. For example people who live in counties a proposed pipeline would cross are more concerned about environmental impacts than are people who live farther away.
- 98.8% of commenters said the Atlantic Coast Pipeline (ACP) will have a negative effect on property values, tourism, and recreation, and
- 99% of commenters said the Atlantic Coast Pipeline will harm their water and their health.
- The list goes on: the ACP is expected to have negative effects on forests, culture and lifestyle, safety, and other values important to the people of West Virginia, Virginia, and North Carolina.

If FERC, once again, ignores these very real and well-founded concerns, decisions about the ACP, the MVP, the PennEast and the rest will mean more unjustified pipelines and more excess environmental harm. With the huge majority of citizens expressing negative attitudes about the

environmental and economic effects of the proposed pipelines, it is intolerable that FERC does not give citizens greater consideration.

**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 14,**  
Testimony of Ted Glick, People's Hearing on FERC's  
Abuses of Power and Law, National Press Club,  
December 2, 2016.

## BXE Testimony at Dec. 2, 2016 FERC People's Hearing

For the last two years, Beyond Extreme Energy has been taking action at FERC and speaking out at monthly commissioner meetings. Our campaign of sustained nonviolent direct action included an 18-day, water-only hunger strike in front of FERC last September before Pope Francis' visit to DC. BXE members also participated in three meetings in 2013 and 2014 with then-FERC Chairs John Wellinghoff and Cheryl LaFleur.

We started BXE in July 2014 because we lived in or had worked with local communities, like those represented here today, whose concerns were disregarded, dismissed or overlooked by FERC. Although FERC makes a charade of hearing public testimony (and, of late, [secret testimony](#)), the public's concerns are routinely brushed aside or explained away. The commission never allows the public to speak at its monthly meetings – hence BXE's planned interruptions.

Although commissioners have noticed our actions, and even referred to us as “a situation,” the agency has not changed course. With only one exception, FERC has approved every industry permit for fracked-gas pipelines, compressor stations and export facilities. FERC has been acting in this manner for decades, a captive agency of the fossil fuel industry in general and the fracked-gas industry in particular. FERC commissioners often come from industry and land jobs in the industry upon leaving the agency. Just last month Bloomberg news reported that the FERC chief of staff, Larry Gasteiger, was leaving to work for Public Service Enterprise Group Inc., a Newark, New Jersey-based power and gas utility. DeSmog Blog has reported on several cases of commissioners ruling in favor of companies while their spouses were consultants for or represented those companies. For example, a FERC official's husband [was a Dominion Power consultant at a time](#) the official was reviewing permits for Dominion's massive and controversial fracked-gas liquefaction and export terminal at Cove Point, Md. And an investigative report in Greenwire in April, 2015 revealed that, “Ethics records throughout 2014 show agency staff seeking employment with grid operators, law firms and utilities that the agency has jurisdiction over and often meets with as it sets new orders and rules. In

addition, FERC employees have held stock in or remain part of pension plans from companies that can be affected by the agency's work.”

FERC is also notorious for refusing to address in its environmental assessments the harm to our climate from fracked-gas infrastructure buildout. The Environmental Protection Agency earlier this year criticized FERC for [failing to consider climate change](#) when it approved the Leach Xpress fracked-gas pipeline that runs through Pennsylvania, Ohio and West Virginia.

Finally, we note that the incoming president, Donald Trump, will be able to appoint at least three new FERC Republican commissioners, one of whom will likely be chair, and probably at least one Democratic commissioner. BXE and allies expect to oppose these nominations, given that these appointees will most certainly be accountable only to the fossil fuel industry, and will not safeguard the public, the climate or the Earth, our only home.

<http://www.eenews.net/stories/1060016380>

<http://www.desmogblog.com/2014/07/02/regulators-and-industry-swap-spots-lobbyists-pushing-natural-gas-exports-swing-revolving-doors>

<http://www.bloomberg.com/news/articles/2016-01-12/ex-regulator-joining-lobby-skirts-revolving-door-ban-group-says>

<https://www.desmogblog.com/2016/08/21/revealed-ex-ferc-commissioner-s-multiple-rulings-favored-energy-companies-his-wife-lobbied>

<https://stateimpact.npr.org/pennsylvania/2016/08/16/penneast-critics-accuse-ferc-of-trying-to-control-public-comment/>

**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 15,**  
Testimony of William Limpert, People's Hearing on  
FERC's Abuses of Power and Law, National Press Club,  
December 2, 2016.

Testimony at National Press Club  
Private Property Taken For Corporate Gain

Good morning. We are Bill and Lynn Limpert. We are retired. Like most folks we have worked hard and followed the rules.

Recently we bought retirement property and built a home in Little Valley, Bath County, Western Virginia. It's the most beautiful property that we have seen. It's all wooded and much of it is very rare uncut virgin forest.

We were notified last February that a change in the route of the Atlantic Coast Pipeline, or ACP, would cut our property in half. If approved by FERC, our property would be taken from us by a private corporation through eminent domain. It would reduce the virgin forest to a 3,000 foot long and 125 foot wide scar next to our home. This is the first tree on our property that would be cut. It's a sugar maple 12.2 feet in circumference. Many, many similar trees would follow. Blasting up to 35 feet deep would occur very close to our home and all across our property. We would be in the 2,200 foot blast zone of this pipeline where we would be killed in an explosion. Our well water could be polluted or completely cut off with no liability for the ACP. Our property value has already dropped \$1/4 million. We will abandon our retirement home and it will become a toxic asset if this pipeline is constructed. We cannot live in fear, or witness the destruction of our beautiful land.

I contacted FERC early on. I was dissuaded from becoming an intervenor for this project. FERC advised me that as an intervenor I would be forced to send out hundreds of letters. Only later, and from a private source, did I learn that I didn't need to send letters...just e-mail copies of my comments.

I learned that properties not directly impacted but still within the blast zone and the evacuation zone are not notified, and I asked FERC how many properties along the 600 mile pipeline are in those zones. The answer..."We don't know. We don't go into that level of detail". I am certain that there are over ten thousand properties in harm's way and FERC doesn't even acknowledge them.

FERC refuses to answer most of my questions. They refer me to large, complicated, technically written, and misleading documents filed by the ACP. Many of these are hundreds of pages in length. I've asked FERC for an explanation of some of these documents and their response..."We don't write them, and it is not our job to interpret them for you". FERC must be interpreting them. They are reviewing them. They just won't interpret them for the public.

FERC's public participation includes public comments to be considered by FERC in their decision making process. When I ask what comments are most important FERC doesn't give me an answer. They tell me they need substantive comments. On the other hand I frequently find specific directions from FERC to the ACP telling them exactly

what they need to submit.

So, it's like a professional football team coming into our valley. We're completely outmatched. We think FERC will help us or at least referee the mismatch, but instead they're on the other side of the field coaching the team and ignoring us. But in this case it's not just a game we stand to lose. It's our home and property.

These are only some of the issues that tell me that FERC is not functioning in the public interest. They are functioning solely for the energy industry. I've dealt with many federal agencies. They have always impressed me with their professionalism and dedication to public service. FERC is not one of them. FERC needs to be reformed to serve we the people...we the people...we the people.

Thank you

**People's Dossier: FERC's Abuses of Power and Law  
→ Public Participation Undermined**

**Public Participation Undermined Attachment 16, Key-  
Log Economics, LLC, *Economic Costs of the Atlantic  
Coast Pipeline*, February 2016.**

# Economic Costs of the Atlantic Coast Pipeline:

*Effects on  
Property Value, Ecosystem Services, and Economic Development  
in Western and Central Virginia*

FEBRUARY 2016

UPDATED MAY 2016

*Highlanders for Responsible Development*

*Augusta County Alliance*

*Friends of Nelson County*

*Friends of Buckingham, Virginia*

*Yogaville Environmental Solutions*

Prepared by:

Spencer Phillips, PhD

Cara Bottorff

Sonia Wang



*Research and strategy for the land community.*

[keylogeconomics.com](http://keylogeconomics.com)

## EXECUTIVE SUMMARY\*

The Atlantic Coast Pipeline (ACP) is proposed to carry natural gas from the Marcellus Shale through a 564-mile-long swath of West Virginia, Virginia, and North Carolina to markets in Virginia and North Carolina and, potentially, overseas. It has been represented as both environmentally safe and economically beneficial, providing economic opportunity for local communities along the proposed route.

Promised economic benefits, however, are only part of the impact the Federal Energy Regulatory Commission (FERC) must review before deciding whether to approve the construction and operation of the pipeline. Under the National Environmental Policy Act, FERC's review must consider the full range of environmental effects of the proposed pipeline. These include the various ways in which environmental effects would result in changes in human well-being—that is, in economic benefits and costs. While estimates of positive economic effects including construction jobs and local tax payments have been developed and promoted as reasons to move forward with the pipeline, no systematic consideration of the potential negative economic effects—economic costs—of the ACP has been completed.

To help fill the gap in current information, five community groups from a four-county region in central and western Virginia commissioned this independent research into key economic costs of the ACP. This region, comprised of Highland, Augusta, Nelson, and Buckingham Counties, would experience three types of economic costs due to the construction, operation, and presence of the ACP. First, the pipeline would impact property values along the 126 miles of pipeline proposed for the region. Affected properties are those touched by the 75-foot-wide right-of-way, within the 1.4-mile-wide evacuation zone, in proximity to the compressor station proposed for Buckingham County, and throughout the viewshed of the proposed pipeline. Second, construction and the ongoing operation of the pipeline would alter land use/land cover in ways that diminish ecosystem service values, such as aesthetics, water supply, and timber and food production. Third, and in part due to a loss of scenic and quality-of-life amenities, there would be decreases in visitation, in-migration, and small business development and a loss of jobs and personal income those activities would otherwise support.

Considering this four-county region alone, estimated one-time costs range from \$72.7 to \$141.2 million. These one-time costs comprise lost property value and the value of ecosystem services lost during construction. Annual costs following the construction period include lower ecosystem service productivity in the ACP's right-of-way, lower property tax revenue due to the initial losses in property value, and dampened economic development. These total between \$54.8 and \$67.8 million per year, and would persist forever. (See "At a Glance," below for details.) Putting the stream of costs into present value terms<sup>1</sup> and adding the one-time costs, the total estimated cost of the ACP in Highland, Augusta, Nelson, and Buckingham Counties is between \$4.0 to \$4.9 billion. For reasons explained in the body of this report, these are conservative estimates.

The costs represented by the estimates presented here are what economists call "externalities," or "external costs," because they would be imposed on parties other than (external to) the company proposing to build the pipeline. Unlike the private (or internal) costs of the pipeline, external costs borne by the public do not affect the company's bottom-line. From an economic perspective, the presence of externalities is what demands public involvement in decisions about the ACP. Without consideration of all of the costs of the project, too much pipeline (which may mean any pipeline at all) is the inevitable result. FERC must therefore consider the true bottom line and ensure that the full costs of the pipeline, especially those external costs imposed on the public, are rigorously examined and brought to bear on its decision about whether or not to permit the ACP project to proceed.

\*This March 2016 update addresses a new report from the Interstate Natural Gas Association of America (INGAA) Foundation Inc., which purports to have found no property value impact from natural gas pipelines. See pages 32-35 of this report for a review of the INGAA study and similar studies.

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<sup>1</sup> The present value of a perpetual stream cost is the one-year cost divided by the 1.4% real discount rate recommended by the Office of Management and Budget for cost-benefit and cost-effectiveness analysis of public projects and decisions (<http://federalaccounting.org/2015/01/omb-updates-cost-benefit-analysis-discount-rates/>).

## At a Glance:

### The Atlantic Coast Pipeline in Western and Central Virginia ~ Highland, Augusta, Nelson, & Buckingham Counties ~

- Miles of Pipeline: 125.5
- Acres in the construction corridor and permanent right-of-way (ROW): 1,901 and 1,140
- Most impacted land cover types (ROW only): forest (795 acres) and pasture (247 acres)
- Parcels touched by ROW: 521
- Parcels in the 1.4-mile-wide evacuation zone: 6,148
- Parcels within one half mile of the compressor station: 87
- Residents and housing units in the evacuation zone: 15,128 people and 8,762 homes
- Parcels from which the pipeline would be visible: 31,117, or 29% of all parcels in the four-county study region
- Baseline property value at risk (and expected one-time cost due to the ACP):
  - In the ROW: \$277.1 million (\$11.6 to \$36.0 million)
  - In the evacuation zone: \$1.13 billion (\$43.0 million)
  - Near the compressor station: \$4.9 million (\$1.2 million)
  - In the viewshed: \$7.44 billion (to avoid double counting with lost aesthetic value under ecosystem services, this impact is not separately estimated)
- Total property value lost: \$55.8 to \$80.2 million
- Resulting loss in property tax revenue (annual): \$281,300 to \$408,400
- Lost ecosystem service value, such as for water and air purification, recreational benefits, and others:
  - Over the two-year construction period: between \$16.9 and \$61.0 million (a one-time cost)
  - Annually for the life of the ACP: between \$4.9 and \$17.8 million
- Lost economic development opportunities due to the erosion of these Counties' comparative advantages as attractive places to visit, reside, and do business. Under the scenarios described below, these could include:
  - Annual loss of recreation tourism expenditures of \$41.3 million that supports 387 jobs and \$7.4 million in payroll and generates \$1.8 million in state and \$1.3 million in local taxes
  - Annual loss of personal income of \$6.6 million due to slower growth in the number of retirees
  - Annual loss of personal income of \$1.6 million due to slower growth in sole proprietorships
- One-time costs (property value and ecosystem services during construction) would total between \$72.7 and \$141.2 million
- Annual costs (all other costs above) would range from \$54.8 to \$67.8 million

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## ABBREVIATIONS AND TERMS

**ACP:** Atlantic Coast Pipeline. For this report, this generally refers to the pipeline corridor itself as well as the compressor station proposed for Buckingham County.

**ACP LLC:** Atlantic Coast Pipeline, LLC, an entity formed by Dominion Resources, Inc., Duke Energy Corporation, Piedmont Natural Gas Co., Inc., and AGL Resources, Inc. to develop, own, and operate the proposed Atlantic Coast Pipeline (ACP)

**BTM:** Benefit Transfer Method, a method for estimating the value of ecosystem services in a study region based on values estimated for similar resources in other places

**DTI:** Dominion Transmission, Inc., the entity that would build and operate the proposed ACP under contract to ACP LLC

**EIS:** Environmental Impact Statement, a document prepared under the National Environmental Policy Act analyzing the full range of environmental effects, including on the economy, of proposed federal actions, which in this case would be the approval of the Atlantic Coast Pipeline

**FERC:** Federal Energy Regulatory Commission, the agency responsible for preparing the EIS and deciding whether to grant a certificate of public convenience and necessity (i.e., whether to permit the pipeline)

**NEPA:** National Environmental Policy Act of 1970, which requires the environmental review of proposed federal actions, preparation of an EIS, and, for actions taken, appropriate mitigation measures

## AUTHORS' NOTE:

We are grateful for the assistance the sponsoring organizations (Highlanders for Responsible Development, Augusta County Alliance, Friends of Nelson County, Yogaville Environmental Solutions, and Friends of Buckingham Virginia) have provided in identifying local information sources and making contacts in the study region. Key-Log Economics however, remains solely responsible for the content of this report, the underlying research methods, and the conclusions we draw from them.

## BACKGROUND

The proposed Atlantic Coast Pipeline (ACP) is a high-volume transmission pipeline intended, as described in filings with the Federal Energy Regulatory Commission (FERC), to transport 1.5 billion cubic feet (bcf) per day of natural gas from the Marcellus Shale region in West Virginia to power generation facilities, natural gas distributors, and commercial and industrial end users in Virginia and North Carolina (Natural Resource Group, 2015c).<sup>2</sup> Atlantic Coast Pipeline, LLC, would control the pipeline, while permit applications, construction, and operations would be managed by Dominion Transmission, Inc. (DTI).

The majority of the pipeline, and all of it in the four-county region considered in this study (Figure 1), would consist of 42-inch diameter pipe and would be operated at a pressure of 1,440 pounds per square inch gauge (PSIG). This pressure would be maintained by three compressor stations, including one proposed for Buckingham County, Virginia, which is part of the study region (Natural Resource Group, 2015c).

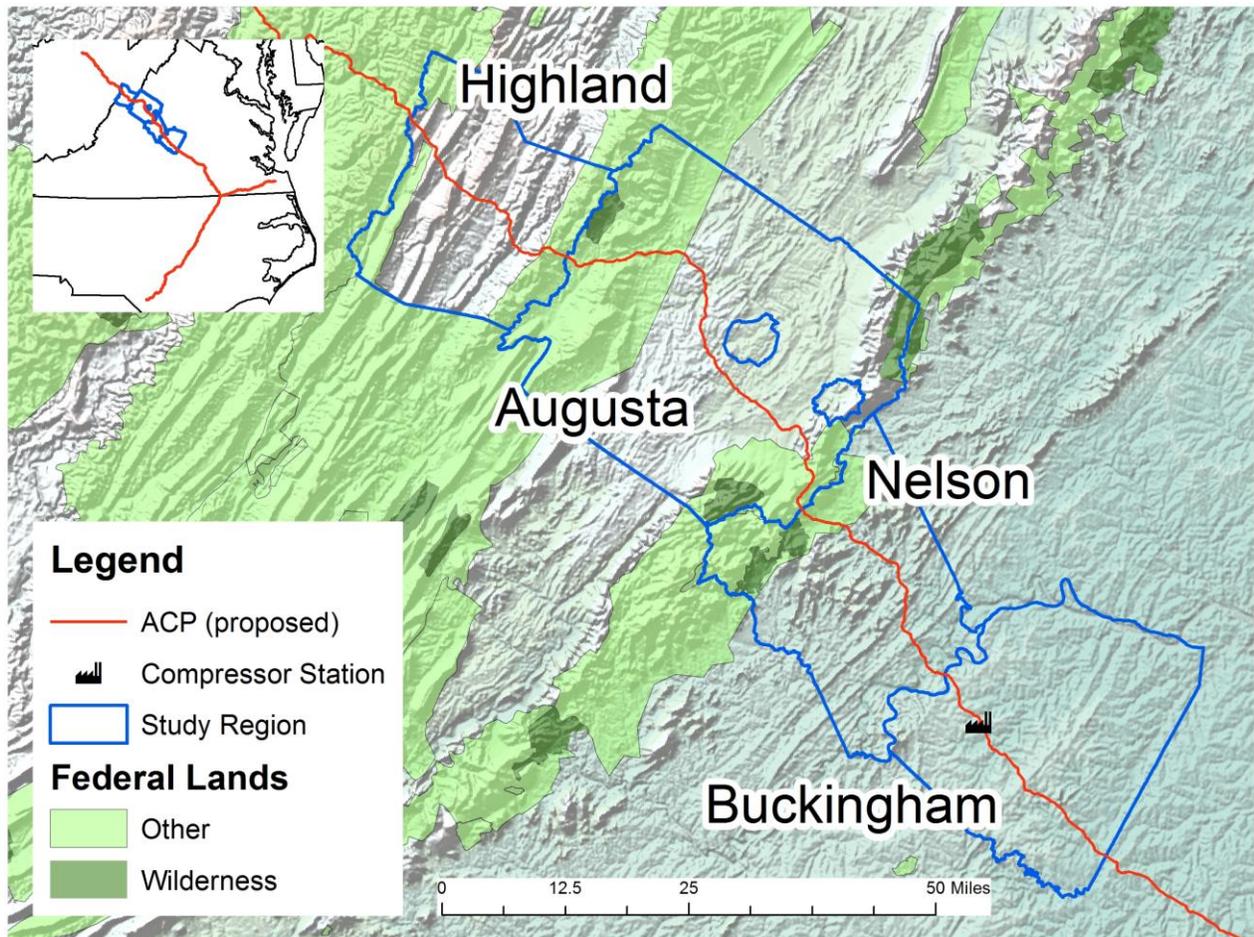
Along the way, the ACP would cross portions of the Monongahela and George Washington National Forests, Blue Ridge Parkway, the Appalachian Trail, and other public conservation, scenic, and natural areas. Its permanent right-of-way and temporary construction corridor—75 and 125 feet wide, respectively—would also cross thousands of private properties. Pipeline leaks and explosions could cause substantial physical damage and require evacuation of even wider swaths, affecting perhaps tens of thousands of homes, farms, and businesses. Still wider, but more difficult to gauge and estimate, are the zones within which the construction, operation, and presence of the pipeline would affect human well-being by changing the availability of ecosystem services such as clean air, water supply, and recreational opportunities. This would occur as the pipeline creates an unnatural linear feature on a landscape that otherwise remains largely natural or pastoral and dampens the attractiveness of the affected region as a place to live, visit, retire, or do business.

To date, such negative effects and estimates of their attendant economic costs have not received much attention in the otherwise vigorous public debate surrounding the ACP proposal. This report, commissioned jointly by five community groups<sup>3</sup> located in central and western Virginia is both an attempt to understand the nature and potential magnitude of the economic costs of the ACP in a particular four-county area, as well as to provide an example for FERC as it proceeds with its process of analyzing and weighing the full effects of the proposed ACP along its entire length and, by extension, throughout the region in which its effects will occur.

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<sup>2</sup> While pipeline backers maintain that the gas transported via the ACP would not be for export, the pipeline would add to overall national gas transmission capacity and thus would serve to free up more gas for export at Dominion Cove Point LNG LP's newly approved liquefied natural gas export facility in Calvert County, Maryland.

<sup>3</sup> These are, from west to east, Highlanders for Responsible Development, Augusta County Alliance, Friends of Nelson County, Yogaville Environmental Solutions, and Friends of Buckingham Virginia.



**Figure 1: Four-County Study Region.**

Note: Augusta County includes the independent cities of Staunton and Waynesboro

Sources: ACP route and compressor digitized from interactive map, Dominion Resources Inc. <http://dom.maps.arcgis.com/>, and Resource Report 1: Appendix A, Topographic Route Maps (Natural Resource Group 2015); Study Region (counties); federal lands, and hill shade from USGS and [http://nationalmap.gov/small\\_scale/](http://nationalmap.gov/small_scale/)

## Policy Context

Before construction can begin, the ACP must be approved by FERC. That approval, while historically granted to pipeline projects, depends on FERC’s judgment that the pipeline would meet a public “purpose and need.” Because the approval would be a federal action, FERC must also comply with the procedural and analytical requirements of the National Environmental Policy Act (NEPA). These include requirements for public participation, conducting environmental impact analysis, and writing an Environmental Impact Statement (EIS) that evaluates all of the relevant effects. Of particular interest here, such relevant effects include direct, indirect, and cumulative effects on or mediated through the economy. As the NEPA regulations state,

Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions

which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial (emphasis added, 36 CFR 1508.b).

It is important to note NEPA does not require that federal actions – which in this case would be approval or not of the ACP – necessarily balance or even compare benefits and costs. NEPA is not a decision-making law, but rather a law that requires decisions be supported by as full as possible an accounting of the reasonably foreseeable effects of federal actions on the natural and human environment. It also requires that citizens have opportunities to engage in the process of analyzing and weighing those effects.

In addition to the requirements of NEPA, FERC’s own policy regarding the certification of new interstate pipeline facilities (Docket No. PL99-3-000) requires that adverse effects of new pipelines on “economic interests of landowners and communities affected by the route of the new pipeline” be weighed against “evidence of public benefits to be achieved [by the pipeline]” (Hoecker, Breathitt, & He’bert Jr., 1999, pp. 18–19). Further, “...construction projects that would have residual adverse effects would be approved only where the public benefits to be achieved from the project can be found to outweigh the adverse effects” (p. 23).

In principal, this policy is in line with the argument, on economic efficiency grounds, that the benefits of a project or decision should be at least equal to its total cost, including external costs. The policy’s guidance regarding what adverse effects must be considered and how they are measured is deeply flawed, however. The policy states, for example, that “if project sponsors...are able to acquire all or substantially all, of the necessary right-of-way by negotiation prior to filing the application...it would not adversely affect any of the three interests,” the third of which include communities through which the proposed pipeline would pass (Hoecker et al., 1999, p. 26). In effect, the Commission’s policy contends that the only adverse effects that matter are those that affect owners of properties in the right-of-way. Even for a policy adopted in 1999, this contention is completely out of step with then current understanding of the economic effects of development that alters the natural environment.

A further weakness of the FERC policy is that it relies on applicants to provide information about benefits and costs. The policy’s stated objective “is for the applicant to develop whatever record is necessary, and for the Commission to impose whatever conditions are necessary, for the Commission to be able to find that the benefits to the public from the project outweigh the adverse impact on the relevant interests” (Hoecker et al., 1999, p. 26). The applicant therefore has an incentive to be generous in counting benefits<sup>4</sup> and parsimonious in counting the costs of its proposal. Under these circumstances, it seems unlikely that the Commission’s policy will prevent the construction of pipelines

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<sup>4</sup> Dominion Resources and Dominion Transmission Inc. have published estimates of economic benefits in the form of employment and income stemming from the construction and operation of the ACP. As has been well documented elsewhere, both studies suffer from errors in the choice and application of methods and in assumptions made regarding the long-run economic stimulus represented by the ACP. Most significantly, the studies make no mention of likely economic costs, and their projections of long-term benefits extend far beyond the time period (of a year or so) within which economic impact analysis is either useful or appropriate. See Phillips (2015b) and Stanton et al. (2015) for details on these shortcomings.

for which the full costs are greater than the public benefits they would actually provide. Indeed, FERC has never rejected a pipeline proposal (van Rossum, 2016).

With ACP LLC having failed to acquire a sufficient portion of the right-of-way and with the need for other federal agencies, including the US Forest Service, to evaluate how the ACP would affect resources under its stewardship, the Commission issued a Notice of Intent to prepare an EIS in February of 2015 (Federal Energy Regulatory Commission, 2015). The process began with a series of scoping meetings at which members of the public could express their thoughts on the pipeline in general as well as what effects should fall under the scope of the EIS. Interested parties also had the opportunity to submit comments online and through the mail. FERC received more than 1,600 individual comment letters, another 1,239 form letters, and several petitions bearing multiple signatures each.<sup>5</sup>

Much of what FERC heard from citizens echoed and expanded upon the list of potential environmental effects listed in its Notice of Intent. Of those, several are particularly important as the sort of environmental effects that resonate in the lives of people. These effects can take the form of external economic costs that would be borne by individuals, businesses, and communities throughout the landscape the ACP would traverse. Table 1 lists these key issues along with the number of scoping letters from residents of Highland, Augusta, Nelson, and Buckingham County who mentioned the issue.

FERC also received input about both the legal and economic importance of considering the economic consequences of these environmental effects along with recommendations of the type and scope of economic analysis that should be undertaken to quantify, to the extent possible, the magnitude of the economic costs (see Phillips, 2015, for example). DTI responded to this input in a letter to FERC arguing against such analysis, stating “because there is no commonly accepted methodology to weigh the economic benefits of the ACP against possible environmental, health, and safety risks using all possible positive and negative externalities, the economic impact assessment can only address tangible economic benefits of the ACP using known variables and economic modeling” (Woolard & Natural Resource Group, 2015, p. 58).

Contrary to DTI’s claim, experts in the fields of natural resource, agricultural, environmental, and ecological economics have been developing, testing, and improving such methods since the 1960s (and the underlying economic models have been established for even longer). Textbooks such as *The Benefits of Environmental Improvement: Theory and Practice* (Freeman III, 1979) or *Valuing Natural Assets: The Economics of Natural Resource Damage Assessment* (Kopp & Smith, 1993) plus many thousands of peer-reviewed papers and other resources provide ample documentation of the methods

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<sup>5</sup> While the NEPA’s scoping phase is intended to generate guidance for the lead agency (FERC) on how to conduct the EIS and is not intended as a referendum, FERC nevertheless has heard opinions in support of the pipeline, and, as it turns out, many more opinions in opposition to the pipeline. Pipeline opponents cite a variety of concerns, including those that are the subject of this report. Key-Log Economics is preparing a full analysis of content of the scoping comments. Using crowd-sourcing, Key-Log Economics has reviewed and coded the content of all 2,875 individual letters, form letters, and petitions submitted to FERC through, and somewhat beyond, its announced formal scoping period. A report summarizing that content as a measure of citizens’ level of interest in the issues they have raised and, therefore, those they should most expect FERC to cover in the EIS process, will be released in early 2016.

by which one may estimate the negative externalities and other economic consequences of changes in environmental quality that projects like the proposed ACP would cause.

**TABLE 1: Environmental Concerns Raised During FERC Scoping Process**

Environmental Issue / Resource Value <sup>a</sup>	Mentions among 1,299 scoping comment letters <sup>b,c</sup>
Impacts on property values, tourism, and recreational resources	521 (property value) 630 (tourism) 381 (recreation)
Safety issues, such as construction and operation of the planned facilities near existing residences, schools, businesses, and military training facilities, and in karst and steep slope terrain	528 (risk of accidents) 467 (general safety) 420 (erosion)
Impacts on forested areas and other vegetation	739 (forested areas, vegetation, habitat, etc.)
Impacts on surface water resources including rivers springs, seeps, and wetlands	812 (waterways) 604 (water quality) 370 (water supply)
Impacts on groundwater resources and wells	370 (water supply)
Impacts on protected species and habitat	404 (wildlife)
Impacts on cultural resources including battlefields, cemeteries, and historic properties	489 (rural character) 240 (culture)
Concerns regarding construction and operational noise, especially related to compressor stations	334 (health) 517 (quality of life) 40 (compressor station)

Notes:

- a. This is a partial list of “Currently Identified Environmental Issues” from FERC’s Notice of Intent to prepare an Environmental Impact Statement regarding the ACP (Federal Energy Regulatory Commission, 2015, p. 12165).
- b. The categories in parentheses are related to the “currently identified environmental issues” listed in the FERC Notice of Intent (Federal Energy Regulatory Commission, 2015, p. 12165).
- c. These “mentions” are the number of comment letters written by or on behalf of residents of the study region (Highland, Augusta, Nelson, and Buckingham Counties) that noted or mentioned the listed issue. While detailed analysis of the full set of comments is ongoing, the vast majority of commenters from the study region expressed a belief that the ACP would have a negative impact on the resource/value listed in the first column.

Moreover, precedent from the Tellico Dam, to the Exxon Valdez settlement, to the national forest planning rule and recent guidance from the Council on Environmental Quality (with their emphases on ecosystem services) show that such methods do exist and are useful both for determining the costs of environmental damage and for guiding cost-effective environmental decision-making (Carson et al., 2003; Donovan, Goldfuss, & Holdren, 2015; Randall, 1987; USDA Forest Service, 2012).

The applicant’s professed ignorance of established methods for estimating the economic costs of environmental damage perhaps serves “to develop whatever record is necessary” (Hoecker et al.,

1999), for FERC to permit the pipeline, but it does nothing to develop a proper assessment of costs and or to serve the public interest. To ensure an economically efficient use of public and private resources and to meet its obligations under NEPA, FERC must obtain credible estimates of public benefit (which has so far not been demonstrated), develop rigorous estimates of the full suite of costs, and bring both sets of information to bear on its decisions regarding the Atlantic Coast Pipeline.

## Study Objectives

Given the policy setting and what may be profound effects of the ACP as proposed on the people and communities of central and western Virginia, we have undertaken this study to provide information of two types:

1. An example of the scope and type of analyses that FERC could, and should, undertake as part of its assessment of the environmental (including economic) effects of the ACP.
2. An estimate of the potential magnitude of economic effects in this four-county subset of the landscape where the ACP's environmental and economic effects will be felt.

We do not claim the estimates below represent the total of all of the potential costs that would attend the construction, operation, and presence of the pipeline. Specifically, we have not estimated costs in two categories: "passive-use value,"<sup>6</sup> including the value of preserving the landscape, without a pipeline, for future direct use; and increases in the cost of community services like road maintenance and emergency response that may increase due to the construction and operation of the pipeline.<sup>7</sup>

Therefore, our figures should be understood to be conservative, lower-bound estimates of the true total cost of the ACP in that sub-region and, of course, they do not include costs for the remainder of the region proposed for the ACP. We do urge that the FERC augment the results of this study with its own similar analysis for the entire region and with additional research to determine the costs of community services and other relevant classes of costs not counted here.

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<sup>6</sup> Passive-use values include *option* value, or the value of preserving a resource unimpaired for one's potential future use; *bequest* value, which is the value to oneself of preserving the resource for the use of others, particularly future generations; and *existence* value, which is the value to individuals of simply knowing that the resource exists, absent any expectation of future use by oneself or anyone else. In the case of the ACP, people who have not yet, but who may intend, to travel the Blue Ridge Parkway or attend the Highland Maple festival are better off knowing that the setting for activities is a beautiful aesthetically pleasing landscape. What such visitors would be willing to pay to maintain that possibility would be part of the "option value" of an ACP-free landscape.

<sup>7</sup> As in communities impacted by the shale gas boom itself, communities along the pipeline can expect spikes in crime as transient workers come and go, more damage to roads under the strain of heavy equipment, increases in physical and mental illnesses including asthma, depression, anxiety, and others triggered by exposure to airborne pollutants, to noise, and to emotional, economic, and other stress. See, for example, Ferrar et al. (2013), Healy (2013), Fuller (2007), Campoy (2012), and Mufson (2012).

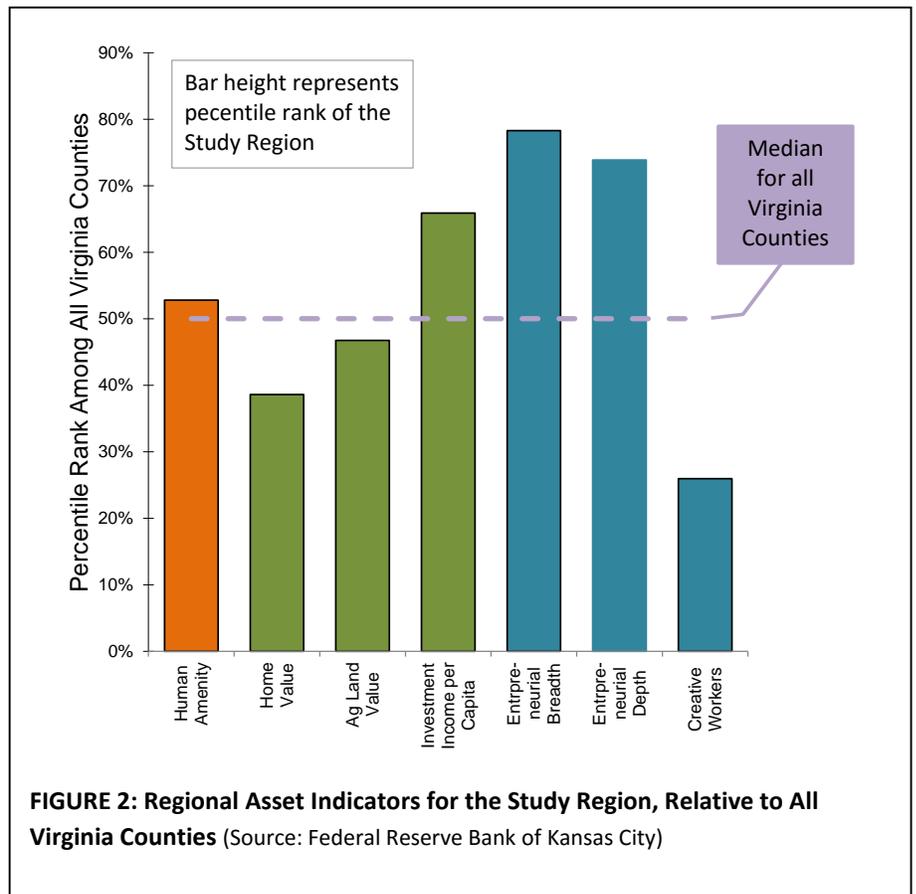
## Current Economic Conditions in the Study Region

Our geographic focus is a four-county region comprising Highland, Augusta,<sup>8</sup> Nelson, and Buckingham Counties in Virginia. This 2,480 square-mile region supports diverse land uses, from some of Virginia’s wildest forests, the iconic Shenandoah Valley, the heart of Virginia’s Blue Ridge traversed by both the Appalachian Trail and Blue Ridge Parkway, thriving cities, international retreat centers, historically and culturally significant human settlements, working farms, and extensive commercial timberland. These natural, cultural, and economic assets are among the reasons more than 150,000 people call this region home and an even larger number visit each year for skiing, sightseeing, music and maple festivals, spiritual retreats, weddings, wine tastings, brewery tours, and other pursuits.

Statistics from the Center for the Study of Rural America, part of the Federal Reserve Bank of Kansas City, further reveal the extent to which the region has the right conditions for resilience and economic success in the long run (Low 2004). These data show that the study region has a higher human amenity index (based on scenic amenities, recreational resources, and access to health care), more financial wealth in the form of investment income per capita, and stronger entrepreneurship than most Virginia counties (Figure 2).<sup>9</sup>

More traditional measures of economic performance suggest the region is strong and resilient. From 2000 through 2014, for example:

- Population in the study region grew by 8.5%, compared to a 0.2% loss of population for non-metro Virginia<sup>10</sup>



<sup>8</sup> Two independent cities, Staunton and Waynesboro, lie within the geographic borders of Augusta County. In this report, subject to some limitations where noted, statistics, estimates, and other information labeled as “Augusta County” reflect totals for the County plus the two independent cities.

<sup>9</sup> Note that the Fed’s statistics have not been updated since 2004-2006, and conditions in and outside the study region have undoubtedly changed. Some of these relative rankings may no longer hold.

<sup>10</sup> “Non-metro Virginia” comprises those counties that are not a part of a federally defined metropolitan statistical area (MSA). While Augusta is part of the Staunton-Waynesboro-Augusta MSA and Nelson and Buckingham are part of the

- Employment grew by 6.3%, compared to a drop of 6.7% for non-metro Virginia
- Personal income grew by 23.8%, compared to 13.1% for non-metro Virginia
- Earnings per job are higher, by about \$2,400/year, than the average for non-metro Virginia
- Per capita income is higher, by \$4,000/year, than the average for non-metro Virginia
- Unemployment grew by less and ended the period two points lower than the average for non-metro Virginia.<sup>11</sup>

These and other trends indicate not only that the region has been doing quite well, but also that it is doing well with, and perhaps because of, a relative absence of industrial development like the ACP. The region has what regional economists McGranahan and Wojan have called the “Rural Growth Trifecta” of outdoor amenities, a creative class of workers, and a strong “entrepreneurial context” (innovation-friendliness) (2010). Individual workers, retirees, and visitors are attracted to the natural beauty of the region while entrepreneurs are attracted by the quality of the environment, by the quality of the workforce, and by existing support from local government. Workers, for their part, are retained and nurtured by dynamic businesses that fit with the landscape and lifestyle that attracted them in the first place.

As four further indicators of this dynamic, consider since 2000:

- The region’s population growth has been primarily due to in-migration
- The proportion of the population 65 years and older has increased from 15.0% to 17.6%
- Proprietors’ employment is up by 28.1%
- Non-labor income (primarily investment returns and age-related transfer payments like Social Security) is up by 45.8%.<sup>11</sup>

These trends suggest that entrepreneurs and retirees are moving to (or staying in) this region. They bring their income, their expertise, and their job-creating energy with them.

Temporary residents – tourists and recreationists – are also an important part of the region’s economy. Tourists spent more than \$413 million in the study region in 2014. The companies that directly served those tourists employed 3,866 people, or 4.9% of all full- and part-time workers (Headwaters Economics, 2015; Virginia Tourism Corporation, 2015).

It is in this context the potential economic impacts of the ACP must be weighed and the apprehension of the region’s residents understood. The region has been doing quite well on the strength of its amenities and quality of life. Many believe the construction and operation of the pipeline will kill or at least dampen the productivity of the proverbial goose that lays its golden eggs in the region. This could

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Charlottesville MSA, each of the study region counties are predominantly rural in landscape and character and are much more like other non-metro counties than they are like Northern Virginia or Tidewater. Therefore, we believe that averages for non-metro Virginia provide a more appropriate point of comparison than statistics that include the Commonwealth’s more urban areas.

<sup>11</sup> These data are from Headwaters Economics (2015), US Bureau of Economic Analysis (2015), and US Bureau of the Census (2014, 2015).

result in a slower rate of growth, which would mean worse economic outcomes than would be expected with a continued absence of a pipeline. For example, if the pipeline is built, business groups Friends of Wintergreen and Nelson 151 identified \$75 million in foregone investments and between 200 and 300 new employees who will not be hired (Theiss, 2015). These businesses, which depend on the scenic and other amenities noted above, would simply not have enough business in the form of visitors, diners, skiers, golfers, and others to justify their now-on-hold expansions and new developments.

More dire is the prospect that such businesses will not be able to maintain their current levels of employment. Just as retirees and many business can choose where to locate, visitors and potential visitors have practically unlimited choices for

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*“Whether they are seeking a retirement home or a weekend retreat, people choose Highland county BECAUSE it doesn't have what people have in other places—over-development, noise, traffic or pollution. They want to get away from all that and be where they can enjoy the peace and beauty of the natural landscape. For my clients, the viewshed, along with the previously mentioned attributes, was a critical driving factor in where they would purchase.”*

*– Fran Davenport, retired Realtor  
Monterey, Virginia*

---

places to spend their vacation time and expendable income. If the study region loses its amenity edge, other things being equal, people will go elsewhere, and this region could contract.

Instead of a “virtuous circle” with amenities and quality of life attracting/retaining residents and visitors, who improve the quality of life, which then attracts more residents and visitors, the ACP could tip the region into a downward spiral. In that scenario, loss of amenity and risk to physical safety would translate into a diminution or outright loss of the use and enjoyment of homes, farms, and recreational and cultural experiences. Potential in-migrants would choose other locations and some long-time residents would move away, draining the region of some of its most productive members. Homeowners would lose equity as housing prices follow a stagnating economy. With fewer people to create economic opportunity, fewer jobs and less income will be generated. Communities could become hollowed out, triggering a second wave of amenity loss, out-migration, and further economic stagnation.

## ENVIRONMENTAL-ECONOMIC EFFECTS AND WHERE THEY WOULD OCCUR

In the remainder of this report, we follow this potential cycle and estimate three distinct types of economic consequences.

First, corresponding to the direct biophysical impacts of the proposed pipeline, are effects on ecosystem services – the benefits nature provides to people for free, like purified water or recreational opportunities, that will become less available and/or less valuable due to the ACP’s construction and operation. Second are effects on property value as owners and would-be owners choose properties farther from the pipeline’s right-of-way, evacuation zone, viewshed, or, in the case of the compressor

station, noise. Third and finally are more general economic effects caused by a dampening of future growth prospects or even a reversal of fortune for some industries.

We begin with an exploration of the geographic area over which these various effects will most likely be felt.

### **Impact Zones within the Study Region**

Construction of the pipeline corridor itself would require clearing an area 125 feet (38.1 m) wide in most areas and 75 feet (22.9 m) wide in wetlands. After construction, the permanent right-of-way (ROW) would be 75 feet wide along the entire length of the pipeline. It is from within this construction zone and right-of-way that the greatest disruption of ecosystem processes will occur, so it is from these zones that reductions in ecosystem service value (ESV) will emanate. Since we are estimating ecosystem service values at their point of origin, we will focus on this zone in that analysis below. The value of land crossed by the ROW and the somewhat larger number of parcels crossed by the construction zone will be acutely affected.

Operated at its intended pressure and due to the inherent risk of leaks and explosions, the pipeline would present the possibility of having significant human and ecological consequences within a large “High Consequence Area” and an even larger evacuation zone. A High Consequence Area (HCA) is “the area within which both the extent of property damage and the chance of serious or fatal injury would be expected to be significant in the event of a rupture failure (Stephens, 2000, p. 3).” Using Stephens’ formula, the HCA for this pipeline would have a radius of 1,092 feet (332.8 m). The evacuation zone is defined by the distance beyond which an unprotected human could escape burn injury in the event of the ignition or explosion of leaking gas (Pipeline Association for Public Awareness, 2007, p. 29). There would be a potential evacuation zone with a radius of 3,583 feet (1092.1 m).<sup>12</sup> An explosion would definitely affect ecosystem processes within the HCA, but given the probability of an explosion at any given point along the pipeline at a given time is small, we do not include effects *on ecosystem service value* in this zone in our cost estimates.

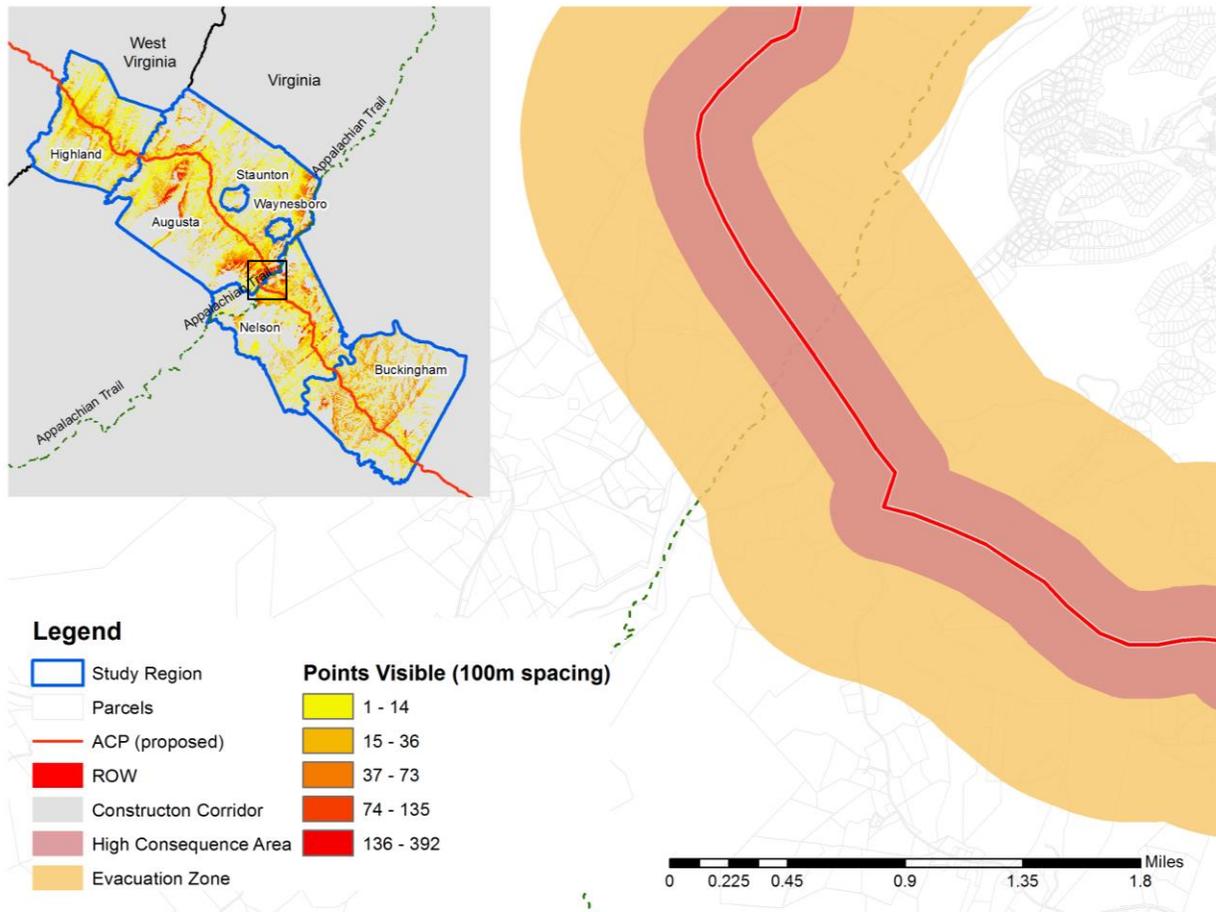
Effects on land value are another matter, and it is reasonable to consider land value impacts through both the high consequence area and the evacuation zone. As Kielisch (2015) stresses, the value of land is determined by human perception, and property owners and would-be owners have ample reason to perceive risk to property near high-pressure natural gas transmission pipelines. Traditional news reports, YouTube, and other media reports attest to the occurrence and consequences of pipeline leaks and explosions, which are even more prevalent for newer pipelines than for those installed decades ago (S. Smith, 2015). Information about pipeline risks translates instantly into buyers’ perceptions and, therefore, into the chances of selling a property exposed to those risks, into prices offered for those properties, and, for people who already own such properties, into diminished enjoyment of them.

Along similar lines, compressor stations have been implicated in a variety of illnesses among nearby residents. (Subra, 2009, 2015). The stations can also be noisy, with low-frequency noise cited as a constant nuisance. (“Proximity of Compressor Station Devalues Homes by as much as 50%,” 2015).

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<sup>12</sup> See the map (Figure 3) which includes a close-up of these zones near the Augusta-Nelson County line.

These issues have led some homeowners to pull-up stakes and move away and to reduced property value assessments for others (Cohen, 2015; “Proximity of Compressor Station Devalues Homes by as much as 50%,” 2015). For the estimates of property value effects below, we consider just those properties within one half mile of the proposed compressor station in Buckingham County. Because this zone overlaps the ROW and the evacuation zone, and because we assume that the more acute and ever present effect of proximity to the compressor station would dominate all other effects, we ignore the ROW and evacuation zone effects for these properties.



**FIGURE 3: Study Region Showing Affected Viewsheds (Inset) and Parcels in Right-of-Way, Construction, High Consequence, and Evacuation Areas.**

Sources: ACP route digitized from interactive map, Dominion Resources Inc. (<http://dom.maps.arcgis.com/>); National Map Study Region (counties) from USGS ([http://nationalmap.gov/small\\_scale/](http://nationalmap.gov/small_scale/)), and Appalachian Trail from the Appalachian Trail Conservancy (<http://www.appalachiantrail.org/>).

In addition, loss of view quality would be expected for properties both near to and far from the pipeline corridor. Unlike leaks and explosions, view quality impacts will occur with certainty. If the pipeline is built, people will see the corridor as a break in a once completely forested hillside, and their “million-dollar” view will be diminished. Therefore, for our analysis of land value below, we consider any place where there is considerable potential to see the pipeline corridor to be within its direct impact zone.

Beyond the loss of ecosystem services stemming from the conversion of land in the ROW and the loss of property value resulting from the chance of biophysical impacts or the certainty of impacts on aesthetics, the proposed ACP would also diminish physical ecosystem services, scenic amenity, and passive-use value that are realized or enjoyed beyond the evacuation zone and out of sight of the pipeline corridor. The people affected include residents, businesses, and landowners throughout the study region, as well as past, current, and future visitors to the region. The impacts on human well-being would be reflected in economic decisions such as whether to stay in or migrate to the study region, whether to choose the region as a place to do business, and whether to spend one's scarce vacation time and dollars near the ACP instead of in some other place.

To the extent the ACP causes such decisions to favor other regions, less spending and slower economic growth in the study region would be the result. One would expect a secondary effect of that slower growth on land values, but in this study we consider the primary effects in terms of slower population, employment, and income growth in key sectors. Table 2 summarizes the types of economic values considered in this study and the zones in which they are estimated.

One would also expect economic development effects to spill beyond the county boundaries that define our study region. For example, the Satchidananda Ashram - Yogaville attracts thousands of visitors to the region each year (5,642 in 2014; 3,687 through early August, 2015) from around the world. Based on its own survey of past visitors, leaders there anticipate visits will decrease drastically, perhaps catastrophically if the ACP is built near its campus in Buckingham County. Most of its students, instructors, and other visitors come from out of state, so fewer visits to Yogaville will mean, for example, fewer flights into Charlottesville-Albemarle airport, fewer car rentals, and perhaps fewer side excursions to Monticello or extended stays in the wider region. Such negative economic effects of the pipeline would be felt in Charlottesville and Albemarle County and would be in addition to the direct effects felt by Yogaville and/or within the immediate study region.

The same dynamic would play out if, as business leaders fear, people from outside the study region make fewer trips to Wintergreen for skiing, attend fewer wine tastings or concerts in the Rockfish Valley, skip a stay in the Shenandoah Valley, or make fewer return visits to the Highland Maple festival.

We do not include those outside-the-region effects in the current study. This is a matter of study scoping and budget only, and should not be construed as a suggestion that these and other impacts cease at the Buckingham-Albemarle County line or any other study region boundary. The effects we do include are enumerated and estimated in more detail in the following sections. To recap before proceeding, Table 2 summarizes the geographic extent of the values and analyses included as well as those that should be considered as part of FERC's research agenda to gain an even more complete picture of the proposed ACP's economic effects.

**TABLE 2: Geographic Scope of Effects.**

A check mark indicates those zones/effects for which estimates are included in this study. The "X's" indicate areas for future study.

Values / Effects	Right-of-Way and Construction Zone	High Consequence Area	Evacuation Zone	Compressor Station Zone	Pipeline Viewshed	Entire Study Region	The World Beyond the Study Region
Ecosystem Services	✓	a	a		a	x <sup>a,b</sup>	x
Land / Property Value	✓ <sup>c</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>	✓	✓ <sup>e</sup>	x	n/a
Economic Development Effects	f	f	f	f	f	✓	n/a

Notes:

- a. Changes in ecosystem services that are felt beyond the ROW and Construction zone may be key drivers of “Economic Development Effects,” but they are not separately estimated to avoid double counting.
- b. With the exception of the impact on visual quality, we do not estimate the spillover effects of alteration of the ecosystem within the ROW on the productivity of adjacent areas. The ROW, for example provides a travel corridor to invasive species that could reduce the integrity and ecosystem productivity of areas that, without the ACP would remain core ecological areas, interior forest habitat, etc.
- c. We estimate land value effects for the ROW but not for the construction zone.
- d. Properties in the HCA are treated as though there is no additional impact on property value relative to the impact of being in the evacuation zone. Also, we exclude properties in the compressor station zone from estimates of impacts related to the ROW and the evacuation zone. The reason is that while the compressor station’s effects on land value may be similar (that is, they are driven by health and safety concerns and possible loss of use), they are both more acute and more certain. (Noise and air emissions from the compressor stations will be routine, while leaks from the pipeline should be rare.) We assume that the ongoing effects of the compressor station on use and enjoyment of properties nearby would overshadow or dominate the possibility of a high-consequence event or the need to evacuate.
- e. To avoid double-counting, changes in property value due to an altered view from the property are considered to be part of lost aesthetic value under the heading of ecosystem services.
- f. Economic development effects related to these subsets of the study region are included in estimates for the study region.

## EFFECTS ON ECOSYSTEM SERVICE VALUE

The idea that people receive benefits from nature is not at all new, but “ecosystem services” as a term describing the phenomenon is more recent, emerging in the 1960s (Millennium Ecosystem Assessment, 2003). “Benefits people obtain from ecosystems” is perhaps the simplest and most commonly heard definition of ecosystem services (Reid et al., 2005). Other definitions abound, including the following from Gary Johnson of the University of Vermont. It is helpful both because it emphasizes that services are not necessarily things—tangible bits of nature—but rather, they are the effects on people of the functions of bits of nature:

Ecosystem services are the effects on human well-being of the flow of benefits from an ecosystem endpoint to a human endpoint at a given extent of space and time (2010).

This definition also makes clear that ecosystem services happen or are produced and enjoyed in particular places and at particular times.

No matter the definition, different types of ecosystems (forest, wetland, cropland, urban areas) produce different arrays of ecosystem services, and/or they produce similar services to greater or lesser degrees. Certain ecosystems or land uses simply produce a higher flow of benefits than others.

“Ecosystem services” is sometimes lengthened to “ecosystem goods and services” to make it explicit that some are tangible, like physical quantities of food, water for drinking, and raw materials, while others are truly services, like cleaning the air and providing a place with a set of attributes that are conducive to recreational experiences or aesthetic enjoyment. We use the simpler “ecosystem services” here. Table 3, lists the provisioning, regulating, and cultural ecosystem services included in this study.

At a conceptual level, we estimate the potential effects of the ACP on ecosystem service value by identifying the extent to which the construction and longer-term existence of the pipeline would change land cover or land use, which in turn results in a change in ecosystem productivity. Construction would essentially strip bear the 125-foot-wide construction corridor. Once construction is complete and after some period of recovery, the 75-foot-wide right-of-way will be

### Ecosystem Service Impacts 1: Water Supply

Currently the Cowpasture River Valley in Highland County enjoys naturally clean water thanks to environmental filtration. However, if the ACP is built any contamination that it causes through erosion, sedimentation, or spills would carry high costs.

For a domestic well, a landowner would face an estimated out-of-pocket expense of \$35,000 or more to drill into a potable aquifer. For a livestock operation, which needs more water, a contaminated aquifer would be even worse. Dairies and ranches in the Cowpasture River Valley that need to replace their water supply would face an estimated cost of \$50,000, and they would need an emergency supply of 20,000 gallons daily. If a city or town must replace a municipal water supply that becomes contaminated, the costs are even higher; it would take an estimated out-of-pocket cost of \$2.5 million to complete geophysical, hydrological, and engineering studies, purchase land, drill a well, and build the necessary surrounding infrastructure.

-Nelson Hoy, Cowpasture River Preservation Association

**TABLE 3: Ecosystem Services Included in Valuation**

<b>Provisioning Services<sup>a</sup></b>
<p><b>Food Production:</b> The harvest of agricultural produce, including crops, livestock, and livestock by-products; the food value of hunting, fishing, etc.; and the value of wild-caught and aquaculture-produced fish.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Forest</p>
<p><b>Raw Materials:</b> Fuel, fiber, fertilizer, minerals, and energy.</p> <p><b>Associated land uses<sup>b</sup>:</b> Forest</p>
<p><b>Water Supply:</b> Filtering, retention, storage, and delivery of fresh water—both quality and quantity—for drinking, irrigation, industrial processes, hydroelectric generation, and other uses.</p> <p><b>Associated land uses<sup>b</sup>:</b> Forest, Water, Wetland</p>
<b>Regulating Services<sup>a</sup></b>
<p><b>Air Quality:</b> Removing impurities from the air to provide healthy, breathable air for people.</p> <p><b>Associated land uses<sup>b</sup>:</b> Shrub/Scrub, Forest, Urban Open Space</p>
<p><b>Biological Control:</b> Inter- and intra-specific interactions resulting in reduced abundance of species that are pests, vectors of disease, or invasive in a particular ecosystem.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture, Grassland, Forest</p>
<p><b>Climate Regulation:</b> Storing atmospheric carbon in biomass and soil as an aid to the mitigation of climate change, and/or keeping regional/local climate (temperature, humidity, rainfall, etc.) within comfortable ranges.</p> <p><b>Associated land uses<sup>b</sup>:</b> Pasture/Forage, Grassland, Shrub/Scrub, Forest, Wetland, Urban Open Space, Urban Other</p>
<p><b>Erosion Control:</b> Retaining arable land, stabilizing slopes, shorelines, riverbanks, etc.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Shrub/Scrub, Forest</p>
<p><b>Pollination:</b> Contribution of insects, birds, bats, and other organisms to pollen transport resulting in the production of fruit and seeds. May also include seed and fruit dispersal.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Forest</p>
<p><b>Protection from Extreme Events:</b> Preventing and mitigating impacts on human life, health, and property by attenuating the force of winds, extreme weather events, floods, etc.</p> <p><b>Associated land uses<sup>b</sup>:</b> Forests, Urban Open Space, Wetland</p>
<p><b>Soil Fertility:</b> Creation of soil, inducing changes in depth, structure, and fertility, including through nutrient cycling.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Forest</p>
<p><b>Waste Treatment:</b> Improving soil and water quality through the breakdown and/or immobilization of pollution.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Shrub/Scrub, Forest, Water, Wetland</p>
<p><b>Water Flows:</b> Regulation by land cover of the timing of runoff and river discharge, resulting in less severe drought, flooding, and other consequences of too much or too little water available at the wrong time or place.</p> <p><b>Associated land uses<sup>b</sup>:</b> Forests, Urban Open Space, Urban Other</p>
<b>Cultural Services<sup>a</sup></b>
<p><b>Aesthetic Value:</b> The role that beautiful, healthy natural areas play in attracting people to live, work, and recreate in a region.</p> <p><b>Associated land uses<sup>b</sup>:</b> Forest, Pasture/Forage, Urban Open Space, Wetland</p>
<p><b>Recreation:</b> The availability of a variety of safe and pleasant landscapes—such as clean water and healthy shorelines—that encourage ecotourism, outdoor sports, fishing, wildlife watching, etc.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Forest, Water, Wetland, Urban Open Space, Urban Other</p>

Notes:

- a. Descriptions follow Balmford (2010, 2013), Costanza et al. (1997), Reid et al. (2005), and Van der Ploeg, et al. (2010).
- b. “Associated Land Uses” are limited to those for which per-unit-area values are available in this study.

occupied by a different set of ecosystem (land cover) types than were present before construction. By applying per-acre ecosystem service productivity estimates (denominated in dollars) to the various arrays of ecosystem service types, we can estimate ecosystem service value before, during, and after construction. The difference between ecosystem service value during construction and before construction is the cost during construction. The difference between the ecosystem service value during ongoing operations (i.e., the value produced in the ROW) and the before-construction baseline is the annual ecosystem service cost that will be experienced indefinitely.

This overall process is illustrated in Figure 4 and the details of our methods, assumptions, and calculations are described in the following two sub sections.

## **Ecosystem Service Estimation Methods**

Economists have developed widely used methods to estimate the dollar value of ecosystem services and/or natural capital. The most widely known example was a study by Costanza et al. (1997) that valued the natural capital of the entire world. That paper and many others since employ the “benefit transfer method” or “BTM” to establish a value for the ecosystem services produced or harbored from a particular place.<sup>13</sup> According to the Organization for Economic Cooperation and Development, BTM is “the bedrock of practical policy analysis,” particularly in cases such as this when collecting new primary data is not feasible (OECD, 2006).

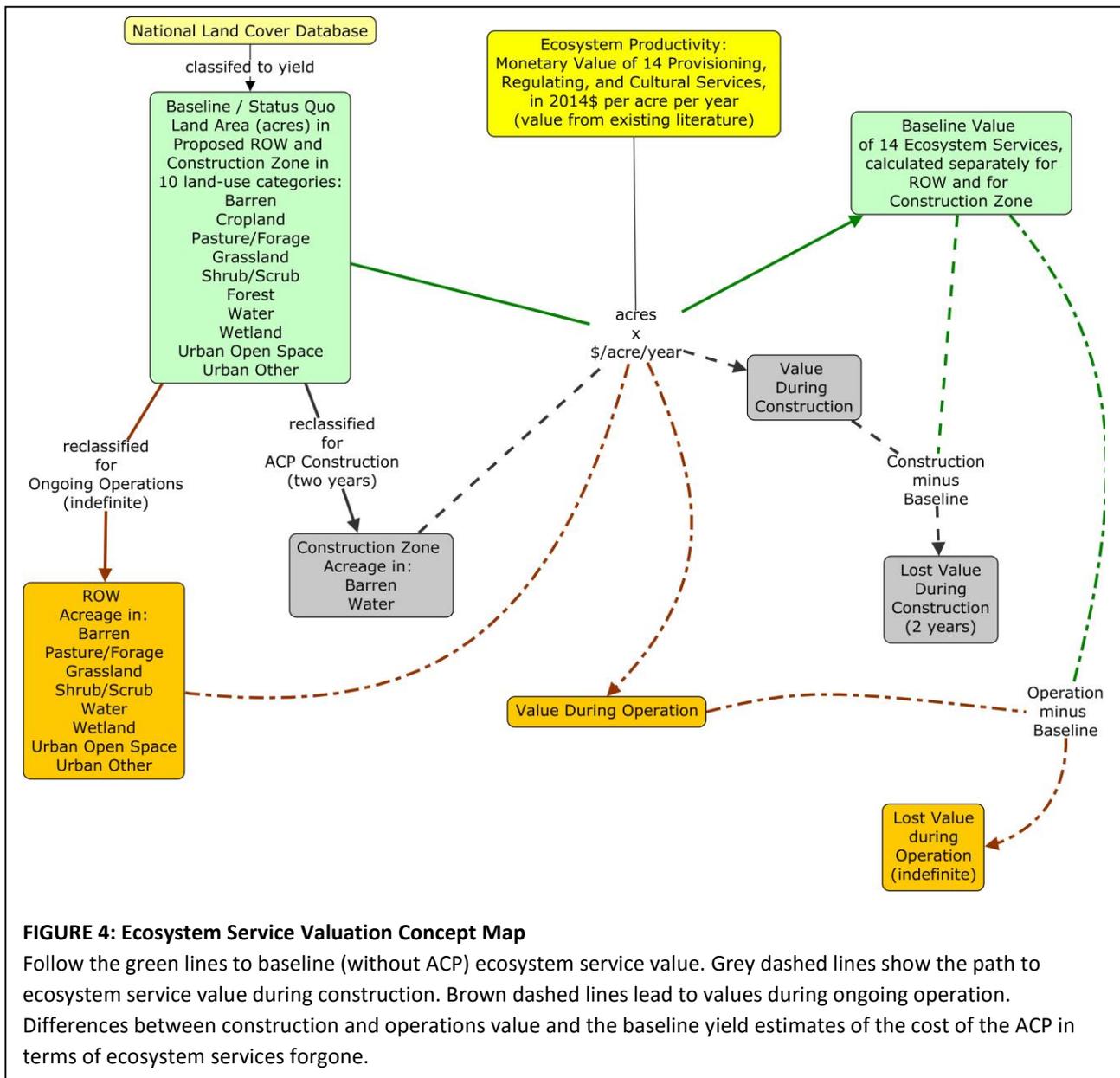
As the name implies, BTM takes a rate of ecosystem benefit delivery calculated for one or more “source areas” and applies that rate to conditions in the “study area.” As Batker et al. (2010) state, the method is very much like a real estate appraiser using comparable properties to estimate the market value of the subject property. It is also very much like using an existing or established market or regulated price, such as the price of a gallon of water, to estimate the value of some number of gallons of water supplied in some period of time. The key is to select “comps” (data from source areas) that match the circumstances of the study area as closely as possible.

Typically, values are drawn from previous studies that estimate the value of various ecosystem services from similar land cover or ecosystem types. Also, it is benefit (in dollars) per-unit-area-per-year in the source area that is transferred and applied to the number of hectares or acres in the same land cover/biome in the study area. So, for example, if data for the source area includes the value of forest land for recreation, one would apply per-acre values from the source area’s forest to the number of acres of forestland in the study area. Furthermore, it is important to use source studies that are from regions with underlying economic, social, and other conditions similar to the study area.

Following these principles as well as techniques developed by Esposito et al. (2011), Esposito (2009), and Phillips and McGee (2014, 2016), and as illustrated in Figure 4, we employ a four-step process to evaluate the short-term and long-term effects of the ACP on ecosystem service value in our study region. The steps are described in greater detail below, but in summary, they are:

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<sup>13</sup> See also Esposito et al. (2011), Flores et al. (2013), and Phillips and McGee (2014) for more recent examples.



**FIGURE 4: Ecosystem Service Valuation Concept Map**

Follow the green lines to baseline (without ACP) ecosystem service value. Grey dashed lines show the path to ecosystem service value during construction. Brown dashed lines lead to values during ongoing operation. Differences between construction and operations value and the baseline yield estimates of the cost of the ACP in terms of ecosystem services forgone.

1. Assign land and water in the study to one of 10 land uses based on remotely sensed (satellite) data in the National Land Cover Dataset (NLCD) (Fry et al., 2011). This provides the array of land uses for estimating baseline or “without ACP” ecosystem service value.
2. RE-assign or re-classify land and water to what the land cover would most likely be during construction and during ongoing operation.
3. Multiply acreage by per-acre ecosystem service productivity (the “comps”) to obtain estimates of aggregate ecosystem service value under the baseline/no ACP scenario, for the construction corridor (and period), and for the ROW during ongoing operation.

For simplicity and given the two-year construction period, we assume that the construction

corridor will remain barren for a full two-year period. We recognize that revegetation will begin to occur soon after the trench is closed and fill and soil are returned, but it will still be some time until something like a functioning ecosystem has actually been restored.

4. Subtract baseline ESV from ESV for the construction period (and in the construction corridor) and from ESV during ongoing operations (in the ROW) to obtain estimates of the ecosystem service costs imposed annually during the construction and operations period, respectively.

### **Step 1: Assign Land to Ecosystem Types or Land Uses**

The first step in the process is to determine the area in the 10 land use groups in the study region. This determination is made using remotely sensed data from the National Land Cover Database (NLCD) (Fry et al., 2011). Satellite data provides an image of land in one of up to 21 land cover types at the 30-meter level of resolution;<sup>14</sup> 15 of these land cover types are present in the study region (Table 4).

Looking forward to the final step, we will use land use categories to match per-acre ecosystem value estimates from source areas to the four-county study region. Unfortunately, there are not value estimates for all of the detailed land use categories present in the region. We therefore simplify the NLCD classification by combining a number of classifications into larger categories for which per-acre values are more available. Specifically, low-, medium-, and high-intensity development are grouped as “urban other,” and deciduous, evergreen, and mixed forest are grouped as “forest.”

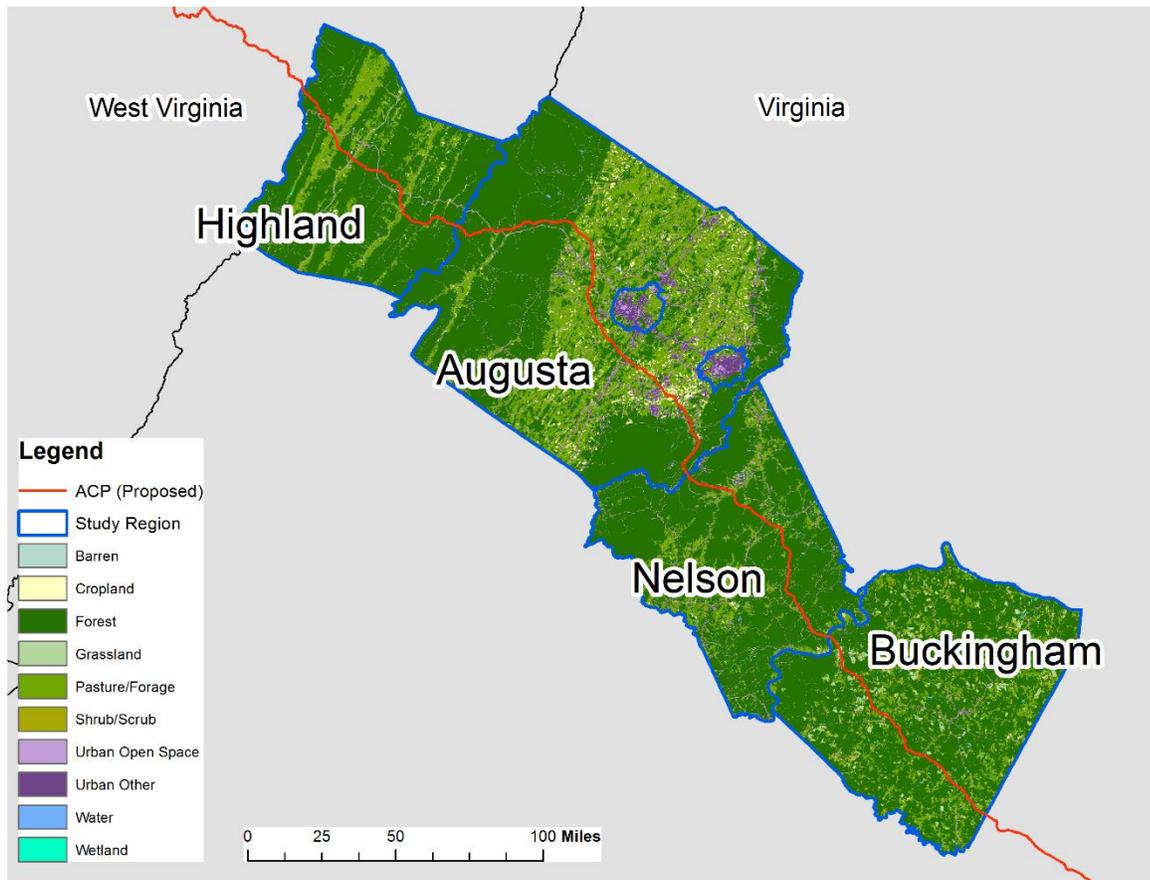
In addition, we add land in the NLCD category of “woody wetlands” to the “forest” category for two reasons. The first is that, left to their devices, such wetlands would normally become forest in the study region. Second, wetlands have some of the highest per-acre values for several ecosystem services. So, to avoid over-estimating the ecosystem services contribution of “woody wetlands,” we count them as “forest” instead of “wetland”.

In the end, at least for baseline conditions, we have land in 10 land uses. The total area that would be disturbed in the construction corridor through the study region is 1,900 acres,<sup>15</sup> and 1,140 acres would be occupied by the permanent right-of-way. Tables 5 and 6 show acreage in the land cover types across the four counties in the study region.

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<sup>14</sup> Because 30 meters is wider than the right-of-way and not much narrower than the 125-foot construction corridor, we resample the NLCD data to 10m pixels, which breaks each 30m-by-30m pixel into 9 10m-by-10m pixels. This allows for a closer approximation of the type and area of land cover in the proposed ROW and construction corridor.

<sup>15</sup> Note that these are minimum estimates of the land that would be taken during construction and for ongoing operations. Not counted in these totals are staging areas, temporary or permanent access roads, and the footprint of any infrastructure, such as the compressor station proposed to be sited in Buckingham County. Consequently (and in addition to other minimizing factors) the estimates of ecosystem service cost of the ACP will likely be much smaller than what would be experienced if the ACP were to be built and operated.



**FIGURE 5: Land Use in the Study Region, Classified for Ecosystem Service Valuation**

Land cover for the entire study region is shown to display the overall range and pattern of land use. The ecosystem service valuation itself covers only those portions of the study region that would be occupied by the ACP right-of-way and construction corridor.

Source: National Land Cover Database (Fry, et al. 2011).

**Step 2: Re-assign Acreage to New Land Cover Types for the Construction and Operation Periods**

Table 4 lists the reassignment assumptions in detail, but in general, we assume that all land in the construction corridor will be “barren” or at least possess the same ecosystem service productivity profile as naturally-occurring barren land for the duration of the construction period. Water will remain water during construction.

**TABLE 4: Land Cover Reclassification**

<b>NLCD Category</b>	<b>Reclassification for Baseline</b>	<b>Reclassification for Construction</b>	<b>Reclassification for Ongoing Operation</b>
<b>Barren Land</b>	Barren	Barren	Barren
<b>Cultivated Crops</b>	Cropland	Barren	Pasture/Forage
<b>Pasture/Hay</b>	Pasture/Forage	Barren	Pasture/Forage
<b>Grassland/Herbaceous</b>	Grassland	Barren	Grassland
<b>Shrub/Scrub</b>	Shrub/Scrub	Barren	Shrub/Scrub
<b>Deciduous Forest</b>	Forest	Barren	Shrub/Scrub
<b>Evergreen Forest</b>	Forest	Barren	Shrub/Scrub
<b>Mixed Forest</b>	Forest	Barren	Shrub/Scrub
<b>Woody Wetlands</b>	Forest	Barren	Shrub/Scrub
<b>Open Water</b>	Water	Water	Water
<b>Emergent Herbaceous Wetlands</b>	Wetland	Barren	Wetland
<b>Developed, Open Space</b>	Urban Open Space	Barren	Urban Open Space
<b>Developed, Low Intensity</b>	Urban Other	Barren	Urban Other
<b>Developed, Medium Intensity</b>	Urban Other	Barren	Urban Other
<b>Developed, High Intensity</b>	Urban Other	Barren	Urban Other

For the indefinite period following construction—during ongoing operations—we assume that pre-ACP forestland will become shrub/scrub, and cropland will become pasture/forage. We recognize that some pre-ACP cropland may be used for crops after construction has been completed, but as expressed in comments to FERC and elsewhere and as we discovered through personal interviews with agricultural producers in the region, it seems likely that the ability to manage acreage for row crops will be greatly curtailed, if not eliminated entirely by the physical limits imposed by the ACP and by restrictions in easements to be held by ACP LLC. These include limits on the weight of equipment that could cross the corridor at any given point and difficulty using best soil conservation practices, such as tilling along a contour, which may be perpendicular to the pipeline corridor. (This would require extra time and fuel use that could render some fields too expensive to till, plant, or harvest.) Reclassifying cropland as pasture/forage (which is generally less productive of ecosystem services) recognizes these effects while also recognizing that some sort of future agricultural production in the ROW (grazing and possibly haying) could be possible.

An additional effect not captured in our methods is long-standing harm to agricultural productivity due to soil compaction, soil temperature changes, and alteration of drainage patterns due to pipeline construction. As agronomist Richard Fitzgerald (2015) concludes, “It is my professional opinion that the productivity for row crops and alfalfa will never be regenerated to its existing present ‘healthy’ and productive condition [after installation of the pipeline].” Thus the true loss in food and other ecosystem service value from pasture/forage acreage would be larger than our estimates reflect.

TABLE 5: Acreage in Proposed Construction Corridor, by Land Cover and County, Baseline and in “With ACP” Scenario

Land Cover Classification	Highland		Augusta		Nelson		Buckingham	
	Baseline	w/ ACP						
Barren	0.0	386.0	0.3	708.1	-	395.9	12.6	409.0
Cropland	3.5	-	37.9	-	2.1	-	0.3	-
Pasture/Forage	76.4	-	249.0	-	35.2	-	52.4	-
Grassland	-	-	-	-	-	-	26.5	-
Shrub/Scrub	-	-	-	-	-	-	13.2	-
Forest	293.5	-	386.6	-	345.7	-	297.1	-
Water	0.2	0.2	-	-	0.8	0.8	0.4	0.4
Wetland	-	-	-	-	0.3	-	-	-
Urban Open Space	12.6	-	31.7	-	11.6	-	6.6	-
Urban Other	-	-	2.6	-	1.1	-	0.2	-
<b>Total</b>	<b>386.2</b>	<b>386.2</b>	<b>708.1</b>	<b>708.1</b>	<b>396.7</b>	<b>396.7</b>	<b>409.4</b>	<b>409.4</b>

TABLE 5: Continued

Land Cover Classification	Study Region	
	Baseline	w/ ACP
Barren	12.9	1,899.0
Cropland	43.8	-
Pasture/Forage	413.0	-
Grassland	26.5	-
Shrub/Scrub	13.2	-
Forest	1,322.9	-
Water	1.3	1.3
Wetland	0.3	-
Urban Open Space	62.5	-
Urban Other	3.8	-
<b>Total</b>	<b>1,900.3</b>	<b>1,900.3</b>

**TABLE 6: Acreage in Proposed Right-of-Way, by Land Cover and County, Baseline and in “with ACP” Scenario**

Land Cover Classification	Highland		Augusta		Nelson		Buckingham	
	Baseline	w/ ACP						
Barren	-	-	0.0	0.0	-	-	7.5	7.5
Cropland	2.0	-	23.2	-	1.2	-	0.2	-
Pasture/Forage	46.1	48.1	148.8	172.1	20.8	22.0	31.2	31.4
Grassland	-	-	-	-	-	-	16.3	16.3
Shrub/Scrub	-	176.4	-	233.0	-	207.6	7.7	185.9
Forest	176.4	-	233.0	-	207.6	-	178.2	-
Water	0.1	0.1	-	-	0.5	0.5	0.2	0.2
Wetland	-	-	-	-	0.2	0.2	-	-
Urban Open Space	7.7	7.7	18.4	18.4	6.8	6.8	4.1	4.1
Urban Other	-	-	1.5	1.5	0.6	0.6	0.1	0.1
<b>Total</b>	<b>232.3</b>	<b>232.3</b>	<b>425.0</b>	<b>425.0</b>	<b>237.8</b>	<b>237.8</b>	<b>245.5</b>	<b>245.5</b>

**TABLE 6: Continued**

Land Cover Classification	Study Region	
	Baseline	w/ ACP
Barren	7.6	7.6
Cropland	26.7	-
Pasture/Forage	246.9	273.6
Grassland	16.3	16.3
Shrub/Scrub	7.7	802.9
Forest	795.2	-
Water	0.8	0.8
Wetland	0.2	0.2
Urban Open Space	37.0	37.0
Urban Other	2.2	2.2
<b>Total</b>	<b>1,140.5</b>	<b>1,140.5</b>

**Step 3: Multiply Acreage by Per-Acre Value to Obtain ESV**

After obtaining acreage by land use in the construction corridor and the ROW, we are ready to multiply those acres times per-acre-per-year ecosystem service productivity to obtain total ecosystem service value in each area and for with- and without-pipeline scenarios. Per-acre ecosystem service values are obtained primarily from a database of more than 1,300 estimates compiled as part of a global study known as “The Economics of Ecosystems and Biodiversity” or “the TEEB” (Van der Ploeg et al., 2010).<sup>16</sup>

<sup>16</sup> Led by former Deutsche Bank economist, Pavan Sukhdev, the TEEB is designed to “[make] nature’s values visible” in order to “mainstream the values of biodiversity and ecosystem services into decision-making at all levels” (“TEEB - The Initiative,” n.d.). It is also an excellent example of the application of the benefit transfer method.

The TEEB database allows the user to select the most relevant per-unit-area values, based on the land use/land cover profile of the study region, comparison of general economic conditions in the source and study areas, and the general “fit” or appropriateness of the source study for use in the study area at hand. After eliminating estimates from lower-income countries and estimates from the U.S. that came from circumstances vastly different from central and western Virginia, we identified 91 per-acre estimates in the TEEB that adequately provide approximations of ecosystem service value in our study region.<sup>17</sup>

After selecting the best candidate studies and estimates in the TEEB database, we still had some key land use/ecosystem services values (such as food from cropland) without value estimates. To fill some of the most critical gaps, we turned to other studies that had examined ecosystem service value in this general region (Phillips, 2015a; Phillips & McGee, 2016) and to specific data on cropland and pasture/hayland value from Virginia Cooperative Extension and the National Agricultural Statistics Service (Lex & Groover, 2015).

For several land cover-ecosystem service combinations, either multiple source studies were available or the authors of those studies reported a range of dollar-per-acre ecosystem service values. We

## Ecosystem Service Effects 2: Food and Farmland

Cros-B-Crest Farm in Staunton was established in 1894 and is now recognized by the Commonwealth of Virginia as a “Century Farm.” Harry Crosby is the fourth generation to farm this land and has seen the damage that a utility corridor (last time it was a power line) can do to property values and quality of life. This time, Crosby says, the impacts would be even more profound.

The proposed ACP would affect the farm operations and the farm in several ways. First, the pipeline would run more or less directly down the natural slope of one of Cros-B-Crest’s best fields, while Mr. Crosby, to conserve soil and otherwise exercise good stewardship, farms the field along the natural contour. Interrupting the contour with the pipeline would lead to increased erosion. Due to restrictions on crossing the pipeline with larger farm equipment, the ACP would effectively take the entire field (30-40 acres in total) out of production.

Even if the field could still be used, Crosby expects that it would not return to its current high level of productivity any time soon. Digging up, trenching, filling, and attempting to put back the soil will, however carefully done, disrupt the soil profile, increase compaction and otherwise depress fertility that has taken nature and the Crosby family generations to build. (Crosby, 2015a, 2015b).

Beyond the impact on farm operations themselves, Crosby says, the ACP will reduce the enjoyment the family receives from owning and living on the property (Crosby, 2015b). The family might not realize the financial loss unless or until it sells the farm, but it will experience the loss of well-being every day.

<sup>17</sup> Among those U.S. studies included in the TEEB database that we deemed inappropriate for use here were a study from Cambridge Massachusetts that reported extraordinarily high values for aesthetic and recreational value and the lead author’s own research on the Tongass and Chugach National Forests in Alaska. (The latter was excluded due to the vast differences in land use, land tenure, climate, and other factors between the source area and the current study region.)

are therefore able to report both a low and a high estimate based on the bottom and top end of the range of available estimates.

In the end, we have 162 separate estimates from 60 unique source studies covering 67 combinations of land uses and ecosystem services. (See Appendix A to this report for a full list of the values and sources that yielded these estimates.) This is still fairly sparse coverage, given that there are 140 possible combinations of the 10 land uses and 14 services. We therefore know that our aggregate estimates will be lower than they would be if dollar-per-acre values for all 14 services were available to transfer to each of the 10 land use categories in the study region. One can either live with that known underestimation, or one can assign per-acre values from a study of one land-use-and-service combination to other combinations. Doing so would introduce unknown over- or perhaps under-estimation of aggregate values. We prefer to take the first course, knowing that our estimates are low/conservative and urge readers to bear this in mind when interpreting this information for use in weighing the costs of the proposed ACP.

With acreage and per-acre ecosystem service values in hand, we can now calculate ecosystem service value for each of the four area/scenario combinations. To repeat, these are:

- Baseline ecosystem service value in the proposed construction corridor
- Ecosystem service value in the construction corridor during construction
- Baseline ecosystem service value in the proposed right-of-way
- Ecosystem service value in the right-of-way during the (indefinite) period of ongoing operations.<sup>18</sup>

Value calculations are accomplished according to this formula

$$ESV = \sum_{i,j} [(Acres_j) \times (\$/acre/year)_{i,j}]$$

Where:

$Acres_j$  is the number of acres in land use (j)  
 $(\$/acre/year)_{i,j}$  is the dollar value of each ecosystem service (i) provided from each land use (j) each year. These values are drawn from the TEEB database and other sources listed in Appendix A.

#### **Step 4: Subtract Baseline ESV from ESV in “with ACP” Scenario**

With the steps above complete, we can now estimate the cost in ecosystem service value of moving from the baseline or status quo to a scenario in which the ACP is built and operating.

The cost of construction is the ESV from the construction corridor during construction, minus baseline ESV for the construction corridor, times two. The multiplication by two is due to the conservative

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<sup>18</sup> Note that while the ROW and construction corridors overlap in space, they do not overlap in time, at least not from an ecosystem services production standpoint. During construction, the land cover that would eventually characterize the ROW will not exist in the construction corridor. Thus, there is no double counting of ecosystem service values or of costs from their diminution as a result of either construction or ongoing operations.

assumption that revegetation and restoration to a land use that is functionally different from barren land will take at least two years.

The ecosystem service cost of ongoing operations is ESV from the ROW in the “with ACP” scenario minus the baseline ESV for the ROW. This will be an annual cost borne every year in perpetuity.

### Ecosystem Service Value Estimates

In the baseline or “no pipeline” scenario, the construction corridor and land slated for temporary roads and workspaces produces between \$11.4 and \$41.1 million per year in ecosystem service value (ESV). The largest contributors to this total (at the high end) are aesthetic value, water supply, and protection from extreme events. Under a “with MVP” scenario, and not surprisingly given the temporary conversion to bare/barren land, these figures drop to near zero, or between \$451 and \$3,552 per year for each of the two years. Taking the difference as described above, estimated per-year ecosystem service cost of the ACP’s construction would be between \$11.4 and \$41.1 million, or between \$22.8 and \$82.2 million over two years in the eight-county study region.

Loss of aesthetic value and impacts on water (both supply and regulation of flow) represent the largest losses during the construction phase (Table 7).

**TABLE 7: Ecosystem Service Value Lost to the Construction Corridor and Temporary Roads and Workspaces in Each of Two Years, Relative to Baseline, by Ecosystem Service (2014\$)**

Ecosystem Service	Study Region			
	Baseline (low)	Loss (low)	Baseline (high)	Loss (high)
<b>Aesthetic Value</b>	8,046,503	(8,046,503)	32,491,871	(32,491,871)
<b>Air quality</b>	666,647	(666,647)	680,270	(680,270)
<b>Biological Control</b>	12,524	(12,524)	30,044	(30,044)
<b>Climate Regulation</b>	209,199	(209,199)	228,236	(228,236)
<b>Erosion Control</b>	15,104	(15,104)	146,466	(146,466)
<b>Protection from Extreme Events</b>	1,447,945	(1,447,945)	1,482,118	(1,482,118)
<b>Food Production</b>	10,929	(10,929)	10,929	(10,929)
<b>Pollination</b>	369,769	(369,769)	433,706	(433,706)
<b>Raw materials</b>	43,763	(43,763)	297,240	(297,240)
<b>Recreation</b>	64,090	(63,722)	967,718	(965,459)
<b>Soil formation</b>	12,837	(12,837)	41,061	(41,061)
<b>Waste Treatment</b>	22,692	(22,666)	527,395	(527,369)
<b>Water Supply</b>	84,501	(84,444)	2,306,613	(2,305,346)
<b>Water flows</b>	417,057	(417,057)	1,444,340	(1,444,340)
<b>Total</b>	<b>11,423,559</b>	<b>(11,423,108)</b>	<b>41,088,007</b>	<b>(41,084,455)</b>

The ecosystem service costs for the ROW are predictably smaller on a per-year basis, but because they will persist indefinitely the cumulative effect will be much higher. Under the “with MVP” scenario, and using minimum values, annual ecosystem service value from the ROW falls from \$4.2 million to about \$159,000 for an annual loss of over \$4.1 million. At the high end, the ecosystem service value of the ROW would fall from \$15.3million to about \$435,000 for an annual loss of \$14.8 million (Table 8).

Most of this loss is due to the conversion of forestland to shrub/scrub. Shrub/scrub naturally increases its share of overall ecosystem service value in the “with pipeline” scenario. Those gains are dwarfed, however, by the loss of much more productive forests. Similarly, the value of cropland falls due to its assumed transition to pasture/forage. While there is some gain in the pasture/forage category, there is a net loss of ecosystem service value from the two agricultural land uses of between \$1,700 and \$28,600 per year.<sup>19</sup>

**TABLE 8: Ecosystem Service Value Lost Each Year Post Construction in Right-Of-Way, Relative to Baseline, by Ecosystem Service (2014\$)**

Ecosystem Service	Study Region			
	Baseline (low)	Loss (low)	Baseline (high)	Loss (high)
<b>Aesthetic Value</b>	2,985,838	(2,945,731)	12,089,964	(12,040,073)
<b>Air quality</b>	248,102	(222,539)	251,931	(222,539)
<b>Biological Control</b>	4,062	(1,673)	10,554	(8,166)
<b>Climate Regulation</b>	68,141	(32,887)	75,238	(39,900)
<b>Erosion Control</b>	4,926	12,931	51,847	(26,014)
<b>Protection from Extreme Events</b>	536,977	(529,386)	547,721	(529,386)
<b>Food Production</b>	3,308	(1,043)	3,308	(1,043)
<b>Pollination</b>	137,114	(133,628)	160,576	(153,309)
<b>Raw materials</b>	16,306	(16,278)	110,739	(110,711)
<b>Recreation</b>	18,729	1,738	355,391	(332,073)
<b>Soil formation</b>	4,641	(4,083)	15,136	(14,579)
<b>Waste Treatment</b>	8,197	(7,182)	194,147	37,326
<b>Water Supply</b>	31,478	(31,450)	859,334	(857,620)
<b>Water flows</b>	155,301	(152,619)	536,635	(529,356)
<b>Total</b>	4,223,118	(4,063,831)	15,262,520	(14,827,442)

Finally, the establishment of permanent access roads and other surface installations will entail the conversion of land from various uses to what, from an ecosystem services perspective, will function as barren land. These areas amount to a total of only 76 acres across the study region, so the effect on ecosystem service values are correspondingly small, at least when compared to the impact of the construction zone and ROW. As with the ROW, however, these effect occur year after year for as long as the MVP would exist. The annual loss of ecosystem service value from these areas under a “with MVP” scenario would range from \$350,000 and \$1.3 million

It bears repeating that the benefit transfer method applied here is useful for producing first-approximation estimates of ecosystem service impacts. For several reasons, we believe that this

<sup>19</sup> Note that due to differences in the range of dollars-per-acre estimates available for the various combinations of land use and ecosystem service, there are some instances where an apparent gain at the low end turns into a loss at the high end. For example, and based on the estimates available from the literature, the minimum value for erosion control from shrub/scrub acres is higher than the minimum for forests. Because we assume that forests return to shrub/scrub after the pipeline is in operation, this translates into a net increase in erosion regulation. At the high end, however, available estimates show a higher erosion control value for forests than for shrub/scrub. Thus the high estimate shows a net loss of erosion control benefits. It is important, therefore, to keep in mind that these estimates are sensitive to the availability of underlying per-acre estimates.

approximation of the effect of the ACP's construction and operation on ecosystem service values is too low rather than too high. These reasons include:

- The estimates include only the loss of value that would otherwise emanate from the ROW and construction corridors themselves.
- The estimates do not account for the extent to which the construction and long-term presence of the ACP could damage the ecosystem service productivity of adjacent land. During construction, the construction corridor itself could be a source of air and water pollution that may compromise the ability of surrounding or downstream areas to deliver ecosystem service value of their own. For example, if sediment from the construction zone in Nelson County were to reach the Rockfish River or its tributaries, those surface waters will lose some of their ability to provide clean water, food (fish), recreation, and other services. This reduced productivity may persist well after construction is complete.<sup>20</sup>

Over the long term, the right-of-way would serve as a pathway by which invasive species or wildfire could more quickly penetrate areas of interior forest habitat, thereby reducing the natural productivity of those areas.

- Finally, these estimates reflect only those changes in natural benefits that occur due to changes in conditions on the surface of the land. Particularly because the proposed pipeline would traverse areas of karst topography there is well-founded concern that subsurface hydrology could be affected during construction and throughout the lifetime of the pipeline (Jones, 2015; Pyles, 2015). Blasting and other activities during construction could alter existing underground waterways and disrupt water supply. There is also a risk that sediment and other contaminants could reach groundwater supplies if sinkholes form near the pipeline during construction or afterwards. For example, in Nelson County, where steep slopes with shallow soils over bedrock is common (Nelson County Planning Commission, 2002), there is concern that erosion and landslides during and after pipeline construction will harm water quality. These scenarios would entail further loss of ecosystem service value and, for the homeowners or municipalities affected, major expenditures. Officials in Augusta County estimate it would cost at least \$2.1 million to establish a new municipal well, for example (Hoover, 2015).

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<sup>20</sup> This is not a small risk. As noted by the Dominion Pipeline Monitoring Coalition “pipeline construction over steep Appalachian mountains creates significant runoff and slope-failure problems” (Webb, 2015b). In one example, multiple problems during and after construction of a relatively small pipeline on Peters Mountain in Giles County caused extensive erosion and damage to waterways (Webb, 2015a). The coalition points out that “the potential for water resource problems will be greatly multiplied for the proposed larger projects [like the ACP], both in terms of severity and geographic extent.”

## Buckingham County Compressor Station

One way the ACP impacts air quality is by converting forests, which remove normal levels of impurities from the air, to other land uses. There is also concern for impacts that would occur due to the dumping of excess impurities into the air in the first place. While there is some chance of leaks occurring at any place along the proposed route, leaks and major releases of gas and other substances (lubricants, etc.) at the 40,645 horsepower (hp) compressor station proposed for the Union Hill section of Buckingham County would certainly occur.

The negative effects of the compressor station would include noise and air pollution from everyday operations plus periodic “blowdowns,” or venting of gas in the system to reduce pressure. As a recent study by the New York Department of Environmental Conservation indicates, pollution around compressor stations is common and severe. The five-state study found that “more than 40% of the air samples from compressor stations exceeded federal regulations for certain chemicals like methane, benzene, and hydrogen sulfide” (Lucas, “Officials To NYS: Take A Second Look At Pipelines.”). The study also found high rates of illnesses such as nosebleeds and respiratory difficulties among people living near the stations.

While more definitive epidemiological studies are needed to determine the extent to which natural gas compressor stations *add to* background rates of various illnesses, these stations are implicated as contributing to a long list of maladies. According to Subra (2015), individuals living within 2 miles of compressor stations and metering stations experience respiratory impacts (71% of residents), sinus problems (58%), throat irritation (55%), eye irritation (52%), nasal irritation (48%), breathing difficulties (42%), vision impairment (42%), sleep disturbances (39%), and severe headaches (39%). In addition, some 90% of individuals living within 2 miles of these facilities also reported experiencing odor events (Southwest Pennsylvania Environmental Health Project 2015). Odors associated with compressor stations include sulfur smell, odorized natural gas, ozone, and burnt butter. (Subra, 2009). Finally, compressors emit constant low-frequency noise, which can cause negative physical and mental health effects (Lockett, Buppert, & Margolis, 2015).

In Buckingham, 471 people live within 2 miles of the proposed compressor station (US Census Bureau, 2015). This would mean 424 people experiencing odor events, 334 people experiencing respiratory impacts, 273 people experiencing sinus problems, and 184 people experiencing sleep disturbances and/or severe headaches.

In addition to the health impacts discussed above, this pollution can cause damage to agriculture and infrastructure. One study found that shale gas air pollution damages in Pennsylvania already amount to between \$7.2 and \$30 million, with compressor stations responsible for 60-75% of this total (Walker & Koplinka-Loehr, 2014). Using the low estimate of 60% that is between \$4.32 and \$18 million in damages associated with compressor stations.

Yogaville, an ashram, teaching, and retreat center located approximately 5 miles from the proposed compressor station, is especially concerned about these impacts on its 10,000 annual visitors and on the peace, tranquility, and air quality available at its iconic Mount Kailash and Lotus Shrine. Officials there worry that the air and noise pollution may entirely destroy the Shrine’s ability to serve as a place of silent prayer, meditation, and healing (Yogaville, 2015).

The selection of Union Hill for the compressor station also raises environmental justice questions that FERC and others must consider as part of their review (Lockett, Buppert, & Margolis, 2015; Executive Order 12898).

## **Buckingham County Compressor Station, Continued.**

In addition to the direct effects on nearby residents' health and quality-of-life, compressor stations have caused some homes to lose value and some homeowners to move away rather than endure the noise, smells, and illnesses they have experienced. In one case from Minisink, New York, a family of six moved to escape the effects of a 12,600 hp compressor station operated by Millennium Pipeline LLC. After two years of headaches, eye irritation, and lethargy among the children and even lost vigor in their fruit trees, the couple, unable to find a buyer for their home, moved away, leaving their \$250,000 investment in the property on the table with their bank holding the balance of the mortgage (Cohen 2015).

In Hancock, another New York town with a slightly larger (15,000 hp) compressor station, three homeowners have had their property assessments reduced, two by 25% and one by 50%, due to the impact of truck traffic, noise, odors, and poor air quality associated with the compressor station ("Proximity of Compressor Station Devalues Homes by as Much as 50%" 2015). The larger of these reductions was for a home very close to the station and reflected physical damage that led to an increase in radon concentrations above safe levels. The two properties devalued by 25% were approximately one half mile away (Ferguson, Bruce, Personal Communication, 12/31/2015).

As of this writing, there have not been statistical studies of the relationship between a property's value and its proximity to a compressor station. The mounting anecdotal information does suggest that there is a negative relationship, however, and that depending on the particular circumstances, the effect can be large—up to the 100% loss sustained by the family in Minisink (less whatever the bank can recover at auction). With the caveat that the effect on property value of the compressor station in Buckingham County may be different in scope and intensity, we do include such effects among the total estimated cost of the pipeline in the study region.

For our estimates, we follow the example of the Hancock New York case and assume that properties within one half mile of the Buckingham compressor station would lose 25% of their value if the station is built. We believe this assumption provides a conservative estimate in part because the Buckingham compressor station would be nearly three times the size. It is therefore likely that its noise, odor events, and other physical effects would be experienced at a greater distance and/or with greater intensity than in the New York case. The resulting loss of value would affect Buckingham landowners over a wider area and, possibly, the percentage reduction would be greater at any given distance.

Beyond health and safety concerns, compressor stations might also affect property values due to a "stigma of industrialization" similar to that found for high-voltage lines, according to real estate expert Kurt Kielisch of the Forensic Appraisal Group (Personal Communication 1/6/2016). It is reasonable to assume that such an effect would occur if a portion of Buckingham County's landscape of working forests, farms, and small villages were turned into a compressor station.

## EFFECTS ON PROPERTY VALUE

### Land Price Effects

To say that the impacts and potential impacts of the ACP on private property value is important to people along its proposed route would be an extreme understatement. Some 521 comment letters submitted by study region residents to FERC during the scoping period mentioned property value (Docket (PF15-6)). Of these, 517, or 99.2%, expressed a belief that the pipeline would have a negative effect on that value. Those reductions are not merely hypothetical. Landowners and Realtors along the proposed route of the Atlantic Coast Pipeline report that buyers have backed out of contracts and that other buyers are simply less interested in potentially affected properties (Davenport, 2015; Hotz, 2015; R. Smith, 2015a).<sup>21</sup> In the words of one Realtor, “every single one of my buyer clients who are looking to buy property in Augusta County have told me that they do not want to even look at properties that are located ON or NEAR the proposed locations of the ACP” (Adler, 2015). While it is impossible to know how large an effect the specter of the ACP, including the compressor station in Buckingham County, has already had on land prices, there is strong evidence from other regions that the effect would be negative.

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*“Buyers are concerned about safety, views, and resale values. The permanent easement that it will create will devalue every property in its path.”*

*– Daniel Hotz, Realtor  
McDowell, Virginia*

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In a systematic review, Kielisch (2015) presents evidence from surveys of Realtors, home buyers, and appraisers demonstrating that natural gas pipelines negatively affect property values for a number of reasons. Among his key findings relevant to the ACP:

- 68% of Realtors believe the presence of a pipeline would decrease residential property value.
- Of these Realtors, 56% believe the decrease in value would be between 5% and 10%. (Kielisch does not report the magnitude of the price decrease expected by the other 44%.)
- 70% of Realtors believe a pipeline would cause an increase in the time it takes to sell a home. This is not merely an inconvenience, but a true economic and financial cost to the seller.
- More than three quarters of the Realtors view pipelines as a safety risk.
- In a survey of buyers presented with the prospect of buying an otherwise desirable home with a 36-inch diameter gas transmission line on the property, 62.2% stated that they would no longer buy the property at any price. Of the remainder, half (18.9%) stated that they would still buy the property, but only at a price 21%, on average, below what would otherwise be the market price. The other 18.9% said the pipeline would have no effect on the price they would offer.

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<sup>21</sup> FERC’s docket for the pre-filing phase of the Atlantic Coast Pipeline (PF15-6) is rife with testimony from landowners concerned that their property will be or already has been negatively affected by the mere possibility of the pipeline’s construction.

Not incidentally, the survey participants were informed that the risks of “accidental explosions, terrorist threats, tampering, and the inability to detect leaks” were “extremely rare” (2015, p. 7).

If one considers just those buyers who are still willing to purchase the property, the expected loss in market value would be 10.5%.<sup>22</sup> This loss in value provides the mid-level impact in our estimates. A much greater loss (and higher estimates) would occur if one takes into account the fact that 62% of buyers are effectively reducing their offer prices by 100%, making the average reduction in offer price for all potential buyers 66.2%.<sup>23</sup> In our estimates, however, we have used the smaller effect (-10.5%) based on the assumption that sellers will eventually find one of the buyers still willing to buy the pipeline-easement-encumbered property.

- Based on five “impact studies” in which appraisals of smaller properties with and without pipelines were compared, “the average impact [on value] due to the presence of a gas transmission pipeline is -11.6%” (Kielisch, 2015, p. 11). The average rises to a range of -12% to -14% if larger parcels are considered, possibly due to the loss of subdivision capability.

These findings are consistent with economic theory about the behavior of generally risk-averse people. While would-be landowners who are informed about pipeline risks and nevertheless decide to buy property near the proposed ACP corridor could be said to be “coming to the nuisance,” one would expect them to offer less for such a property than they would offer for a property with no known risks.

Kielisch’s findings demonstrate that properties on natural gas pipeline rights of way suffer a loss in property value. Boxall, Chan, and McMillan (2005), meanwhile, show that pipelines also decrease the value of properties lying at greater distances. In their study of property values near oil and gas wells, pipelines, and other infrastructure, the authors found that

### **Diminished Property Value, Lost Revenue, Higher Costs: Mt. Rush Farm**

Mt. Rush Farm located in Buckingham County is a 1,000-acre family farm that has been operated by the Leech family for over 100 years. About half the farm is in managed forests, with the remainder in Angus cattle and crop production. It is one of the largest remaining active farms in the county. The farm typically employs 3 full-time workers, and 4 families live on the property.

The pipeline will bisect the property mainly through the un-wooded portion, which is in daily use. The pipeline will be directly in the way of bringing the cattle in from pasture, a monthly activity. To simply feed their cattle the Leech family would need to cross the pipeline twice daily with heavy equipment. With restrictions on where they could cross the pipeline, these trips would be more time consuming and costly, creating a serious burden on the farm.

“We do not make a lot of money; margins are tight. The pipeline could make it so that we cannot continue farming.” If farming is no longer viable, the family worries that the pipeline will also hurt its value for other uses such as housing.

-Irene Ellis Leech, Owner of  
Mt Rush Farm

<sup>22</sup> Half of the buyers would offer 21% less, and the other half would offer 0% less; therefore the expected loss is  $0.5(-21\%) + 0.5(0\%) = -10.5\%$ .

<sup>23</sup> This is the expected value calculated as  $0.622*(-100\%)+0.189*(-21\%)+0.189*(0\%)$ .

properties within the “emergency plan response zone” of sour gas<sup>24</sup> wells and natural gas pipelines faced an average loss in value of 3.8%, other things being equal.

The risks posed by the ACP would be different – it would not be carrying sour gas, for example—but there are similarities between the ACP scenario and the situation in the study that makes their finding particularly relevant. Namely, the emergency plan response zones (EPZs) are defined by the health and safety risks posed by the gas operations and infrastructure. Also, in contrast to ACP-cited studies showing no price effects (see below), the Boxall study examines prices of properties for which landowners must inform prospective buyers when one or more EPZs intersect the property.

The ACP has both a high consequence area (HCA) and an evacuation zone radiating from both sides of the pipeline that are defined by health and safety risks. Whether disclosed or not by sellers, prospective buyers are likely to become informed regarding location of the property relative to the ACP’s HCA and evacuation zones or, at a minimum, regarding the presence of the ACP in the study region.

As described in the box above, the compressor station proposed for the Union Hill section of Buckingham County would likely cause its own more severe reduction in the value of nearby properties. We apply the percentage reduction awarded in the Hancock, New York case (25%) to properties that are (as the properties were in that case) within one half mile of the proposed compressor station.

While there remains a paucity of statistical analysis on the effects of high-pressure natural gas transmission lines on property value, there have been many analyses demonstrating the opposite analog—namely, that amenities such as scenic vistas, access to recreational resources, proximity to protected areas, cleaner water, and others convey positive value to real property.<sup>25</sup> There are also studies demonstrating a negative impact on land value of various other types of nuisance that impose noise, light, air, and water pollution, life safety risks, and lesser human health risks on nearby residents (Bixuan Sun, 2013; Bolton & Sick, 1999; Boxall et al., 2005). The bottom line is that people derive greater value from, and are willing to pay more for, properties that are closer to positive amenities and farther from negative influences, including health and safety risks.

### **Claims that Pipelines have no effect on property value may be invalid.**

Both FERC and ACP LLC have cited several studies purporting to show that natural gas pipelines (and in one case a liquid petroleum pipeline) have at most an ambiguous and non-permanent effect on property values. In its Final EIS regarding the Constitution Pipeline, for example, FERC cited two articles concluding, in brief, that effects on property value from the presence of a pipeline can be either positive or negative, and that decreases in values due to a pipeline explosion fade over time (Diskin, Friedman, Peppas, & Peppas, 2011; Hansen, Benson, & Hagen, 2006). In its filing, ACP LLC cites additional studies drawing similar conclusions based on comparison of market and/or assessed prices paid for properties “on” or “near” a pipeline versus those farther away (Allen, Williford & Seale Inc., 2001; Fruits, 2008; Natural Resource Group, 2015b; Palmer, 2008).

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<sup>24</sup> “Sour” gas contains high concentrations of hydrogen sulfide and poses an acute risk to human health.

<sup>25</sup> Phillips (2004) is one such study that includes an extensive review of the literature on the topic.

While the studies differ in methods, they are similar in that each fails to take into account two factors that may void their conclusions entirely. The first is that the studies do not consider that the property value data used do not represent prices arising from transactions in which all buyers have full information about the subject properties. The second is that, for the most part, the definition of nearness to the pipelines may be inappropriate or inadequate for discerning actual effects on property value of that nearness.

Economic theory holds that for an observed market price to be considered an accurate gauge of the value of a good, all parties to the transaction must have full information about the good. If, on the other hand, buyers lack important information about a good, in this case whether a property is near a potential hazard, they cannot bring their health and safety concerns—their risk aversion—to bear on their decision about how much to offer for the property. As a result, buyers' offer prices will be higher than they would be if they had full information.

As Albright (2011) notes in response to the article by Disken, Friedman, Peppas, & Peppas (2011):

The use of the paired-sales analysis makes the assumption of a knowing purchaser, but I believe this analysis is not meaningful unless it can be determined that the purchaser had true, accurate and appropriate information concerning the nature and impact of the gas pipeline on, near or across their property. ... I believe that the authors' failure to confirm that the purchasers in any of the paired sales transactions had full and complete knowledge of the details concerning the gas transmission line totally undercut the authors' work product and the conclusions set forth in the article. (p.5)

Of the remaining studies, only Palmer (2008) gives any indication that any buyers were aware of the presence of a pipeline on or near the subject properties. For Palmer's conclusion that the pipeline has no effect on property value to be valid, however, it must be true that **all** buyers have full information, and this was not the case.

The study by Hansen, Benson, and Hagen (2006) actually reinforces the conclusion that when buyers know about a nearby pipeline, market prices drop. The authors found that property values fell after a deadly 1999 liquid petroleum pipeline explosion in Bellingham, Washington. They also found that the negative effect on prices diminished over time. This makes perfect sense if, as is likely, information about the explosion dissipated once the explosion and its aftermath left the evening news and the physical damage from the explosion had been repaired.

We do not think it is appropriate to conclude from this study (as FERC did in the case of the Constitution Pipeline) that natural gas transmission pipelines would have no effect on land prices in today's market. In contrast to Bellingham homebuyers in the months and years after the 1999 explosion, today's homebuyers can query Zillow to see the history of land prices near the pipeline and explore online maps to see what locally undesirable land uses exist near homes they might consider buying. They also have YouTube and repeated opportunities to find and view news stories, citizens' videos, news reports, and other media describing and depicting such explosions and their aftermath. Whether the pre-explosion prices reflected the presence of the pipeline or not, it is hard to imagine

that a more recent event and the evident dangers of living near a fossil fuel pipeline would be forgotten so quickly by today's would-be home buyers.

Online based tools have changed the ways people shop for homes, and we are now in a real world much closer to the competitive economic model that assumes all buyers have full information about the homes they might purchase. Anyone with an eye toward buying property near the proposed ACP corridor would quickly learn that the property is in fact near the corridor, that there is a danger that the property could be adversely affected by still-pending project approval, and that fossil fuel pipelines and related infrastructure have an alarming history of negative health and environmental effects. Accordingly, the price that buyers would offer for a home near the ACP will be lower than the price offered for one farther away or in another community or region entirely.

The second problem with the studies is that while they purport to compare the price of properties near a pipeline to properties not near a pipeline, many or in some cases all of the properties counted as “not near” the pipelines are, in fact, near enough to the subject pipelines that health and safety concerns could influence prices. In both studies written by the Interstate Natural Gas Association of America (INGAA), for example, the authors compare prices for properties directly on pipeline rights-of-way to prices of properties off the right-of-way. However, in almost all cases the geographic scope of the analysis was small enough that most or all of the properties not on the right-of-way are still within the pipelines' respective evacuation zones (Allen, Williford & Seale Inc., 2001; Integra Realty Resources, 2016).<sup>26</sup>

The 2016 INGAA study suffers from the same problems, including the comparison of properties “on” and “off” the six pipelines analyzed when a majority of the “off” properties are within the pipelines evacuation zones. In four of the case studies—those for which a specific distance from pipeline was reported—an average of 72.5% of the “off” properties were actually within the evacuation zone. (We estimated the evacuation zone based information available information about the pipelines' diameter and operating pressure.) For the other two of the pipelines, the study reported a simple “yes” or “no” to indicate whether the property abutted the pipeline in question. For these cases, we assume the author's methods, while flawed, are at least consistent from one case study to the next meaning it is likely at least 50% or more of the comparison properties (the “off” properties) are in fact within the evacuation zone.

If one wants to compare the price of properties with and without a particular feature, one must be sure that some properties have the feature and others do not. It is a case where one actually does need to compare apples to oranges. But if there is no variation in the feature of interest, which in this case would be the presence of a nearby risk to health and safety, then one would expect to find no systematic variation in the price of the properties. By comparing apples to apples when it should be comparing apples to oranges, the INGAA study reaches the forgone and not very interesting conclusion

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<sup>26</sup> This is based on a best estimate of the location of the pipelines derived from descriptions of the pipeline's location provided in the study (only sometimes shown on the neighborhood maps) and an approximation of the evacuation zone based on pipeline diameter and operating pressure (Pipeline Association for Public Awareness, 2007).

that properties that are similar in size, condition, and other features including their location within the evacuation zone of a natural gas pipeline have similar prices.

To varying degrees, the other studies cited by FERC and in ACP LLC's filing suffer from the same problem. Fruits (2008), who analyzes properties within one mile of a pipeline that has a 0.8-mile-wide-evacuation zone (0.4 miles on either side), offers the best chance that a sizable portion of subject properties are in fact "not near" the pipeline from a health and safety standpoint. He finds that distance from the pipeline does not exert a statistically significant influence on the property values, but he does not examine the question of whether properties within the evacuation zone differ in price from comparable properties outside that zone. A slightly different version of Fruits' model, in other words, could possibly detect such a threshold effect. Such an effect would show up, of course, only if the buyers of the properties included in the study had been aware of their new property's proximity to the pipeline.

In short, one cannot conclude from these flawed studies' failure to identify a negative effect of pipelines on property value that no such effect exists. To evaluate the effects of the proposed ACP on property value, FERC and others must therefore look to studies (including those summarized in the previous section) in which buyers' willingness to pay is fully informed about the presence of nearby pipelines and in which the properties bought are truly different in terms of their exposure to pipeline-related risks.

## Visual Effects and Viewshed Analysis

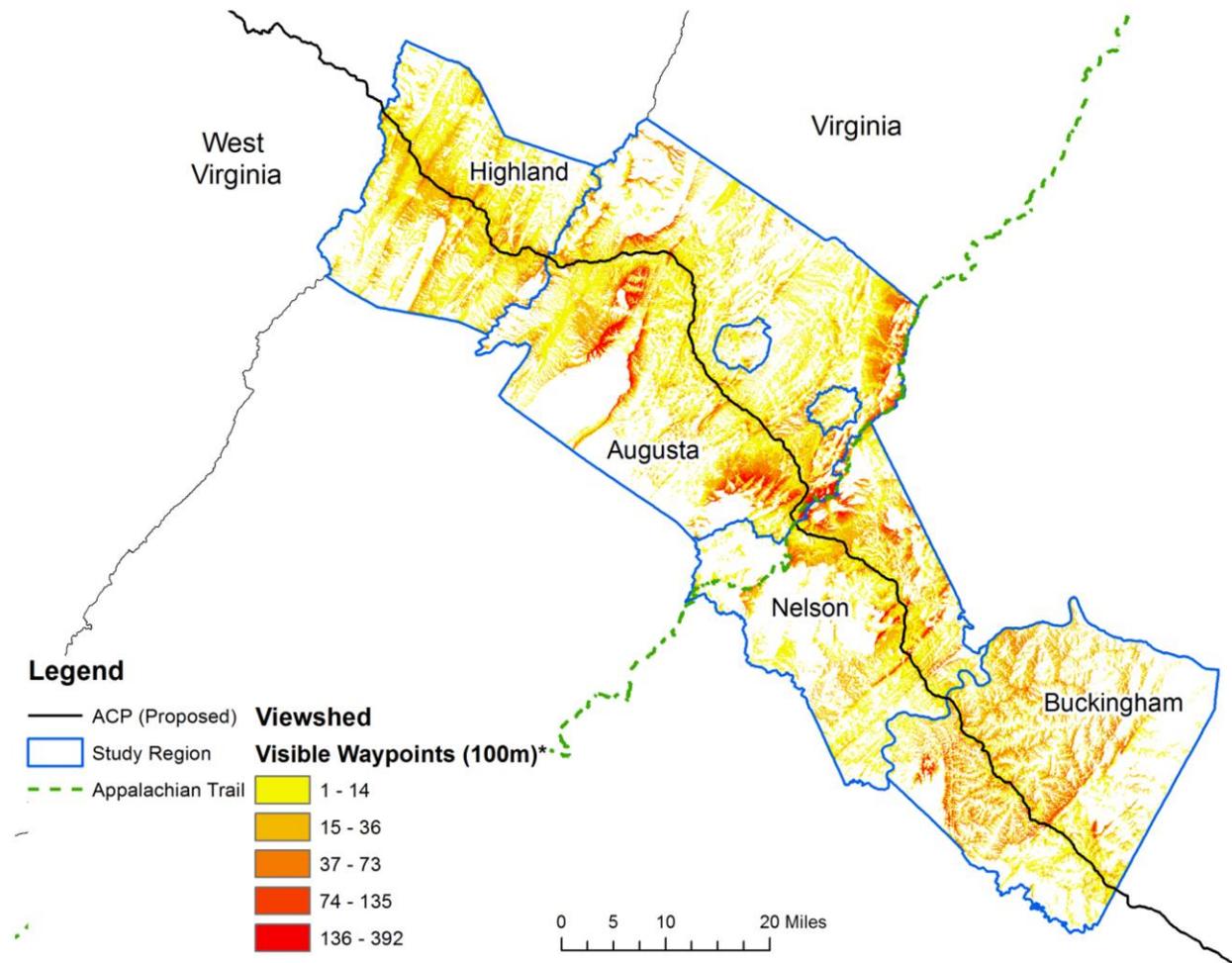
Information about how the visual effects of natural gas transmission pipelines are reflected in property value is scarcer than information related to health and safety effects. On one hand, we know better views increase property value. Conversely, utility corridors from which power lines can be seen decrease property values (by 6.3% in one study) (Bolton & Sick, 1999). This suggests a pipeline corridor reduces property value either by impairing a good view or, if like power lines, by simply being unattractive. It is reasonable to conclude that the proposed ACP would have effects on property value that are mediated through visual effects, but the literature to date does not offer clear guidance on how large or strong the effect may be. We therefore have not included separate estimates of the impact of the ACP on property value in the viewshed. Moreover, we do not wish to double-count a portion of the impact of the ACP on "Aesthetics," which is already included among the ecosystem service value effects.

We do want to know, however, how many properties might suffer a portion of that lost aesthetic value. To keep the estimate conservative, we count only those properties with a higher-than-average likelihood the ACP corridor could be seen from them. To determine this for each parcel, a GIS-based visibility analysis provides an estimate of how many points along the pipeline could potentially be seen from each 30m-by-30m spot in the study region. To keep the computing needs manageable, we analyzed a sample of points placed at 100m intervals along the proposed ACP route.

Because weather, smog, and other conditions limit the distance at which one can see anything in the mountains and valleys of Virginia, we restricted the scope of analysis for any given point on the pipeline

to spots in the study region that lie within a 25-mile radius. As a practical matter, this meant that we analyzed a section of the ACP beginning 25 miles west of the western boundary of Highland County, Virginia and extending to a point 25 miles east of the eastern boundary of Buckingham County.

By tallying the number of points on the pipeline corridor that could be seen from each spot in the study region and then connecting those spots to parcel boundaries, we obtain an estimate of how much of the pipeline could be seen from some spot within a given parcel. In Figure 6, yellow spots on the maps are those where one could see between 1 and 14 points on the pipeline, whereas red spots have a view of up to as many as 392 points along the pipeline. Since each point represents 100 meters of pipeline, there are places in the study region where 39.2 km, or 24.4 miles, of pipeline corridor could be visible.



**FIGURE 6: Visibility Analysis Results**

\*The color indicates the number of waypoints, spaced 100m apart along the proposed route that would be visible from the colored grid cell. Only waypoints within 25 miles are considered. Does not account for obstructions like buildings or trees.

Taking into account those spots on nearly every parcel from which one could not see the ACP corridor, the average of the maximum number of points visible from a parcel is 12. This serves as our threshold for identifying parcels from which the pipeline would be “visible.” Parcels containing no spot (again each spot is a 30m-by-30m square) from which one could see more than 12 pipeline points is

considered to have no view of the pipeline. By this rule, and out of 106,717 parcels in the study region, some 31,117 parcels, or just under one-third, would have a potential view of the pipeline. The total value of these properties is currently \$7.44 billion.

We call this a potential view of the pipeline because we have not taken other visual obstructions, such as trees or buildings into account. In particular, smaller parcels in the more densely developed areas could be at elevations relative to the pipeline that could afford a view of it, but the house next door could block that view. The restriction of our analysis to those parcels that have comparatively many spots from which to potentially see the pipeline mitigates this limitation of our GIS analysis. The reason is simply that smaller urban lots have very few 30-meter-square spots to begin with. A parcel has to be at least 13 spots in size (2.9 acres), with the pipeline visible from every spot, to cross the 12-spot threshold.

## Parcel Values

With the exceptions of the City of Staunton and Highland County, parcel value is obtained from the jurisdictions' public records. We obtained Staunton's parcel boundaries (the GIS file) from the city, but it is not possible to download or create a file with the assessed value that corresponds to each parcel. For Highland County, we obtained the parcel boundaries from the Commonwealth of Virginia's web-based map service, but those parcels lack any identifying information, such as an address or key code by which parcels could be connected to property value obtained separately from the County.

For both Staunton and Highland County, we adopted a second-best approach to enable some spatial analysis of property value impacts. We extracted the median house value for block groups in those two jurisdictions from the American Community Survey (ACS) (2014). After adjusting the ACS's figures for inflation, we attached those values to each parcel, according to which block group the parcel occupies.<sup>27</sup>

Each of the remaining jurisdictions have some parcels with missing value data or parcels where a match in the jurisdictions' separate assessment records could not be found. This will lead to some underestimation of any land value effects, since the value of these parcels is set to zero.

Two other features of the parcel data required adjustments prior to performing any land value impact calculations. First, the Buckingham County data had instances in which two or more individual tracts in different parts of the County are listed on a single tax record with a single property value. The consequence is that the value of all of the land connected to such multi-tract tax records would be swept up with the value of just those tracts actually crossed by the proposed ROW, in the evacuation zone, or near the compressor station. To avoid overstating impacts, we split the multi-tract parcels into separate tax records and assigned each tract its own value based on its size and the per-acre value of the original multi-tract parcel.

The second remaining issue deals with public land that is unlikely to be sold and therefore does not

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<sup>27</sup> Because many parcels overlap block group boundaries, each parcel is assigned to a block according to whether its centroid, or geometric center, lies within the block group.

possess any market value. To ensure these properties would not inflate overall property value effects, we used the “Protected Areas Database” from the National Gap Analysis Program to identify fee-owned conservation properties, such as portions of the George Washington National Forest and state, county, and municipal parks (Conservation Biology Institute, 2012). Once identified, we set the value of all such properties equal to zero.

With all of these adjustments made, there remains the comparatively straightforward matter of identifying parcels of six types for which one could expect some effect of the ACP on the value. In order of increasing distance from the pipeline itself, these are:

1. Parcels crossed by the right-of-way  
(508 parcels, with total value (before ACP) of \$277.5 million)
2. Parcels crossed by the construction corridor  
(553 parcels, with total value (before ACP) of \$281.8 million)
3. Parcels at least partially within the High Consequence Area (HCA)  
(1,799 parcels, with total value (before ACP) of \$539.7 million)
4. Parcels at least partially within the Evacuation Zone  
(5,553 parcels, with total value (before ACP) of \$1.13 billion)
5. Parcels with their geographic center (centroid) within one half mile of the compressor station  
(87 parcels, with total value (before ACP) of \$4.9 million)
6. Parcels from which the pipeline would be visible (as defined above)  
(31,117 parcels, with total value (before ACP) of \$7.44 billion)

Note that there is overlap among these zones. All ROW parcels are within the construction, HCA, and evacuation zones, and 13 are near the compressor station, for example. To avoid double counting we apply only one land value effect to any given parcel. We assume that the health and safety concerns associated with the compressor station dominate the effects of the ROW and of the evacuation zone, and so we exclude the compressor zone parcels from estimates of the impact of those zones and estimate a separate effect of the compressor station. Similarly, ROW parcels are assumed to suffer no further reduction in value due to their location within the evacuation zone.

We ignore the construction corridor for this analysis. Even though the additional 32 parcels and \$4.3 million in value (relative to parcels in the ROW) are not trivial, we do not have a basis for estimating a change in value that is separate from or in addition to the change due to the parcels’ proximity to the ROW or their location within the evacuation zone.

Furthermore, we treat parcels in the HCA and in the evacuation zone the same way and apply a single land value change to all parcels in the evacuation zone. Arguably, there should be a larger effect on parcels in the HCA than those only in the evacuation zone. Living with the possibility that one would need to evacuate one’s home at any time day or night would, one would expect, have a smaller effect on property value than living with the possibility that one would not survive a “high consequence” event and, therefore, not have the chance to evacuate at all. We do not have data or previous study results that allow us to draw such a distinction, so instead we apply the lower evacuation zone effect to all HCA and evacuation zone parcels.

To summarize, Table 9 repeats a portion of Table 2, but with the property value effects discussed above in place of check marks.

**TABLE 9: Summary of Marginal Property Value Effects**

Values / Effects	Right-of-Way (Low, Medium, & High effects)	High Consequence Area	Evacuation Zone	Compressor Station Zone	Pipeline Viewshed
Land / Property Value	-4.2% <sup>a</sup> -10.5% <sup>b</sup> -13.0% <sup>c</sup>	-3.8% <sup>d</sup>		-25% <sup>e</sup>	Impact included with Ecosystem Services

Notes:

- a. Kielisch, Realtor survey in which 56% of respondents expected an effect of between -5% and -10% ( $0.56 \times -7.5\% = -4.2\%$ ).
- b. Kielisch, buyer survey in which half of buyers still in the market would reduce their offer on a property with a pipeline by 21% ( $0.50 \times -0.21 = -10.5\%$ ).
- c. Kielisch, appraisal/impact studies showing an average loss of between -12% and -14% (-13% is the midpoint)
- d. Boxall, study in which overlap with an emergency planning zone drives, on average, a 3.8% reduction in price. We apply this reduction ONLY to those parcels in the evacuation zone that are not also in the ROW or within one half mile of the compressor station.
- e. Based on examples from the town of Hancock, New York.

### Estimated Land Value Effects

Following the procedures outlined in the previous section, our conservative estimate for costs of the proposed ACP would include between \$55.8 million and \$80.2 million in diminished property value. Some of the most intense effects will be felt by the owners of 508 parcels in the path of the right-of-way, who collectively would lose between \$11.7 million and \$36.1 million in property value. There are 87 parcels in the compressor station zone, and their owners would together experience a drop of \$1.2 million in property value. Some 5,553 additional parcels lie outside the ROW and compressor station zones but are within or touching the evacuation zone. These parcels’ owners would lose an estimated \$43.0 million. (See Table 10). A far greater number of parcels, 31,117, would experience a loss in value due to diminished quality of the view from their properties.

**TABLE 10: Summary of Land Value Effects, by Zone and County**

County	Effects in Right-of-Way			Effects in Evacuation Zone
	Realtor Survey (4.2%)	Buyer Survey (10.5%) <sup>a</sup>	Impact Studies (13.0%)	Boxall Study (3.8%)
Augusta	-5,201,628	-13,004,069	-16,100,276	-28,380,818
Buckingham	-993,700	-2,484,249	-3,075,737	-2,884,845
Highland	-360,981	-902,453	-1,117,323	-2,094,518
Nelson	-5,082,259	-12,705,646	-15,730,800	-9,596,010
<b>Study Region Total</b>	<b>-\$11,654,492</b>	<b>-\$29,136,230</b>	<b>-\$36,073,427</b>	<b>-\$42,956,191</b>

TABLE 10: Continued

	Effects Near Compressor Hancock, NY Finding (25%)	Total of ROW, Compressor Station, and Evacuation Zone Effects		
		Low	Medium	High
Augusta	n/a	-33,582,445	-41,384,887	-44,481,094
Buckingham	-1,214,140	-5,092,685	-6,583,234	-7,174,722
Highland	n/a	-2,455,500	-2,996,972	-3,211,841
Nelson	n/a	-14,678,268	-22,301,656	-25,326,810
<b>Study Region Total</b>	<b>-\$1,214,140</b>	<b>-\$55,808,898</b>	<b>-\$73,266,748</b>	<b>-\$80,194,467</b>

Based on median property tax rates in each county, these one-time reductions in property value would result in reductions in property tax revenue of between \$281,000 and \$408,000 per year (see Table 11). To keep their budgets balanced in the face of this decline in revenue, the counties would need to increase tax rates, cut back on services, or both. The loss in revenue would be compounded by the likelihood that the need for local public services, such as road maintenance, water quality monitoring, law enforcement, and emergency preparedness/emergency response could increase. The ACP, in other words, could drive up expenses while driving down the counties’ most reliable revenue stream.<sup>28</sup>

TABLE 11: Effects on Local Property Tax Revenue

	Median Tax Rate (% of Value) <sup>a</sup>	Lost Property Tax Revenue		
		Low	Medium	High
Augusta County	0.47%	-157,837	-194,509	-209,061
Buckingham	0.56%	-28,519	-36,866	-40,178
Highland	0.46%	-11,295	-13,786	-14,774
Nelson	0.57%	-83,666	-127,119	-144,363
<b>Study Region Total</b>		<b>-\$281,318</b>	<b>-\$372,281</b>	<b>-\$408,377</b>

a. Source: Property Taxes By State (Virginia Counties and Independent Cities) (propertytax101.org, 2015)

In addition to factors that make our estimates of the effects on property value itself conservative,<sup>29</sup> there is one other factor that makes the estimates of effects on property taxes lower than what one would expect if the ACP is permitted. Namely, nearly a quarter of the properties in the ROW are currently undeveloped but still assessed at a value that assumes a single house site. Buckingham County has 70 such properties, Nelson has 7, and Augusta has 46.<sup>30</sup> The total assessed value of these

<sup>28</sup> We recognize that ACP anticipates making tax payments, but because those payments are tied to net income from the operation of the pipeline, they may fluctuate from year to year or disappear entirely if pipeline operations become unprofitable.

<sup>29</sup> These factors include using the lower expected price reduction from the buyer survey and applying the same price reduction to the entire evacuation zone (including the HCA).

<sup>30</sup> There are no such properties in Highland County, where the County does not assume any development value until development is imminent. In Buckingham County all unimproved properties are assessed as if they include at least one

properties is \$15.1 million. Depending on where and how the ROW crosses these properties, it is likely that some will lose their potential usefulness for future residential or other development. In those cases, the assessed value (which by law reflects market value) will fall, and tax revenue generated by future development will never materialize.

## EFFECTS ON ECONOMIC DEVELOPMENT

Across the study region, county-level economic development plans recognize the importance of a high quality of life, a clean environment, and scenic and recreational amenities to the economic future of people and communities. Augusta County's Economic Development Strategic Plan, for example, stresses "Respect for Heritage and Environment: Promote a quality of life that embraces our heritage, preserves the environment and effectively manages the resources we have been given" (Glover & Castle, 2015). In Highland County, the Economic Development Authority states its mission is to "promote sustainable economic development in order to achieve a desirable quality of life for the citizens of Highland County," and it aims to complete that by "preserving our rural heritage and natural beauty, supporting existing businesses, promoting new investment and igniting entrepreneurship" (Billingsley et al., 2015).

The ACP would undermine the progress toward these visions if the loss of scenic and recreational amenities, the perception and the reality of physical danger, and environmental and property damage were to discourage people from visiting, relocating to, or staying in the study region. Workers, businesses, and retirees who might otherwise choose to locate along the ACP's proposed route will instead pick locations retaining their rural character, productive and healthy landscapes, and promise for a higher quality of life.

This is already occurring in the region. With the possibility of the ACP looming, business plans have stalled and the real estate market has slowed (Adler, 2015; R. Smith, 2015a, 2015b). Study region residents are also concerned the ACP could have broad, negative impacts on the economy. Of those

### **Forgone Economic Development: Eco-Village**

In April of 2014 a father and son purchased two parcels near Bold Rock Cidery in Nelson County in order to begin developing a "stunning boutique eco-resort focused on the natural beauty of the Rockfish Valley and the delightful Virginia-Made craft beers, wines, ciders, foods, and handmade goods."

Designed to be a top destination on the East Coast, the developers predict \$35 million in investment costs to create this vision. They began developing a plan in April of last year and have already hired a world-class landscape design firm. The eco-resort would provide 50 full-time and 50 or more part-time jobs as well as \$15-30 million in annual taxable revenue for Nelson County.

This project, which will be "a pure celebration of Virginia", will be entirely derailed by the ACP, which would cut "right through the heart of this project and destroy any opportunity to develop this land in a meaningful way." This project represents just one of many "small business owners investing in their own ideas and opportunities to serve the exploding tourism market and our local economy."

- Richard Averitt  
Developer of Spruce Creek Resort  
and Market

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house site. Nelson County assumes that all unimproved properties of 10 acres or smaller include a single house site. Augusta County applies the single house site assumption to unimproved properties of between 0.5 and 20 acres in size.

who mentioned the economy in written comments to the Federal Energy Regulatory Commission during the scoping phase of its environmental review, 91.4% expressed a belief that the ACP would have a negative effect. Of those who mentioned agriculture, 98.6% thought the effect would be negative, and 99.5% of those who addressed tourism said the effect would be negative.

These fears are consistent with research results from this region and around the country demonstrating that quality of life is often of primary importance when people choose places to visit, live, or do business. As Niemi and Whitelaw state, “as in the rest of the Nation, natural-resource amenities exert an influence on the location, structure, and rate of economic growth in the southern Appalachians. This influence occurs through the so-called people-first-then-jobs mechanism, in which households move to (or stay in) an area because they want to live there, thereby triggering the development of businesses seeking to take advantage of the households’ labor supply and consumptive demand” (1999, p. 54). They note that decisions affecting the supply of amenities “have ripple effects throughout local and regional economies” (p. 54).

Along similar lines, Johnson and Rasker (1995) found that quality of life is important to business owners deciding where to locate a new facility or enterprise and whether to stay in a location already chosen. This is not surprising. Business owners value safety, scenery, recreational opportunities, and quality of life factors as much as residents, vacationers, and retirees.

It is difficult to predict just how large an effect the ACP would have on decisions about visiting the study region, or locating, or staying there. Even so, based on information provided by business owners to FERC and as part of this research, we can consider reasonable scenarios for how the ACP might affect key portions of the region’s overall economy.

As noted above, the study region’s residents believe the ACP will harm the travel and tourism industry. Wintergreen Resort, located in Nelson and Augusta Counties, expects a 40% drop in business relative to a planned expansion (Theiss, 2015). The nearby Fenton Inn projects it “will be losing at least 10% of projected

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***Natural and Scenic Resources [Goals]***

***– Recognize that the natural environment is an important facet of our quality of life and efforts should be made to support and enhance that environment.***

***– Protect the county’s scenic resources as essential to the county’s rural character, economic strength and quality of life.***

*- Nelson County Comprehensive Plan*

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income for [the life of the pipeline]” and that insurance and other costs will further impact its bottom line (Fenton & Fenton, 2015). In one widely reported case, a planned resort in Nelson County will never be built if the ACP is constructed—effectively a 100% loss for a business that would supply 50 full-time and 50 part-time jobs (Averitt, 2015). Finally, Yogaville in Buckingham County surveyed current and former guests regarding how a pipeline near its campus could affect future demand for its programs and found some 95% of those surveyed responded they would visit less often if the pipeline were constructed.

While more systematic research could provide refined estimates of the impact of natural gas transmission pipelines on recreation and tourism spending, one plausible scenario is that the impact is at least as high as the minimum of these business owners' reported expectations. That is, if the ACP were to cause a 10% drop in recreation and tourism spending from the 2014 baseline, the ACP could mean \$41.3 million less in travel expenditures each year. Those missing revenues would otherwise support roughly \$7.5 million in payroll, \$1.3 million in local tax revenue, \$1.8 million in state tax revenue, and 387 jobs in the four-county region's recreation and tourism industry each year.<sup>31</sup> In the short run, these changes multiply through the broader economy as recreation and tourism businesses buy less from local suppliers and fewer employees spend their paychecks in the local economy. As with the reduction in local property taxes, lost tax revenue from a reduction in visitation and visitor spending would squeeze local governments trying to meet existing public service needs as well as those additional demands presented by the ACP.

Along similar lines, retirement income is an important economic engine that could be adversely affected by the ACP. In county-level statistics from the US Department of Commerce, retirement income shows up in investment income and as age-related transfer payments, including Social Security and Medicare payments. In the study region, investment income grew by 1.5% per year from 2000 through 2014, and age-related transfer payments grew by 5.4% per year. During roughly the same time period (through 2013), the number of residents age 65 and older grew by 27.3% (2.1% per year), and this age cohort now represents 17.6% of the total population.<sup>2</sup>

It is difficult to precisely quantify the effect of the ACP on retirement income, but given the strong expression of concern from residents about changes in quality of life, safety, and other factors influencing retirees' location decisions, it is important to consider that some change is likely. Here, we consider what just a *10% slowing of the rate of increase* might entail. Such a scenario entails an annual decrease in investment income and age-related transfer payments of approximately \$6.6 million. That loss would ripple through the economy as the missing income is not spent on groceries, health care, and other services such as restaurant meals, home and auto repairs, etc.

The same phenomenon also applies to people starting new businesses or moving existing businesses to communities in the study region. This may be particularly true of sole proprietorships and other small businesses who are most able to choose where to locate. As noted, sole proprietors account for a large and growing share of jobs in the region. If proprietors' enthusiasm for starting businesses in the study region were dampened to the same degree as retirees' enthusiasm for moving there, the 10% reduction in the rate of growth would mean 41 fewer jobs and \$1.6 million less in personal income.

For "bottom line" reasons (e.g., cost of insurance) or due to owners' own personal concerns, businesses in addition to sole proprietorships might choose locations where the pipeline is not an issue. If so, further opportunities for local job and income growth will be missed.

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<sup>31</sup> Raw data on travel expenditures is from the Virginia Tourism Corporation (2015). This reduction in economic activity would be in addition to the lost recreation benefits (that is, the value to the visitors themselves over and above their expenditures on recreational activity) that are included with ecosystem service costs above.

These are simple scenarios and the actual magnitude of these impacts of the ACP will not be known unless and until the pipeline is built. Even so, and especially because the pipeline is promoted by supporters as bringing some jobs and other economic benefits to the region, it is important to consider the potential for loss.

## CONCLUSIONS

The full costs of the proposed Atlantic Coast Pipeline in our four-county study area and beyond are wide-ranging. They include one-time costs like reductions in property value and lost ecosystem services during pipeline construction, which we estimate to be between \$72.7 and \$141.2 million. Plus there are ongoing costs like lost property tax revenue, diminished ecosystem service value, and dampened economic growth that would recur year after year for the life of the pipeline. These annual costs range from an estimated \$54.8 to \$67.8 million per year. Most of these costs would be borne by residents, businesses, and institutions in Highland, Augusta, Nelson, and Buckingham Counties.

By contrast, the ACP's one local benefit is much smaller. It is an estimated average tax payment of \$3.2 million per year (for the four-counties) through 2025 (Natural Resource Group, 2015b, pp. 5–31). Other ACP-promoted benefits, such as jobs from the ACP's construction and operation and those stemming from lower energy costs, would accrue primarily in other places (Atlantic Coast Pipeline, LLC, n.d.).<sup>32</sup>

The decision to approve or not approve the ACP does not hinge on a simple comparison of estimated benefits and estimated costs. The scope and magnitude of the costs outlined here, however, reflect and are an important component of the full environmental effects that must be considered in making that decision. Impacts on human well-being, including but not limited to those that can be expressed in dollars-and-cents must be taken into account by the Federal Energy Regulatory Commission and others weighing the societal value of the Atlantic Coast Pipeline.

If these considerations and FERC's overall review, under the National Environmental Policy Act, result in selection of the "no-action" alternative and the Atlantic Coast Pipeline is never built, most of the costs outlined in this report will be avoided. It is *most*, but not *all* costs because there has already been the cost of delaying implementation of business plans, the cost of houses languishing on the market, and the cost to individuals of the stress, time, and energy diverted to concern about the pipeline rather than what would normally (and more productively) fill their lives.

Another possible scenario is that the FERC, considering the impacts of the ACP *as currently proposed* on ecosystem services, property values, and economic development, would conduct a thorough analysis of all possible alternatives. Those alternatives may include using existing gas transmission infrastructure (with or without capacity upgrades), routing new gas transmission lines along existing utility and transportation rights-of-way, and/or scaling down permitted new pipeline capacity to match regional gas transmission needs (as opposed to permitting pipelines on a company-by-company basis). In this case, estimates of these impacts should inform the choice of a preferred alternative that minimizes environmental damage and, thereby, minimizes the economic costs to individuals, businesses, and the public at large.

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<sup>32</sup> Due to issues with the methods and assumptions used in the ACP-sponsored studies, the benefit estimates they present may be inflated. See Stanton, et al. (2015), and Phillips (2015b) for a review.

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## APPENDIX A:

### CANDIDATE PER-ACRE VALUES FOR LAND-USE AND ECOSYSTEM SERVICE COMBINATIONS

As explained under “Effects on Ecosystem Service Value,” the benefit transfer method applies estimates of ecosystem service value from existing studies of “source areas” to the “study area,” which in this case is the proposed ACP corridor. This application is done on a land-use-by-land-use basis. So, for example, values of various ecosystem services associated with forests in the source area are applied to forests in the study area. The table below lists all of the values from source area studies areas considered for our calculations.

Land Use	Ecosystem Service	Minimum \$/Acre/year	Maximum \$/Acre/year	Source Study
Cropland	Aesthetic	35.01	89.23	(Bergstrom, Dillman, & Stoll, 1985)
	Biological Control	15.21	15.21	(Brenner Guillermo, 2007) *
	Biological Control	14.38	204.95	(Cleveland et al., 2006)
	Erosion	27.31	72.55	(Pimentel et al., 2003) *
	Food	33.25	33.25	(Lex & Groover, 2015)
	Pollination	10.14	10.14	(Brenner Guillermo, 2007) *
	Pollination	13.89	13.89	(Robinson, Nowogrodzki, & Morse, 1989)
	Pollination	47.43	1,987.97	(Winfree, Gross, & Kremen, 2011)
	Recreation	18.77	18.77	(Brenner Guillermo, 2007) *
	Recreation	2.16	5.02	(Knoche & Lupi, 2007)
	Soil Fertility	7.28	7.28	(Pimentel, 1998) *
	Soil Fertility	115.23	115.23	(Pimentel et al., 2003)
	Waste	132.26	132.26	(Perrot-Maître & Davis, 2001) *
Grasslands	Aesthetic	102.38	116.61	(Ready, Berger, & Blomquist, 1997)
	Biological Control	15.21	15.21	(Brenner Guillermo, 2007) *
	Climate	3.55	3.55	(Brenner Guillermo, 2007) *
	Erosion	17.48	17.48	(Barrow, 1991) *
	Erosion	68.28	68.28	(Sala & Paruelo, 1997) *
	Food	15.50	15.50	(Lex & Groover, 2015) *
	Pollination	16.23	16.23	(Brenner Guillermo, 2007) *
	Soil Fertility	3.55	3.55	(Brenner Guillermo, 2007) *
	Waste	55.28	55.28	(Brenner Guillermo, 2007) *
	Waste	5.88	64.40	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Water Flows	2.54	2.54	(Brenner Guillermo, 2007) *
Pasture	Aesthetic	102.38	116.61	(Ready et al., 1997)
	Biological Control	15.21	15.21	(Brenner Guillermo, 2007) *
	Climate	3.55	3.55	(Brenner Guillermo, 2007) *
	Erosion	17.48	17.48	(Barrow, 1991) *
	Erosion	68.28	68.28	(Sala & Paruelo, 1997) *
	Food	15.50	15.50	(Lex & Groover, 2015)
	Pollination	16.23	16.23	(Brenner Guillermo, 2007) *
	Soil Fertility	3.55	3.55	(Brenner Guillermo, 2007) *

Land Use	Ecosystem Service	Minimum \$/Acre/year	Maximum \$/Acre/year	Source Study
Pasture, cont'd	Waste	55.28	55.28	(Brenner Guillermo, 2007) *
	Waste	5.88	64.40	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Water Flows	2.54	2.54	(Brenner Guillermo, 2007) *
Shrub/Scrub	Air Quality	37.26	37.26	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Climate	7.27	7.27	(Croitoru, 2007) *
	Erosion	22.75	22.75	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Pollination	1.41	7.10	(Robert Costanza, Wilson, et al., 2006)
	Recreation	3.95	3.95	(Haener & Adamowicz, 2000)
	Waste	46.35	46.35	(Croitoru, 2007) *
	Waste	0.10	324.35	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
Forest	Aesthetic	4,439.71	18,141.99	(Nowak, Crane, Dwyer, & others, 2002)
	Air Quality	372.57	372.57	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Biological Control	8.91	8.91	(Wilson, 2005) *
	Biological Control	2.54	2.54	(Brenner Guillermo, 2007) *
	Climate	67.45	67.45	(Brenner Guillermo, 2007) *
	Climate	56.89	56.89	(Robert Costanza, d'Arge, et al., 2006)
	Erosion	61.87	61.87	(Brenner Guillermo, 2007) *
	Erosion	3.09	36.09	(Zhou, Al-Kaisi, & Helmers, 2009)
	Extreme Events	797.66	797.66	(Weber, 2007)
	Food	0.13	0.13	(Wilson, 2005) *
	Pollination	202.87	202.87	(Brenner Guillermo, 2007) *
	Raw Materials	24.53	24.53	(Wilson, 2005) *
	Raw Materials	166.82	166.82	(Weber, 2007)
	Recreation	152.66	152.66	(Brenner Guillermo, 2007) *
	Recreation	1.29	4.55	(Cruz & Benedicto, 2009) *
	Recreation	1.56	1.56	(Kniivila, Ovaskainen, & Saastamoinen, 2002) *
	Recreation	37.13	45.50	(Prince & Ahmed, 1989)
	Recreation	2.79	503.97	(Shafer, Carline, Guldin, & Cordell, 1993)
	Soil Fertility	6.09	6.09	(Brenner Guillermo, 2007) *
	Soil Fertility	19.97	19.97	(Weber, 2007)
	Waste	55.28	55.28	(Brenner Guillermo, 2007) *
	Waste	8.66	8.66	(Cruz & Benedicto, 2009) *
	Waste	265.79	266.89	(Lui, 2006)
	Water	204.39	204.39	(Brenner Guillermo, 2007) *
	Water	47.39	47.39	(Cruz & Benedicto, 2009) *
	Water	1,292.23	1,292.23	(Weber, 2007)
	Water Flows	230.01	230.01	(Mates, 2007)
Water Flows	797.66	797.66	(Weber, 2007)	

Land Use	Ecosystem Service	Minimum \$/Acre/year	Maximum \$/Acre/year	Source Study
Water	Recreation	446.31	446.31	(Brenner Guillermo, 2007) *
	Recreation	155.36	914.10	(Cordell & Bergstrom, 1993)
	Recreation	304.18	437.19	(Mullen & Menz, 1985)
	Recreation	148.68	148.68	(Postel & Carpenter, 1977)
	Waste	10.72	10.72	(Gibbons, 1986) *
	Water	512.74	512.74	(Brenner Guillermo, 2007) *
	Water	22.98	22.98	(Gibbons, 1986) *
Wetland	Aesthetic	38.46	38.46	(Amacher & Brazee, 1989) *
	Air Quality	75.50	98.02	(Jenkins, Murray, Kramer, & Faulkner, 2010)
	Climate	1.84	1.84	(Wilson, 2005) *
	Climate	157.73	157.73	(Brenner Guillermo, 2007) *
	Extreme Events	228.06	369.85	(Wilson, 2005) *
	Extreme Events	110.06	4,583.26	(Brenner Guillermo, 2007) *
	Extreme Events	304.18	304.18	(Robert Costanza, Farber, & Maxwell, 1989)
	Extreme Events	278.77	278.77	(Robert Costanza & Farley, 2007)
	Extreme Events	1,645.59	7,513.98	(Leschine, Wellman, & Green, 1997)
	Raw Materials	50.16	50.16	(Everard, Great Britain, & Environment Agency, 2009)
	Recreation	80.71	80.71	(Bergstrom, Stoll, Titre, & Wright, 1990)
	Recreation	1,716.76	1,761.89	(Brenner Guillermo, 2007) *
	Recreation	109.30	429.97	(Robert Costanza et al., 1989)
	Recreation	1,041.04	1,041.04	(Creel & Loomis, 1992)
	Recreation	88.06	994.50	(Gren & Söderqvist, 1994) *
	Recreation	71.11	71.11	(Gren, Groth, & Sylven, 1995) *
	Recreation	208.01	208.01	(Kreutzwiser, 1981)
	Recreation	209.51	209.51	(Lant & Roberts, 1990) *
	Recreation	648.57	4,203.82	(Whitehead, 1990)
	Waste	141.56	141.56	(Wilson, 2005) *
	Waste	67.02	67.02	(Breux, Farber, & Day, 1995)
	Waste	1,050.34	1,050.34	(Brenner Guillermo, 2007) *
	Waste	170.05	170.05	(Gren & Söderqvist, 1994) *
	Waste	35.20	35.20	(Gren et al., 1995) *
	Waste	551.02	551.02	(Jenkins et al., 2010)
	Waste	209.51	209.51	(Lant & Roberts, 1990) *
	Waste	5,027.28	5,027.28	(Meyerhoff & Dehnhardt, 2004) *
	Waste	10,881.15	10,881.15	(Lui, 2006)
	Water	1,934.84	2,407.52	(Brenner Guillermo, 2007) *
	Water	622.77	622.77	(Creel & Loomis, 1992)
	Water	18.19	18.19	(Folke & Kaberger, 1991) *
	Water Flows	3,741.87	3,741.87	(Brenner Guillermo, 2007) *
Water Flows	3,920.69	3,920.69	(Leschine et al., 1997)	
Water Flows	4,329.70	4,329.70	(UK Environment Agency, 1999)	

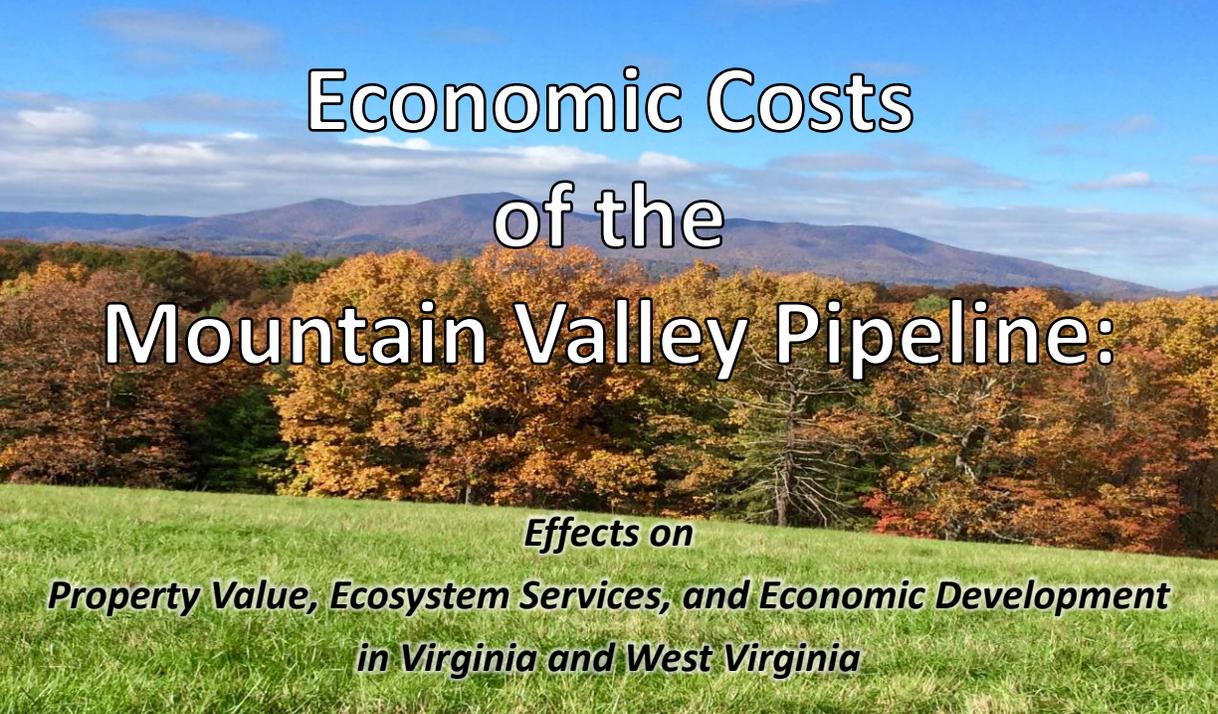
Land Use	Ecosystem Service	Minimum \$/Acre/year	Maximum \$/Acre/year	Source Study
Urban Open Space	Aesthetic	1,006.06	1,322.31	(Qiu, Prato, & Boehrn, 2006)
	Air Quality	32.46	32.46	(G. McPherson, Scott, & Simpson, 1998)
	Air Quality	192.35	192.35	(G. E. McPherson, 1992)
	Climate	1,134.38	1,134.38	(G. E. McPherson, 1992)
	Extreme Events	315.52	597.01	(Streiner & Loomis, 1995)
	Water Flows	8.32	8.32	(G. E. McPherson, 1992)
	Water Flows	138.22	187.58	(The Trust for Public Land, 2010)
Urban Other	Climate	420.95	420.95	(Brenner Guillermo, 2007) *
	Recreation	2,670.74	2,670.74	(Brenner Guillermo, 2007) *
	Water Flows	7.61	7.61	(Brenner Guillermo, 2007)

All values are adjusted for inflation to 2014 dollars.

\* Indicates source is from the TEEB database.

**People's Dossier: FERC's Abuses of Power and Law  
→ Public Participation Undermined**

**Public Participation Undermined Attachment 17, Key-  
Log Economics, LLC, *Economic Costs of the Mountain  
Valley Pipeline*, May 2016.**



# Economic Costs of the Mountain Valley Pipeline:

*Effects on  
Property Value, Ecosystem Services, and Economic Development  
in Virginia and West Virginia*

MAY 2016

*Report to:  
Protect Our Water, Heritage, Rights (The POWHR Coalition)  
[powhr.org](http://powhr.org)*

Spencer Phillips, PhD  
Sonia Wang  
Cara Bottorff

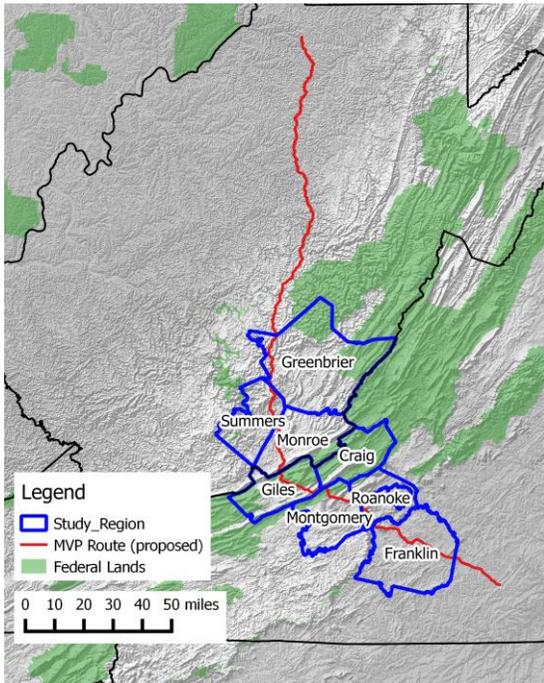


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## EXECUTIVE SUMMARY

The Mountain Valley Pipeline (MVP) is proposed to carry natural gas from the Marcellus and Utica Shale approximately 300 miles through 11 West Virginia and 6 Virginia counties before terminating at the existing Transcontinental pipeline compressor station in Pittsylvania County, Virginia. Mountain Valley Pipeline, LLC, which would construct and operate the pipeline as a joint venture of EQT Corporation and NextEra Energy, Inc., and some public officials have promoted the MVP as both environmentally safe and economically beneficial, providing economic opportunity for local communities along the proposed route.



**FIGURE 1: Eight-County Study Region**

Note: Roanoke County includes the independent cities of Salem and Roanoke

Sources: MVP route digitized from online maps and MVP LLC filings (<http://mountainvalleypipeline.info/maps/>); Study Region (counties), federal lands, and hill shade from USGS and [http://nationalmap.gov/small\\_scale/](http://nationalmap.gov/small_scale/)

Promised economic benefits, however, are only part of the impact the Federal Energy Regulatory Commission (FERC) must review before deciding whether to approve the construction and operation of the pipeline. Under its own policy and the more comprehensive requirements of the National Environmental Policy Act, FERC's review must consider the full range of environmental effects of the proposed pipeline. These include the various ways in which environmental effects would result in changes in human well-being—including economic benefits and costs. While estimates of the positive economic effects, including construction jobs and local tax payments, have been developed and promoted as reasons to move forward with the pipeline, no systematic consideration of the potential negative economic effects—economic costs—of the MVP has been completed.

To help fill the gap in current information, the POWHR (Protect Our Water, Heritage, Rights) coalition of community groups from an eight-county region in West Virginia and Virginia commissioned this independent research into key economic costs of the MVP. This region comprises Greenbrier, Monroe, and Summers Counties in West Virginia and Craig, Franklin, Giles, Montgomery, and Roanoke Counties in Virginia (Figure 1). The MVP's construction, operation, and presence would impose three types of costs on this region. First, the pipeline would impact property values along the approximately 143 miles

of pipeline proposed for the study region. Affected properties are those touched by the 50-foot-wide right-of-way, within the 1.4-mile-wide evacuation zone, and throughout the viewshed of the proposed pipeline. Second, construction and the ongoing operation of the pipeline would alter land use/land cover in ways that diminish the value of ecosystem services, such as aesthetics, water supply, and timber and food production. Third, and in part due to a loss of scenic and quality-of-life amenities, there would be decreases in visitation, in-migration, tourism, small business development, plus a loss of jobs and personal income those activities would otherwise support.

Considering this eight-county region alone, estimated one-time costs range from \$65.1 to \$135.5 million. These one-time costs comprise lost property value and the value of ecosystem services lost during construction. Annual costs following the construction period include lower ecosystem service productivity in the MVP's right-of-way, lower property tax revenue due to the initial losses in property value, and dampened economic development. These total between \$119.1 and \$130.8 million per year and would persist for as long as the MVP right-of-way exists—that is, in perpetuity. (See "At a Glance," page iii for details.) Putting the stream of costs

into present value terms<sup>1</sup> and adding the one-time costs, the total estimated cost of the MVP in the eight counties is between \$8.0 and \$8.9 billion.

The costs represented by the estimates presented here are what economists call “externalities,” or “external costs,” because they would be imposed on parties other than (external to) the company proposing to build the pipeline. Unlike the private (or internal) costs of the pipeline, external costs borne by the public do not affect the company’s bottom-line. From an economic perspective, the presence of externalities is what demands public involvement in decisions about the MVP. Without consideration of all of the costs of the project, too much pipeline (which may mean any pipeline at all) is the inevitable result. FERC must consider the true bottom line and ensure that the full costs of the pipeline, especially those external costs imposed on the public, are rigorously examined and brought to bear on its decision about whether or not to permit the MVP project to proceed.

For reasons explained in the body of this report, estimates of external costs developed as part of this study and reported here are conservative. One reason is simply that there are categories of impacts that are beyond the scope of the study. These impacts include changes to sites or landscapes that have historical or cultural significance. Like lost aesthetic quality or a decrease in the capacity of the landscape to retain soil, filter water, or sequester carbon, historical and cultural impacts matter to humans and, therefore, can be expressed as monetary value. We have also not included the cost to communities of increased emergency response planning and capacity necessary during the operation of the proposed pipeline or of increased law enforcement, road maintenance and repair, or other costs that would accompany its construction.<sup>2</sup>

Another important category of cost not counted here is “passive use value.” Passive use value includes the value to people of simply knowing an unspoiled natural area exists and the value of keeping such places unspoiled for the sake of some future direct or active use. In light of this, it is important to consider the estimates of economic costs provided here as a fraction of the total economic value put at risk by the proposed Mountain Valley Pipeline.

Finally, while this report covers many of the costs that *will* happen if the MVP is constructed and operated, it does not include an assessment of natural resource damage and other effects that *might* happen during construction and operation. For example, there is some probability that erosion of steep slopes and resulting sedimentation of streams and rivers will occur during construction. Similarly, there is some probability that there will be a leak and explosion somewhere along the length of the MVP during its lifetime. If, when, and where such events occur with the MVP, there will be clean-up and remediation costs, costs of fighting fires and reconstructing homes, businesses, and infrastructure, the cost of lost timber, wildlife habitat, and other ecosystem services, and most tragically, the cost of lost human life and health.<sup>3</sup> The magnitude of these damages, multiplied by the probability that they will occur, yields additional “expected costs,” which would then be added to the more certain costs estimated in this study. The same is true of the costs that could accrue after the MVP is no longer used and maintained.

To be clear, the costs estimated here—the effect on ecosystem services from clearing land for the pipeline corridor, the impact on land values resulting from buyers’ concerns about pipeline safety, and reductions in economic vitality stemming from changes in the landscape—will occur with or without any discreet or extreme events like landslides or explosions ever happening. These impacts and their monetary equivalents are simply part of what will happen in West Virginia and Virginia if the MVP is approved, built, and operated.

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<sup>1</sup> The present value of a perpetual stream of costs is the one-year cost divided by the 1.5% real discount rate recommended by the Office of Management and Budget for cost-benefit and cost-effectiveness analysis of public projects and decisions (Office of Management and Budget, 2015).

<sup>2</sup> As of this writing, a pilot study of these cost for one Virginia county in our study region is underway, with results expected in the coming weeks.

<sup>3</sup> While no one was killed in the incident, one need look no further than the recent explosion of Spectra Energy’s Texas Eastern gas transmission line in Pennsylvania to see such impacts. See, for example, <https://stateimpact.npr.org/pennsylvania/2016/05/04/pa-pipeline-explosion-evidence-of-corrosion-found/>

## At a Glance:

### The Mountain Valley Pipeline in Virginia and West Virginia *Craig, Franklin, Giles, Montgomery, and Roanoke Counties in Virginia and Greenbrier, Monroe, and Summers Counties in West Virginia*

- Miles of pipeline: 143
- Acres
  - In the construction corridor and temporary roads and workspaces: 2449
  - In the permanent right-of-way (ROW): 861
  - In permanent access roads and other facilities: 76
- Most impacted land cover types (ROW only): forest (664 acres) and pasture (142 acres)
- Parcels touched by ROW: 716
- Parcels in the 1.4-mile-wide evacuation zone: 8,221
- Residents and housing units in the evacuation zone: 20,389 people and 9,700 homes
- Parcels from which the pipeline would be visible: 78,553 or 31% of all parcels in the six counties for which detailed parcel data are available
- Baseline (no pipeline) property value at risk (and expected one-time cost due to the MVP):
  - In the ROW: \$125.9 million (\$5.3 to \$16.4 million)
  - In the evacuation zone: \$972.6 million (\$37.0 million)
  - In the viewshed: \$16.8 billion (to avoid double counting with lost aesthetic value under ecosystem services, this impact is not separately estimated)
- Total property value lost (a one-time cost): \$42.2 to \$53.3 million
- Resulting loss in property tax revenue (annual): \$243,500 to \$308,400
- Lost ecosystem service value, such as for water and air purification, recreational benefits, and others:
  - Over the two-year construction period (a one-time cost): between \$22.9 and \$82.2 million
  - In the ROW (annual): between \$4.1 and \$14.8 million
- Lost economic development opportunities due to the erosion of these counties' comparative advantages as attractive places to visit, reside, and do business. Under the scenarios described below, these could include:
  - Annual loss of recreation tourism expenditures of \$96.8 million that supports 1,073 jobs and \$24.3 million in payroll and generates \$4.8 million in state and \$2.6 million in local taxes
  - Annual loss of personal income of \$15.6 million due to slower growth in the number of retirees
  - Annual loss of personal income of \$2.1 million due to slower growth in sole proprietorships
- Total of estimated costs:
  - One-time costs (lost property value and lost ecosystem service value during construction) would total between \$65.1 to \$135.5 million
  - Annual costs (costs that recur year after year) would range from \$119.1 to \$130.8 million
    - Present discounted value of all future annual costs (discounted at 1.5%): \$7.9 to \$8.7 billion
  - One-time costs plus the discounted value of all future annual costs: \$8.0 to \$8.9 billion

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## ABBREVIATIONS AND TERMS

**BTM:** Benefit Transfer Method, a method for estimating the value of ecosystem services in a study region based on values estimated for similar resources in other places

**EIS:** Environmental Impact Statement, a document prepared under the National Environmental Policy Act analyzing the full range of environmental effects, including on the economy, of proposed federal actions, which in this case would be the approval of the Mountain Valley Pipeline

**ESV:** Ecosystem Service Value, the effects on human well-being of the flow of benefits from an ecosystem endpoint to a human endpoint at a given extent of space and time, or more briefly, the value of nature's benefits to people

**FERC:** Federal Energy Regulatory Commission, the agency responsible for preparing the EIS and deciding whether to grant a certificate of public convenience and necessity (i.e., whether to permit the pipeline)

**HCA:** High Consequence Area, the area within which both the extent of property damage and the chance of serious or fatal injury would be expected to be significant in the event of a rupture failure

**MVP:** Mountain Valley Pipeline, which in this report generally refers to the pipeline corridor itself

**MVP LLC:** Mountain Valley Pipeline, LLC, a joint venture of EQT Midstream Partners, LP, NextEra US Gas Assets, LLC, Con Edison Gas Midstream, LLC, WGL Midstream, Vega Midstream LLC, and RGC Midstream, will own and construct the proposed Mountain Valley Pipeline

**NEPA:** National Environmental Policy Act of 1970, which requires the environmental review of proposed federal actions, preparation of an EIS, and, for actions taken, appropriate mitigation measures

**ROW:** Right-of-Way, the permanent easement in which the pipeline is buried

## AUTHOR'S NOTE

We are grateful for the assistance of POWHR—for “Protect Our Water, Heritage, Rights” (information at [powhr.org](http://powhr.org))—coalition members and other groups in identifying local information sources and making contacts in the study region. These groups include Blue Ridge Land Conservancy, Border Conservancy, Chesapeake Climate Action Network, Greenbrier River Watershed Association, Preserve Bent Mountain, Preserve Craig, Preserve Franklin, Preserve Giles County, Preserve Greenbrier County, Preserve Monroe, Preserve Montgomery County, Va., Preserve the New River Valley, Preserve Roanoke, Roanoke Valley Cool Cities Coalition, Save Monroe, Summers County Residents Against the Pipeline, Virginia Chapter, Sierra Club, and Virginia Citizens Consumer Council.

We also thank Professor Stockton Maxwell of Radford University and his students John DeGroot and Bryan Behan for their assistance acquiring and processing spatial (GIS) data for the land value and visibility analyses. Key-Log Economics remains solely responsible for the content of this report, the underlying research methods, and the conclusions drawn. We have used the best available data and employed appropriate and feasible estimation methods but nevertheless make no claim regarding the extent to which these estimates will match the actual magnitude of economic effects if the MVP is built.

*Cover Photo from Franklin County, Virginia courtesy of David Sumrell*

## BACKGROUND

The proposed Mountain Valley Pipeline (MVP) is a high-volume transmission pipeline intended, as described in filings with the Federal Energy Regulatory Commission (FERC), to transport up to two million dekatherms per day of natural gas from the Marcellus and Utica Shale region in West Virginia to markets in the Mid- and South-Atlantic Region of the United States (Mountain Valley Pipeline LLC, 2015a). MVP LLC partners have also indicated that the pipeline could facilitate export of liquefied natural gas to India or other overseas markets (Adams, 2015).

The majority of the pipeline, and the entire portion in the eight-county region considered in this study (Figure 1), would consist of 42-inch diameter pipe and would be operated at a nominal pressure of 1,480 pounds per square inch gauge (PSIG).

Along the way, the MVP would cross portions of the Jefferson National Forest, the Appalachian Trail, the Blue Ridge Parkway, and other public conservation, scenic, and natural areas. Its permanent right-of-way and temporary construction corridor—50 and 125 feet wide, respectively—would also cross thousands of private properties. Pipeline leaks and explosions, should they occur, would cause substantial physical damage and require evacuation of even wider swaths, affecting perhaps tens of thousands of homes, farms, and businesses. Still wider, but more difficult to gauge and estimate, are the zones within which the construction, operation, and presence of the pipeline would affect human well-being by changing the availability of ecosystem services such as clean air, water supply, and recreational opportunities. This would occur as the pipeline creates an unnatural linear feature on a landscape that otherwise remains largely natural or pastoral and dampens the attractiveness of the affected region as a place to live, visit, retire, or do business.

To date, these negative effects and estimates of their attendant economic costs have not received much attention in the otherwise vigorous public debate surrounding the proposed MVP. This report, commissioned jointly by several regional and local groups, is both an attempt to understand the nature and potential magnitude of the economic costs of the MVP in a particular eight-county area, as well as to provide an example for FERC as it proceeds with its process of analyzing and weighing the full effects of the proposed MVP along its entire length and, by extension, throughout the region in which its effects will occur.

### Policy Context

Before construction can begin, the MVP must be approved by FERC. That approval, while historically granted to pipeline projects, depends on FERC's judgment that the pipeline would meet a public "purpose and need." Because the approval would be a federal action, FERC must also comply with the procedural and analytical requirements of the National Environmental Policy Act (NEPA). These include requirements for public participation, conducting environmental impact analysis, and writing an Environmental Impact Statement (EIS) that evaluates all of the relevant effects. Of particular interest here, such relevant effects include direct, indirect, and cumulative effects on or mediated through the economy. As the NEPA regulations state,

Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial (emphasis added, 36 CFR 1508.b).

It is important to note NEPA does not require that federal actions—which in this case would be approving or denying the MVP—necessarily balance or even compare benefits and costs. NEPA is not a decision-making law, but rather a law requiring decisions be supported by an as full as possible accounting of the reasonably foreseeable effects of federal actions on the natural and human environment. It also requires that citizens have opportunities to engage in the process of analyzing and weighing those effects.

Moreover, FERC’s own policy regarding the certification of new interstate pipeline facilities (88 FERC, para. 61,227) requires adverse effects of new pipelines on “economic interests of landowners and communities affected by the route of the new pipeline” be weighed against “evidence of public benefits to be achieved [by the pipeline]” (88 FERC, para. 61,227; Hoecker, Breathitt, & He’bert Jr., 1999, pp. 18–19). Further, “...construction projects that would have residual adverse effects would be approved only where the public benefits to be achieved from the project can be found to outweigh the adverse effects” (p. 23).

In principle, this policy is in line with the argument, on economic efficiency grounds, that the benefits of a project or decision should be at least equal to its cost, including external costs. However, the policy’s guidance regarding what adverse effects must be considered and how they are measured is deeply flawed. The policy states, for example, “if project sponsors...are able to acquire all or substantially all, of the necessary right-of-way by negotiation prior to filing the application...it would not adversely affect any of the three interests,” which are pipeline customers, competing pipelines, and “landowners and communities affected by the route of the new pipeline” (Hoecker et al., 1999, pp. 18, 26). The Commission’s policy contends the only adverse effects that matter are those affecting owners of properties in the right-of-way. Even for a policy adopted in 1999, this contention is completely out of step with long-established understanding that development that alters the natural environment has negative economic effects.

A further weakness of the FERC policy is that it relies on applicants to provide information about benefits and costs. The policy’s stated objective “is for the applicant to develop whatever record is necessary, and for the Commission to impose whatever conditions are necessary, for the Commission to be able to find that the benefits to the public from the project outweigh the adverse impact on the relevant interests” (Hoecker et al., 1999, p. 26). The applicant therefore has an incentive to be generous in counting benefits<sup>4</sup> and parsimonious in counting the costs of its proposal. Under these

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<sup>4</sup> MVP LLC has published estimates of economic benefits in the form of employment and income stemming from the construction and operation of the MVP (Ditzel, Fisher, & Chakrabarti, 2015a, 2015b). As has been well documented elsewhere, these studies suffer from errors in the choice and application of methods and in assumptions made regarding the long-run economic stimulus represented by the MVP. Most significantly, the studies make no mention of likely

circumstances, it seems unlikely that the Commission's policy will prevent the construction of pipelines for which the full costs are greater than the public benefits they would actually provide. Indeed, until just recently, FERC has never rejected a pipeline proposal (van Rossum, 2016).

Because MVP LLC failed to acquire a sufficient portion of the right-of-way and other federal agencies, including the US Forest Service, needed to evaluate how the MVP would affect resources under its stewardship, the Commission issued a Notice of Intent to prepare an EIS in February of 2015 (Federal Energy Regulatory Commission, 2015). The process began with a series of scoping meetings where members of the public could express their general thoughts on the pipeline as well as what effects should fall under the scope of the EIS. Interested parties also had the opportunity to submit comments online and through the mail.

Much of what FERC heard from citizens echoed and expanded upon the list of potential environmental effects listed in its Notice of Intent. Of those, several including "domestic water sources..., Appalachian Trail..., Residential developments and property values; Tourism and recreation" and others are particularly important as environmental effects that resonate in the lives of people. These effects can take the form of economic costs external to MVP LLC that would be borne by individuals, businesses, and communities throughout the landscape the MVP would traverse.

Based on a review of written comments submitted to FERC in January through March of 2015, citizens do seem to have emphasized these issues. Key issues include economic impacts, environmental degradation, public safety, property value effects, and issues related to cultural and historical resources (Pipeline Information Network, 2015).

## Study Objectives

Given the policy setting and what may be profound effects of the proposed MVP on the people and communities of Virginia and West Virginia, we have undertaken this study to provide information of two types:

1. An example of the scope and type of analyses that FERC could, and should, undertake as part of its assessment of the environmental (including economic) effects of the MVP.
2. An estimate of the potential magnitude of economic effects in this eight-county subset of the landscape where the MVP's environmental effects will be felt.

We do not claim the estimates below represent the total of all potential costs that would attend the construction, operation, and presence of the pipeline. Specifically, we have included several categories of cost: "passive-use value,"<sup>5</sup> including the value of preserving the landscape without a pipeline for

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economic costs, and their projections of long-term benefits extend far beyond the time period (of a year or so) within which economic impact analysis is either useful or appropriate. See Phillips (Phillips, 2015b) for details on these shortcomings.

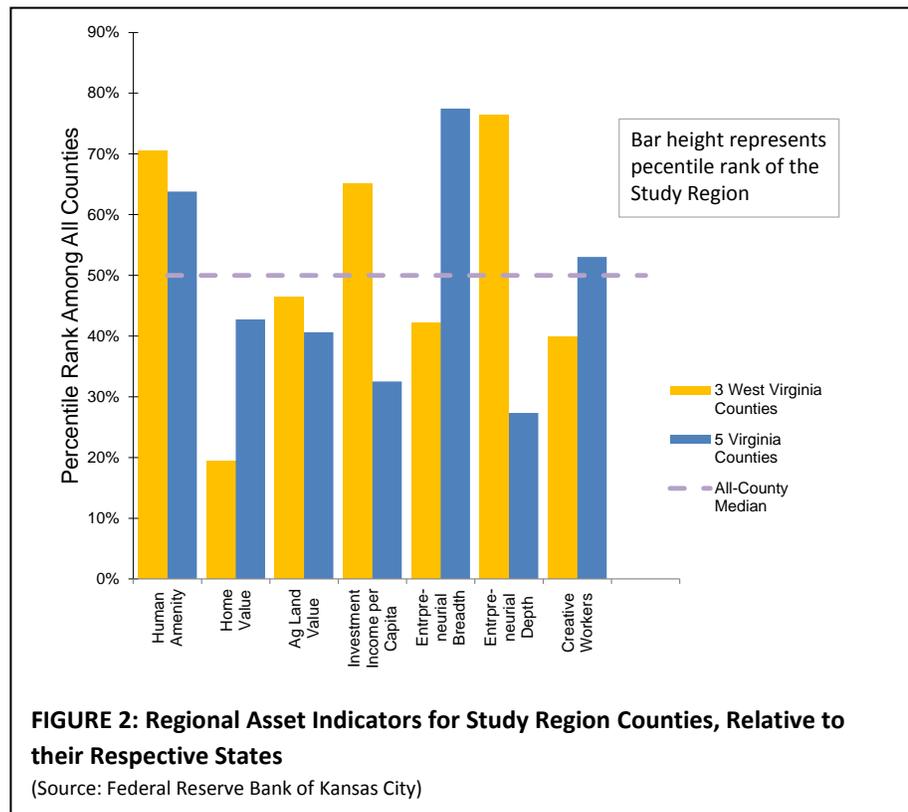
<sup>5</sup> Passive-use values include *option* value, or the value of preserving a resource unimpaired for one's potential future use; *bequest* value, which is the value to oneself of preserving the resource for the use of others, particularly future generations; and *existence* value, which is the value to individuals of simply knowing that the resource exists, absent any expectation of future use by oneself or anyone else. In the case of the MVP, people who have not yet visited the Blue Ridge Parkway or otherwise spent vacation time and dollars in the region are better off knowing that the setting for their planned activities is

future direct use, increases in the cost of community services like road maintenance and emergency response that may increase due to the construction and operation of the pipeline,<sup>6</sup> and probabilistic damages to natural resources, property, and human health and lives in the event of mishaps during construction and leaks/explosions during operation.

Therefore, our figures should be understood to be conservative, lower-bound estimates of the true total cost of the MVP in the sub-region and, of course, they do not include costs for the remainder of the region proposed for the MVP. We urge that the FERC augment the results of this study with its own similar analysis for the entire region and with additional research to determine the costs of community services and other relevant classes of costs not counted here.

### Current Economic Conditions in the Study Region

Our geographic focus is an eight-county region encompassing Craig, Franklin, Giles, Montgomery, and Roanoke counties in Virginia<sup>7</sup> as well as Greenbrier, Monroe, and Summers counties in West Virginia. This 3,964-square-mile region supports diverse land uses, including wild and pristine forests, both the Appalachian Trail and Blue Ridge Parkway, thriving cities, working farms, and extensive commercial timberland. These natural, cultural, and economic assets are among the reasons more than



a beautiful aesthetically pleasing landscape. What future visitors would be willing to pay to maintain that possibility would be part of the “option value” of an MVP-free landscape.

<sup>6</sup> As with communities impacted by the shale gas boom itself, communities along the pipeline can expect spikes in crime as transient workers come and go, more damage to roads under the strain of heavy equipment, increases in physical and mental illnesses including asthma, depression, anxiety, and others triggered by exposure to airborne pollutants, to noise, and to emotional, economic, and other stress. See, for example, Ferrar et al. (2013), Healy (2013), Fuller (2007), Campoy, (2012), and Mufson (2012).

<sup>7</sup> Two independent cities, Salem and Roanoke, lie within the geographic borders of Roanoke County. In this report, subject to some limitations where noted, statistics, estimates, and other information labeled as “Roanoke County” reflect totals for the County plus the two independent cities. The City of Radford at the southern edge of Montgomery County lies on the other side of the New River from the rest of the County, and is considered in this study to be far enough removed from the proposed MVP that it is not included in the statistics or estimates.

342,000 people call this region home and an even larger number visit each year for hiking, boating, sightseeing, festivals, weddings, and other events.

Statistics from the Center for the Study of Rural America, part of the Federal Reserve Bank of Kansas City, highlight the extent to which the region possesses the right conditions for resilience and economic success in the long run (Low, 2004). These data show that the study region has a higher human amenity index (based on scenic amenities, recreational resources, and access to health care), and strong entrepreneurship relative to most West Virginia or Virginia counties (Figure 2).<sup>8</sup> The West Virginia counties are stronger in terms of investment income per capita than the average for other West Virginia counties. The five Virginia counties have slightly more creative workers, as a percentage of the workforce, than the average for the Commonwealth.

More traditional measures of economic performance suggest the region is generally strong and resilient, though there are some differences among the Virginia and West Virginia Counties. From 2000 through 2014, for example:<sup>9</sup>

- Population in the study region grew by 9.6%, compared to a -0.5% loss of population for non-metro Virginia and West Virginia<sup>10</sup>
  - Population in the Virginia section of the study region grew by 10.5%, compared to a -0.2% loss of population for non-metro Virginia
  - Population in the West Virginia section of the study region grew by 0.8%, compared to a -1.1% loss of population for non-metro West Virginia
- Employment in the study region grew by 3.5%, compared to a -4.0% loss for non-metro Virginia and West Virginia
  - Employment in the Virginia section of the study region grew by 3.4%, compared to a -6.7% loss of employment for non-metro Virginia
  - Employment in the West Virginia section of the study region grew by 5.1%, compared to a 2.4% growth of employment for non-metro West Virginia
- Personal income in the study region grew by 20.6%, compared to 15.1% for non-metro Virginia and West Virginia
  - Personal income in the Virginia section of the study region grew by 20.7%, compared to 13.1% growth of personal income for non-metro Virginia

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<sup>8</sup> Note that the Kansas City Fed's statistics have not been updated since 2004-2006, and conditions in and outside the study region have undoubtedly changed. Some of these relative rankings may no longer hold.

<sup>9</sup> These data are from Headwaters Economics (2015), US Bureau of Economic Analysis (2015), and US Bureau of the Census (2014, 2015).

<sup>10</sup> "Non-metro Virginia" and "Non-metro West Virginia" comprises those counties that are not a part of a federally defined metropolitan statistical area (MSA). While the Virginia counties in the study region are in MSAs, each of the study region counties are predominantly rural in landscape and character and are much more like other non-metro counties than they are like Northern Virginia or Tidewater, for example. Therefore, we believe that averages for non-metro Virginia provide a more appropriate point of comparison than statistics that include the Commonwealth's more urban areas. None of the West Virginia counties in the study region are part of an MSA.

- Personal income in the West Virginia section of the study region grew by 19.7%, compared to 19.6% growth of personal income for non-metro West Virginia
- On average, earnings per job in the study region are higher, by about \$7,400/year, than the average for non-metro Virginia and West Virginia
  - Earnings per job in the Virginia section of the study region are higher, by about \$9,300/year, than the average for non-metro Virginia
  - Earnings per job in the West Virginia section of the study are lower, by about \$5,100/year than the average for non-metro West Virginia
- Per capita income is higher in the study region, by \$4,100/year, than the average for non-metro Virginia and West Virginia
  - Per capita income in the Virginia section of the study region is higher, by about \$4,400/year, than the average for non-metro Virginia
  - Per capita income in the West Virginia section of the study region, while growing, is lower, by about \$1,400/year, than the average for non-metro West Virginia
- The unemployment rate in the study region is 2.5%, compared to 2.3% for non-metro Virginia and West Virginia, during 2000-2014
  - The unemployment rate in the Virginia section of the study region is 2.9%, compared to an unemployment rate of 3.2% for non-metro Virginia, during 2000-2014
  - The unemployment rate in the West Virginia section of the study region is 0.3%, compared to an unemployment rate of 1.0% for non-metro West Virginia, during 2000-2014

These trends are consistent with what regional economists McGranahan and Wojan have called the “Rural Growth Trifecta” of outdoor amenities, a creative class of workers, and a strong “entrepreneurial context” (innovation-friendliness) (2010). Individual workers, retirees, and visitors are attracted to the natural beauty of the region while entrepreneurs are attracted by the quality of the environment, by the quality of the workforce, and by existing support from local government. Workers, for their part, are retained and nurtured by dynamic businesses that fit with the landscape and lifestyle that attracted them to the region in the first place. As further indication of this dynamic, consider since 2000:<sup>9</sup>

- The region’s population growth has been primarily due to in-migration
- The proportion of the population 65 years and older has increased from 14.5% to 15.5%
- Proprietors’ employment is up by 28.9%
- Non-labor income (primarily investment returns and age-related transfer payments like Social Security) is up by 39.0%.

These trends suggest entrepreneurs and retirees are moving to (or staying in) this region, bringing their income, expertise, and job-creating energy with them.

Temporary residents—tourists and recreationists attracted to the natural amenities of the region—and the businesses that serve them are also important parts of the region’s economy. Tourists spent more

than \$1.2 billion in the study region in 2014. The companies that directly served those tourists employed 11,642 people, or 15.4% of all full- and part-time workers (Dean Runyan Associates, 2015; Headwaters Economics, 2015; Virginia Tourism Corporation, 2015).

It is in this context the potential economic impacts of the MVP must be weighed and the apprehension of the region's residents understood. Many believe the construction and operation of the pipeline will kill, or at least dampen, the productivity of the proverbial goose that lays its golden eggs in the region. This could result in a slower rate of growth in the region and worse economic outcomes. More dire is the prospect that businesses will not be able to maintain their current levels of employment. Just as retirees and many businesses can choose where to locate, visitors and potential visitors have practically unlimited choices for places to spend their vacation time and expendable income. If the study region loses its amenity edge, other things being equal, people will go elsewhere, and this region could contract.

Instead of a "virtuous circle" with amenities and quality of life attracting/retaining residents and visitors, who improve the quality of life, which then attracts more residents and visitors, the MVP could tip the region into a downward spiral. In that scenario, loss of amenity and risk to physical safety would translate into a diminution or outright loss of the use and enjoyment of homes, farms, and recreational and cultural experiences. Some potential in-migrants would choose other locations and some long-time residents would move away, draining the region of some of its most productive members. Homeowners would lose equity as housing prices follow a stagnating economy. With fewer people to create economic opportunity, fewer jobs and less income will be generated. Communities could become hollowed out, triggering a second wave of amenity loss, out-migration, and further economic stagnation.

## ENVIRONMENTAL-ECONOMIC EFFECTS AND WHERE THEY WOULD OCCUR

In the remainder of this report, we follow this potential cycle and estimate three distinct types of economic consequences.

First, corresponding to the direct biophysical impacts of the proposed pipeline, are effects on ecosystem services—the benefits nature provides to people for free, like purified water or recreational opportunities, that will become less available and/or less valuable due to the MVP's construction and operation. Second are effects on property value as owners and would-be owners choose properties farther from the pipeline's right-of-way, evacuation zone, and viewshed. Third and finally are more general economic effects caused by a dampening of future growth prospects or even a reversal of fortune for some industries.

We begin with an exploration of the geographic area over which these various effects will most likely be felt.

### **Impact Zones within the Study Region**

Construction of the pipeline corridor itself would require clearing an area at least 125 feet (38.1 m) wide. (It would be wider in some areas depending on slope.) After construction, the permanent right-

of-way (ROW) would be 50 feet wide along the entire length of the pipeline. Within the construction zone and right-of-way is where the greatest disruption of ecosystem processes will occur, so these zones are where reductions in ecosystem service value (ESV) emanate. Since we are estimating ecosystem service values at their point of origin, we will focus on the ROW and the construction zone, as well as temporary and permanent access roads, temporary workspaces, and permanent surface infrastructure.

Operated at its intended pressure and due to the inherent risk of leaks and explosions, the pipeline would present the possibility of having significant human and ecological consequences within a large “High Consequence Area” and an even larger evacuation zone. A High Consequence Area (HCA) is “the area within which both the extent of property damage and the chance of serious or fatal injury would be expected to be significant in the event of a rupture failure” (Stephens, 2000, p. 3). Using Stephens’ formula, the HCA for this pipeline would have a radius of 1,095 feet (333.9 m). The evacuation zone is defined by the distance beyond which an unprotected human could escape burn injury in the event of the ignition or explosion of leaking gas (Pipeline Association for Public Awareness, 2007, p. 29). There would be a potential evacuation zone with a radius of at least 3,583 feet (1092.1 m).<sup>11</sup> (See map, Figure 3, for a close-up of these zones in part of the study region.) An explosion would undoubtedly affect ecosystem processes within the HCA and possibly the evacuation zone, but given the probability of an explosion at a particular point along the pipeline at a given time is small, we do not include the additional effects *on ecosystem service value* due to explosion in the cost estimates.

Effects on land value are another matter, and it is reasonable to consider land value impacts through both the high consequence area and the evacuation zone. As Kielisch (2015) stresses, the value of land is

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*“I saw no other option than to cancel my home building project once the MVP was proposed to cross the property.”*

— *Christian Reidys, Blacksburg, VA*

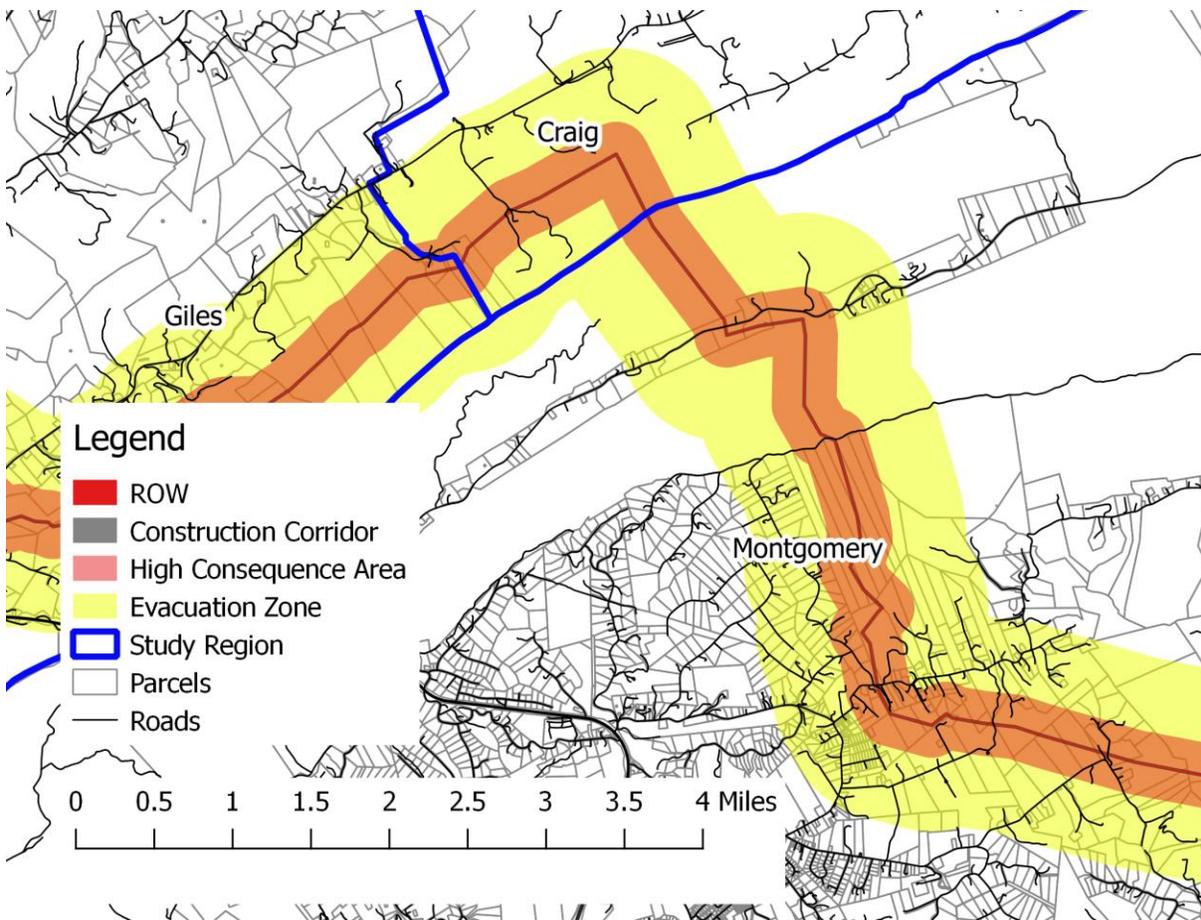
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determined by human perception, and property owners and would-be owners have ample reason to perceive risk to property near high-pressure natural gas transmission pipelines. Traditional news reports, YouTube, and other media reports attest to the occurrence and consequences of pipeline leaks and explosions, which are even more prevalent for newer pipelines than for those installed decades ago (Smith, 2015). Information about pipeline risks translates instantly into buyers’ perceptions and, therefore, into the chances of selling properties exposed to those risks, into prices offered for those properties, and, for people who already own such properties, diminished enjoyment of them (Freybote & Fruits, 2015).

In addition, loss of view quality would be expected for properties both near to and far from the pipeline corridor. Unlike leaks and explosions, view quality impacts will occur with certainty. If the pipeline is built, people will see the corridor as a break in a once completely forested hillside, and their “million-

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<sup>11</sup> The maximum operating pressure proposed for the MVP is 1,480 PSIG, but the source data for this evacuation distance is a table with pressure in 100 PSIG increments. The full evacuation distance would be between 3,583 feet and 3,709 feet, the distance recommended for a 42” pipeline operated at 1,500 PSIG. The upshot for this study is a slightly more conservative estimate of the effect of the MVP on property value.



**FIGURE 3: Right-of-Way, Construction, High Consequence, and Evacuation Areas**

Note that the overlay of the HCA (in rose) and the evacuation zone (in yellow) shows up as the orange band in the map. The ROW covers much of the construction corridor, leaving a thin band of grey visible.

Sources: MVP route digitized from online maps and MVP LLC filings (<http://mountainvalleypipeline.info/maps/>); Counties and roads from USGS (<http://nationalmap.gov>); Parcels from public records in Giles and Montgomery County, respectively. (Parcel boundaries are not available in electronic form for Craig County.)

dollar” view will be diminished. Therefore, for our analysis of land value, we consider any place where there is considerable potential to see the pipeline corridor to be within its direct impact zone. (See map, Figure 7, in the land value section for the results of the visibility analysis.)

Beyond the loss of ecosystem services stemming from the conversion of land in the ROW, the loss of property value resulting from the chance of biophysical impacts, or the certainty of impacts on aesthetics, the proposed MVP would also diminish physical ecosystem services, scenic amenity, and passive-use value that are realized or enjoyed beyond the evacuation zone and out of sight of the pipeline corridor. The people affected include residents, businesses, and landowners throughout the study region, as well as past, current, and future visitors to the region. The impacts on human well-being would be reflected in economic decisions such as whether to stay in or migrate to the study region, whether to choose the region as a place to do business, and whether to spend scarce vacation time and dollars near the MVP instead of in some other place.

To the extent the MVP causes such decisions to favor other areas, less spending and slower economic growth in the study region would be the result. A secondary effect of slower growth would be further reductions in land value, but in this study we consider the primary effects in terms of slower population, employment, and income growth in key sectors. Table 1 summarizes the types of economic values considered in this study and the zones in which they are estimated.

**TABLE 1: Geographic Scope of Effects**

A check mark indicates those zones/effects for which estimates are included in this study. The "X's" indicate areas for future study.

Values / Effects	Right-of-Way and Construction Zone	High Consequence Area	Evacuation Zone	Pipeline Viewshed	Entire Study Region	The World Beyond the Study Region
Ecosystem Services	✓	a	a	a,b	x <sup>a,b</sup>	x
Land / Property Value	✓ <sup>c</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>	✓ <sup>e</sup>	x	n/a
Economic Development Effects	f	f	f	f	✓	n/a

Notes:

- a. Changes in ecosystem services that are felt beyond the ROW and Construction zone may be key drivers of “Economic Development Effects,” but they are not separately estimated to avoid double counting.
- b. With the exception of the impact on visual quality, we do not estimate the spillover effects of alteration of the ecosystem within the ROW on the productivity of adjacent areas. The ROW, for example, provides a travel corridor for invasive species that could reduce the integrity and ecosystem productivity of areas that, without the MVP would remain core ecological areas, interior forest habitat, etc.
- c. We estimate land value effects for the ROW but not for the construction zone.
- d. Properties in the HCA are treated as though there is no additional impact on property value relative to the impact of being in the evacuation zone.
- e. To avoid double-counting, changes in property value due to an altered view from the property are considered to be part of lost aesthetic value under the “Ecosystem Services” section.
- f. Economic development effects related to these subsets of the study region are included in estimates for the study region.

## EFFECTS ON ECOSYSTEM SERVICE VALUE

The idea that people receive benefits from nature is not at all new, but “ecosystem services” as a term describing the phenomenon is more recent, emerging in the 1960s (Millennium Ecosystem Assessment, 2003). “Benefits people obtain from ecosystems” is perhaps the simplest and most commonly heard

definition of ecosystem services (Reid et al., 2005). Other definitions abound, including the following from Gary Johnson of the University of Vermont:

Ecosystem services are the effects on human well-being of the flow of benefits from an ecosystem endpoint to a human endpoint at a given extent of space and time (2010).

This definition is helpful because it emphasizes services are not necessarily things—tangible bits of nature—but rather, they are the effects on people of the functions of the natural world. It also makes clear ecosystem services happen or are produced and enjoyed in particular places and at particular times.

No matter the definition, different types of ecosystems (forest, wetland, cropland, urban areas) produce different arrays of ecosystem services, and/or produce similar services to greater or lesser degrees. This is true for the simple reason that some ecosystems or land uses produce a higher flow of benefits than others.

“Ecosystem services” is sometimes lengthened to “ecosystem goods and services” to make it explicit that some are tangible, like physical quantities of food, water for drinking, and raw materials, while others are truly services, like cleaning the air and providing a place with a set of attributes that are conducive to recreational experiences or aesthetic enjoyment. We use the simpler “ecosystem services” here. Table 2, lists the provisioning, regulating, and cultural ecosystem services included in this study.

At a conceptual level, we estimate the potential effects of the MVP on ecosystem service value by identifying the extent to which the construction and long-term existence of the pipeline would change land cover or land use, resulting in a change in ecosystem service productivity. Lower productivity, expressed in dollars of value per acre per year, means fewer dollars’ worth of ecosystem service value produced each year.

Construction would essentially strip bear the 125-foot-wide construction corridor. Once construction is complete and after some period of recovery, the 50-foot-wide right-of-way will be occupied by a different set of ecosystem (land cover) types than were present before construction. By applying per-acre ecosystem service productivity estimates (denominated in dollars) to the various arrays of ecosystem service types, we can estimate ecosystem service value produced per year in the periods before, during, and after construction. The difference between annual ecosystem service value *during* construction and *before* construction is the annual loss in ecosystem service value *of* construction. The difference between the annual ecosystem service value during ongoing operations (i.e., the value produced in the ROW) and the before-construction baseline (no pipeline) is the annual ecosystem service cost that will be experienced indefinitely.

**TABLE 2: Ecosystem Services Included in Valuation**

Provisioning Services <sup>a</sup>
<p><b>Food Production:</b> The harvest of agricultural produce, including crops, livestock, and livestock by-products; the food value of hunting, fishing, etc.; and the value of wild-caught and aquaculture-produced fish.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Forest</p>
<p><b>Raw Materials:</b> Fuel, fiber, fertilizer, minerals, and energy.</p> <p><b>Associated land uses<sup>b</sup>:</b> Forest</p>
<p><b>Water Supply:</b> Filtering, retention, storage, and delivery of fresh water—both quality and quantity—for drinking, watering livestock, irrigation, industrial processes, hydroelectric generation, and other uses.</p> <p><b>Associated land uses<sup>b</sup>:</b> Forest, Water, Wetland</p>
Regulating Services <sup>a</sup>
<p><b>Air Quality:</b> Removing impurities from the air to provide healthy, breathable air for people.</p> <p><b>Associated land uses<sup>b</sup>:</b> Shrub/Scrub, Forest, Urban Open Space</p>
<p><b>Biological Control:</b> Inter- and intra-specific interactions resulting in reduced abundance of species that are pests, vectors of disease, or invasive in a particular ecosystem.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture, Grassland, Forest</p>
<p><b>Climate Regulation:</b> Storing atmospheric carbon in biomass and soil as an aid to the mitigation of climate change, and/or keeping regional/local climate (temperature, humidity, rainfall, etc.) within comfortable ranges.</p> <p><b>Associated land uses<sup>b</sup>:</b> Pasture/Forage, Grassland, Shrub/Scrub, Forest, Wetland, Urban Open Space, Urban Other</p>
<p><b>Erosion Control:</b> Retaining arable land, stabilizing slopes, shorelines, riverbanks, etc.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Shrub/Scrub, Forest</p>
<p><b>Pollination:</b> Contribution of insects, birds, bats, and other organisms to pollen transport resulting in the production of fruit and seeds. May also include seed and fruit dispersal.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Forest</p>
<p><b>Protection from Extreme Events:</b> Preventing and mitigating impacts on human life, health, and property by attenuating the force of winds, extreme weather events, floods, etc.</p> <p><b>Associated land uses<sup>b</sup>:</b> Forests, Urban Open Space, Wetland</p>
<p><b>Soil Fertility:</b> Creation of soil, inducing changes in depth, structure, and fertility, including through nutrient cycling.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Forest</p>
<p><b>Waste Treatment:</b> Improving soil and water quality through the breakdown and/or immobilization of pollution.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Shrub/Scrub, Forest, Water, Wetland</p>
<p><b>Water Flows:</b> Regulation by land cover of the timing of runoff and river discharge, resulting in less severe drought, flooding, and other consequences of too much or too little water available at the wrong time or place.</p> <p><b>Associated land uses<sup>b</sup>:</b> Forests, Urban Open Space, Urban Other</p>
Cultural Services <sup>a</sup>
<p><b>Aesthetic Value:</b> The role that beautiful, healthy natural areas play in attracting people to live, work, and recreate in a region.</p> <p><b>Associated land uses<sup>b</sup>:</b> Forest, Pasture/Forage, Urban Open Space, Wetland</p>
<p><b>Recreation:</b> The availability of a variety of safe and pleasant landscapes—such as clean water and healthy shorelines—that encourage ecotourism, outdoor sports, fishing, wildlife watching, hunting, etc.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Forest, Water, Wetland, Urban Open Space, Urban Other</p>

Notes:

- a. Descriptions follow Balmford (2010, 2013), Costanza et al. (1997), Reid et al. (2005), and Van der Ploeg, et al. (2010).
- b. “Associated Land Uses” are limited to those for which per-unit-area values are available in this study.

In addition to the ROW and construction corridor, the MVP would require the construction of various temporary and permanent access roads, temporary work areas, and several areas for maintenance facilities. All temporary roads and temporary work areas are treated as though they are part of the construction zone. Permanent roads and installations are treated separately. Note that many of the access roads already exist and will simply be used for pipeline access. Since there is no change in the land use for those roads, there is no loss in ecosystem service value associated with them. It is only when areas are converted from forest, pasture, or other land covers to the developed use (a road or surface facility) that ecosystem service value is altered.

This overall process is illustrated in Figure 4 and the details of our methods, assumptions, and calculations are described in the following two sub sections.

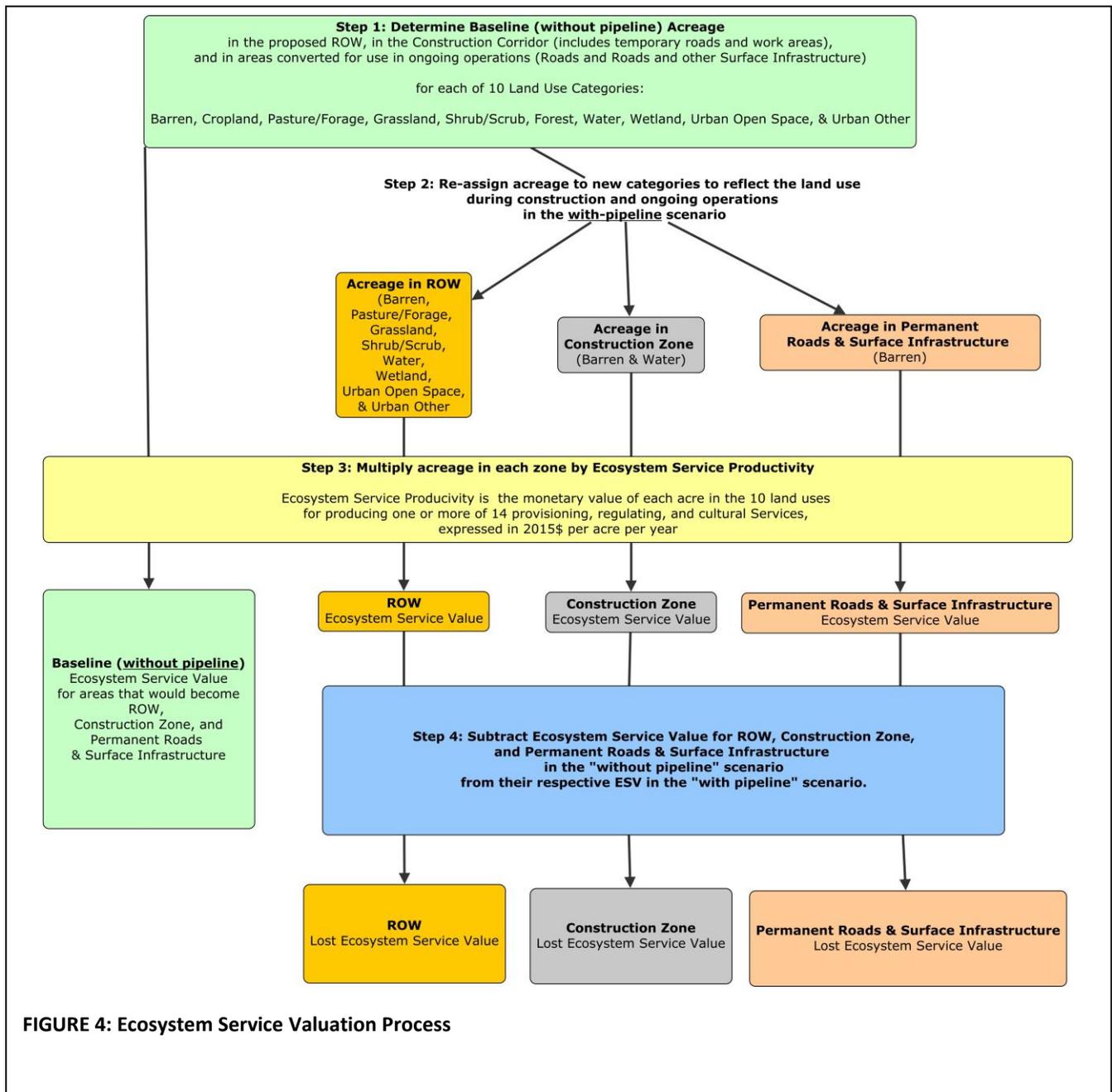


FIGURE 4: Ecosystem Service Valuation Process

## Ecosystem Service Estimation Methods

Economists have developed widely used methods to estimate the monetary value of ecosystem services and/or natural capital. The most widely known example was a study by Costanza et al. (1997) that valued the natural capital of the entire world. That paper and many others employ the “benefit transfer method” or “BTM” to establish a value for the ecosystem services produced or harbored from a particular place.<sup>12</sup> According to the Organization for Economic Cooperation and Development, BTM is “the bedrock of practical policy analysis,” particularly in cases such as this when collecting new primary data is not feasible (OECD, 2006).

As the name implies, BTM takes a rate of ecosystem benefit delivery calculated for one or more “source areas” and applies that rate to conditions in the “study area.” As Batker et al. (2010) state, the method is very much like a real estate appraiser using comparable properties to estimate the market value of the subject property. It is also similar to using an existing or established market or regulated price, such as the price of a gallon of water, to estimate the value of some number of gallons of water supplied in some period of time. The key is to select “comps” (data from source areas) that match the circumstances of the study area as closely as possible.

Typically, values are drawn from previous studies estimating the value of various ecosystem services from similar land cover or ecosystem types. Also, it is benefit (in dollars) per-unit-area-per-year in the source area that is transferred and applied to the number of hectares or acres in the same land cover/biome in the study area. For example, data for the source area may include the value of forest land for recreation. In that case, one would apply the per-acre value of recreation from the source area’s forestland to the number of acres of forestland in the study area. Multiplying that value by the number of acres of forestland in the study area produces the estimate of the value of the study area’s forests to recreational users. Furthermore, it is important to use source studies that are from regions with underlying economic, social, and other conditions similar to the study area.

Following these principles as well as techniques developed by Esposito et al. (2011), Esposito (2009), and Phillips and McGee (2014, 2016a), and as illustrated in Figure 4, we employ a four-step process to evaluate the short-term and long-term effects of the MVP on ecosystem service value in our study region. The steps are described in greater detail below, but in summary, they are:

1. Assign land and water in the study to one of 10 land uses based on remotely sensed (satellite) data in the National Land Cover Dataset (NLCD) (Fry et al., 2011). This provides the array of land uses for estimating baseline or “without MVP” ecosystem service value.
2. Re-assign or re-classify land and water to what the land cover would most likely be during construction and during ongoing operation.
3. Multiply acreage by per-acre ecosystem service productivity (the “comps,”) (in dollars per acre per year) to obtain estimates of annual aggregate ecosystem service value under the baseline/no MVP scenario, for the construction corridor (and period), and for the ROW during

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<sup>12</sup> See also Esposito et al. (2011), Flores et al. (2013), and Phillips and McGee (2014) for more recent examples.

ongoing operation.

For simplicity and given the two-year construction period, we assume the construction corridor will remain barren for a full two-year period. We recognize revegetation will begin to occur soon after the trench is closed and fill and soil are returned, but it will still be some time until something like a functioning ecosystem has actually been restored.

4. Subtract baseline (no pipeline) ESV from ESV (with pipeline) for the construction period (and in the construction corridor) and from ESV during ongoing operations (in the ROW) to obtain estimates of the ecosystem service costs imposed annually during the construction and operations period, respectively.

### Step 1: Assign Land to Ecosystem Types or Land Uses

The first step in the process is to determine the area in the 10 land use groups in the study region. This determination is made using remotely sensed data from the National Land Cover Database (NLCD) (Fry et al., 2011). Satellite data provides an image of land in one of up to 21 land cover types at the 30-meter level of resolution;<sup>13</sup> 15 of these land cover types are present in the study region (Table 3 and Figure 5).

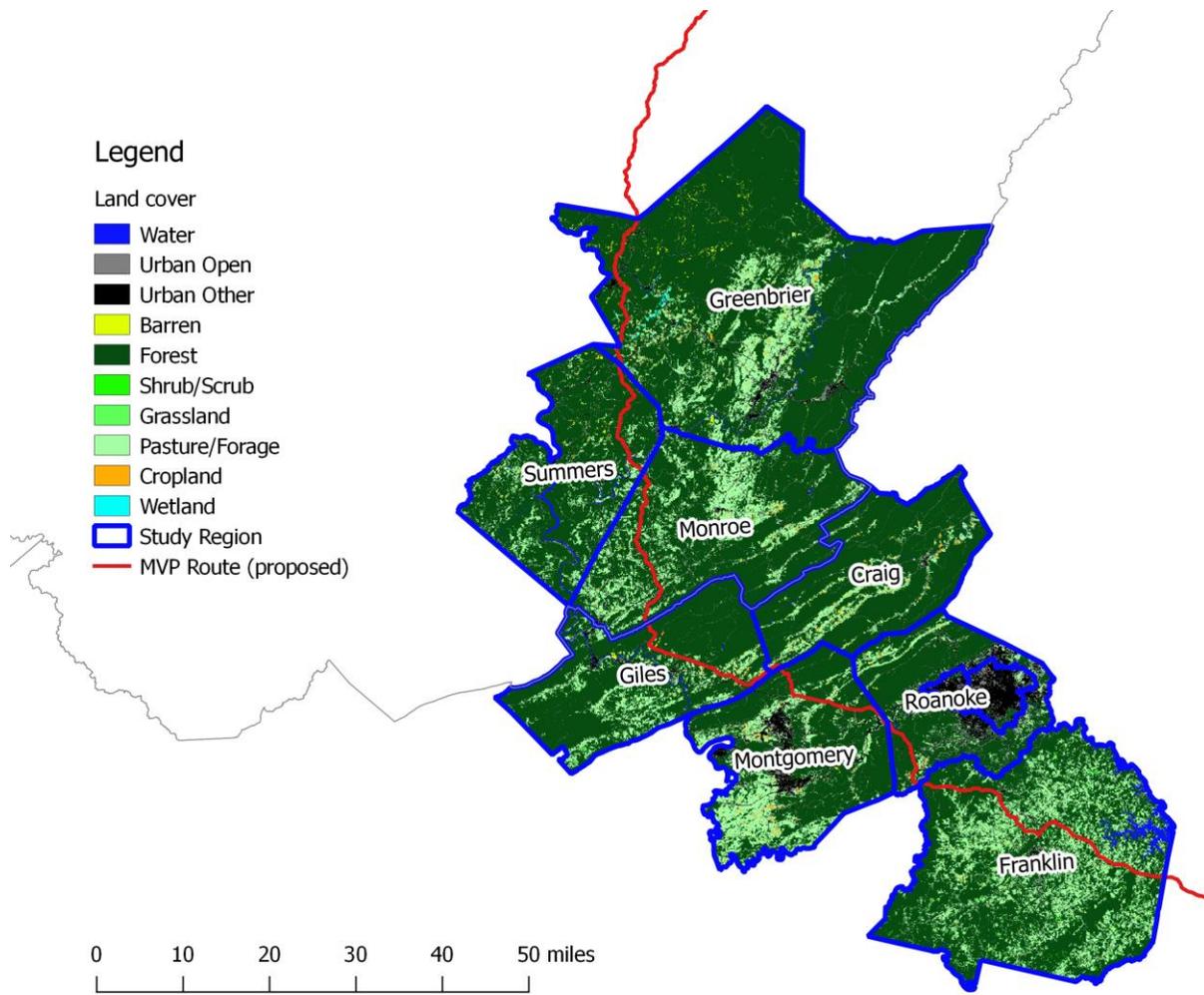
**TABLE 3: Land Area Affected By MVP, Study Region Total (See Also Figure 6)**

Land Use	Baseline acreage in ROW	Baseline acreage in construction corridor, including temp work zones, etc.	Baseline acreage in permanent surface infrastructure
Urban Other	6.6	22.9	1.3
Urban Open Space	23.9	85	3.3
Wetland	0.5	1.4	0
Water	0.8	2.5	0
Forest	663.7	1781.4	54
Shrub/Scrub	0.5	2	0
Grassland	3.6	10.5	0.4
Pasture/Forage	141.5	485.3	15.6
Cropland	11.9	32.3	0.9
Barren	8.2	26.1	0.2
<b>Total</b>	<b>861.2</b>	<b>2449.4</b>	<b>75.7</b>

Looking forward to the final step, we will use land use categories to match per-acre ecosystem value estimates from source areas to the eight-county study region. Unfortunately, value estimates are not available for all of the detailed land use categories present in the region. We therefore simplify the NLCD classification by combining a number of classifications into larger categories for which per-acre

<sup>13</sup> Because 30 meters is wider than the right-of-way and not much narrower than the 125-foot construction corridor, we resample the NLCD data to 10m pixels, which breaks each 30m-by-30m pixel into 9 10m-by-10m pixels. This allows for a closer approximation of the type and area of land cover in the proposed ROW and construction corridor.

values are more available. Specifically, low-, medium-, and high-intensity development are grouped as “urban other,” and deciduous, evergreen, and mixed forest are grouped as “forest.”

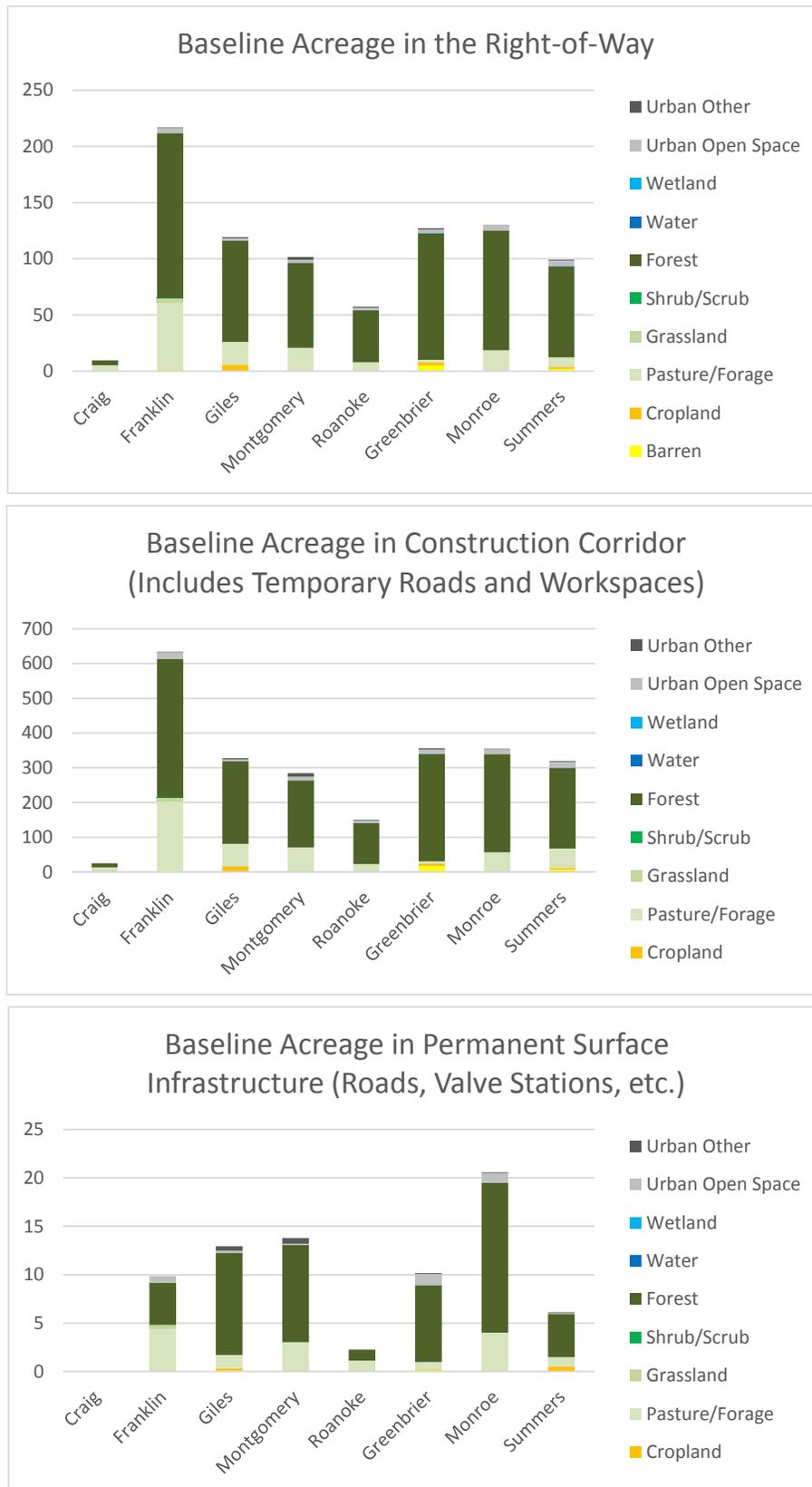


**FIGURE 5: Land Use in the Study Region, as Classified for Ecosystem Service Valuation**

Land cover for the entire study region is shown to display the overall range and pattern of land use. The ecosystem service valuation itself covers only those portions of the study region that would be occupied by the MVP right-of-way and construction corridor.

Sources: Land Cover from National Land Cover Database (Fry, et al. 2011); MVP route digitized from online maps and MVP LLC filings (<http://mountainvalleypipeline.info/maps/>); Counties from USGS (<http://nationalmap.gov>).

In addition and for two reasons, we add land in the NLCD category of “woody wetlands” to the “forest” category for two reasons. First, these wetlands would normally become forest in the study region (Johnston, 2014; Phillips & McGee, 2016a). Second, wetlands possess some of the highest per-acre values for several ecosystem services. To avoid over-estimating the ecosystem services contribution of “woody wetlands,” we count them as “forest” instead of “wetland.”



**FIGURE 6: Baseline (Pre-MVP) Land Use, by County, in the Row, Construction Zones, and Permanent Surface Infrastructure. (See also Table 3.)**

In the end, at least for baseline (no pipeline) conditions, we have land in 10 land uses. The total area that would be disturbed in the construction corridor and temporary roads and other work areas is 2,449 acres, of which 861 acres would be occupied by the permanent right-of-way. An additional 76 acres would be devoted to permanent access roads and other installations on the surface. Figure 6 shows the distribution of acreage in the ROW, construction zone, and in land needed for permanent surface infrastructure by county and pre-MVP, or baseline land use.

**Step 2: Re-assign Acreage to New Land Cover Types for the Construction and Operation Periods**

We assume all land in the construction corridor will be “barren” or at least possess the same ecosystem service productivity profile as naturally-occurring barren land for the duration of the construction period. Water will remain water during construction. Table 4 lists the reassignment assumptions in detail.

**TABLE 4: Land Cover Reclassification**

<b>NLCD Category</b>	<b>Reclassification for Baseline</b>	<b>Reclassification for Construction</b>	<b>Reclassification for Ongoing Operation in the ROW</b>	<b>Reclassification for Ongoing Operation Roads and Surface Infrastructure</b>
<b>Barren Land</b>	Barren	Barren	Barren	Barren
<b>Cultivated Crops</b>	Cropland	Barren	Pasture/Forage	Barren
<b>Pasture/Hay</b>	Pasture/Forage	Barren	Pasture/Forage	Barren
<b>Grassland/Herbaceous</b>	Grassland	Barren	Grassland	Barren
<b>Shrub/Scrub</b>	Shrub/Scrub	Barren	Shrub/Scrub	Barren
<b>Deciduous Forest</b>	Forest	Barren	Shrub/Scrub	Barren
<b>Evergreen Forest</b>	Forest	Barren	Shrub/Scrub	Barren
<b>Mixed Forest</b>	Forest	Barren	Shrub/Scrub	Barren
<b>Woody Wetlands</b>	Forest	Barren	Shrub/Scrub	Barren
<b>Open Water</b>	Water	Water	Water	Barren
<b>Emergent Herbaceous Wetlands</b>	Wetland	Barren	Wetland	Barren
<b>Developed, Open Space</b>	Urban Open Space	Barren	Urban Open Space	Barren
<b>Developed, Low Intensity</b>	Urban Other	Barren	Urban Other	Barren
<b>Developed, Medium Intensity</b>	Urban Other	Barren	Urban Other	Barren
<b>Developed, High Intensity</b>	Urban Other	Barren	Urban Other	Barren

Within the ROW, and for the indefinite period following construction—during ongoing operations—we assume pre-MVP forestland will become shrub/scrub, and cropland will become pasture/forage. We

recognize some pre-MVP cropland may be used for crops after construction has been completed, but as expressed in comments to FERC and elsewhere, and as we discovered through personal interviews with agricultural producers in the region, it seems likely that the ability to manage acreage for row crops will be greatly curtailed, if not eliminated entirely by the physical limits imposed by the MVP and by restrictions in easements to be held by MVP LLC. These include limits on the weight of equipment that could cross the corridor at any given point and difficulty using best soil conservation practices, such as tilling along a contour, which may be perpendicular to the pipeline corridor. (This would require extra time and fuel use that could render some fields too expensive to till, plant, or harvest.) Reclassifying cropland as pasture/forage (which is a generally less productive ecosystem service) recognizes these effects while also recognizing some sort of future agricultural production in the ROW (grazing and possibly haying) could be possible.

An additional effect not captured in our methods is long-standing harm to agricultural productivity due to soil compaction, soil temperature changes, and alteration of drainage patterns due to pipeline construction. As agronomist Richard Fitzgerald (2015) concludes, "it is my professional opinion that the productivity for row crops and alfalfa will never be regenerated to its existing present 'healthy' and productive condition [after installation of the pipeline]." Thus, the true loss in food and other ecosystem service value from pasture/forage acreage would be larger than our estimates reflect.

Permanent access roads and sites for main line valves are assumed, post construction, to remain in the "barren" land use and produce the corresponding level of ecosystem services.

### **Step 3: Multiply Acreage by Per-Acre Value to Obtain ESV**

After obtaining acreage by land use in the construction corridor and the ROW, we are ready to multiply those acres times per-acre-per-year ecosystem service productivity (in dollar terms) to obtain total ecosystem service value in each area and for with- and without-pipeline scenarios. Per-acre ecosystem service values are obtained primarily from a database of more than 1,300 estimates compiled as part of a global study known as "The Economics of Ecosystems and Biodiversity" or "the TEEB" (Van der Ploeg et al., 2010).<sup>14</sup> The TEEB database allows the user to select the most relevant per-unit-area values, based on the land use/land cover profile of the study region, comparison of general economic conditions in the source and study areas, and the general "fit" or appropriateness of the source study for use in the study area at hand. After eliminating estimates from lower-income countries and estimates from the U.S. that came from circumstances vastly different from Virginia and West Virginia, we identified 91 per-acre estimates in the TEEB that adequately provide approximations of ecosystem service value in our study region.<sup>15</sup>

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<sup>14</sup> Led by former Deutsche Bank economist, Pavan Sukhdev, the TEEB is designed to "[make] nature's values visible" in order to "mainstream the values of biodiversity and ecosystem services into decision-making at all levels" ("TEEB - The Initiative," n.d.). It is also an excellent example of the application of the benefit transfer method.

<sup>15</sup> Among those U.S. studies included in the TEEB database that we deemed inappropriate for use here were a study from Cambridge Massachusetts that reported extraordinarily high values for aesthetic and recreational value and the lead author's own research on the Tongass and Chugach National Forests in Alaska. The latter was excluded due to the vast differences in land use, land tenure, climate, and other factors between the source area and the current study region.

After selecting the best candidate studies and estimates in the TEEB database, we still had some key land use/ecosystem services values (such as food from cropland) without value estimates. To fill some of the most critical gaps, we turned to other studies that examined ecosystem service value in this general region (Phillips, 2015a; Phillips & McGee, 2016b) and to specific data on cropland and pasture/hayland value from Virginia Cooperative Extension and the National Agricultural Statistics Service (Lex & Groover, 2015; USDA National Agricultural Statistics Service, 2016).

For several land cover-ecosystem service combinations, either multiple source studies were available or the authors of those studies reported a range of dollar-per-acre ecosystem service values. We are therefore able to report both a low and a high estimate based on the bottom and top end of the range of available estimates.

In the end, we have 165 separate estimates from 61 unique source studies covering 67 combinations of land uses and ecosystem services. (See Appendix A to this report for a full list of the values and sources that yielded these estimates.) This is still a fairly sparse coverage, given there are 140 possible combinations of the 10 land uses and 14 services. Therefore, we know our aggregate estimates will be lower than they would be if dollar-per-acre values for all 14 services were available to transfer to each of the 10 land use categories in the study region. It is possible to live with that known underestimation, or it is possible to assign per-acre values from a study of one land-use-and-service combination to other combinations. Doing so would introduce unknown over- or perhaps under-estimation of aggregate values. We prefer to take the first course, knowing our estimates are low/conservative and urge readers to bear this in mind when interpreting this information for use in weighing the costs of the proposed MVP.

After calculating acreage and per-acre ecosystem service values, we now calculate ecosystem service value per year for each of the four area/scenario combinations. To repeat, these annual values are:

- Baseline (no pipeline) ecosystem service value in the proposed construction corridor
- Ecosystem service value in the construction corridor during construction
- Baseline (no pipeline) ecosystem service value in the proposed right-of-way
- Ecosystem service value in the right-of-way during the (indefinite) period of ongoing operations<sup>16</sup>

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<sup>16</sup> Note that while the ROW and construction corridors overlap in space, they do not overlap in time, at least not from an ecosystem services production standpoint. During construction, the land cover that would eventually characterize the ROW will not exist in the construction corridor. Thus, there is no double counting of ecosystem service values or of costs from their diminution as a result of either construction or ongoing operations.

Value calculations are accomplished according to this formula

$$\text{ESV per year} = \sum_{i,j} [(\text{Acres}_j) \times (\$/\text{acre}/\text{year})_{i,j}]$$

Where:

$\text{Acres}_j$  is the number of acres in land use (j)  
 $(\$/\text{acre}/\text{year})_{i,j}$  is the dollar value of each ecosystem service (i) provided from each land use (j) each year. These values are drawn from the TEEB database and other sources listed in Appendix A.

#### Step 4: Subtract Baseline “without MVP” ESV from ESV in “with MVP” Scenario

With the steps above complete, we now estimate the cost in ecosystem service value of moving from the baseline (no pipeline) or status quo to a scenario in which the MVP is built and operating.

The cost of construction is the ESV from the construction corridor during construction, minus baseline ESV for the construction corridor, multiplied by two. The multiplication by two is due to the conservative assumption that revegetation and restoration to a land use that is functionally different from barren land will take at least two years.

The ecosystem service cost of ongoing operations is ESV from the ROW in the “with MVP” scenario minus the baseline ESV for the ROW. This will be an annual cost borne every year in perpetuity.

### Ecosystem Service Value Estimates

In the baseline or “no pipeline” scenario, the construction corridor and land slated for temporary roads and workspaces produces between \$11.4 and \$41.1 million per year in ecosystem service value. The largest contributors to this total (at the high end) are aesthetic value, water supply, and protection from extreme events. Under a “with MVP” scenario, and not surprisingly given the temporary conversion to bare/barren land, these figures drop to near zero, or between \$451 and \$3,552 per year for each of the two years. Taking the difference as described above, estimated per-year ecosystem service cost of the MVP’s construction would be between \$11.4 and \$41.1 million, or between \$22.8 and \$82.2 million over two years in the eight-county study region (Table 5).

The ecosystem service costs for the ROW are predictably smaller on a per-year basis, but because they will persist indefinitely, the cumulative effect will be much higher. Under the “with MVP” scenario, using minimum values, the annual ecosystem service value from the ROW falls from \$4.2 million to about \$160,000 for an annual loss of over \$4.1 million. At the high end of the range, the ecosystem service value of the ROW would fall from \$15.3 million to about \$436,000 for an annual loss of \$14.8 million in the study region (Table 6).

**TABLE 5: Ecosystem Service Value Lost to the Construction Corridor and Temporary Roads and Workspaces in Each of Two Years, Relative to Baseline, by Ecosystem Service (2015\$)**

Ecosystem Service	Study Region			
	Baseline (low)	Loss (low)	Baseline (high)	Loss (high)
Aesthetic Value	8,046,503	(8,046,503)	32,491,871	(32,491,871)
Air Quality	666,647	(666,647)	680,270	(680,270)
Biological Control	12,524	(12,524)	30,044	(30,044)
Climate Regulation	209,199	(209,199)	228,236	(228,236)
Erosion Control	15,104	(15,104)	146,466	(146,466)
Protection from Extreme Events	1,447,945	(1,447,945)	1,482,118	(1,482,118)
Food Production	10,929	(10,929)	10,929	(10,929)
Pollination	369,769	(369,769)	433,706	(433,706)
Raw Materials	43,763	(43,763)	297,240	(297,240)
Recreation	64,090	(63,722)	967,718	(965,459)
Soil Formation	12,837	(12,837)	41,061	(41,061)
Waste Treatment	22,692	(22,666)	527,395	(527,369)
Water Supply	84,501	(84,444)	2,306,613	(2,305,346)
Water Flows	417,057	(417,057)	1,444,340	(1,444,340)
<b>Total</b>	<b>11,423,559</b>	<b>(11,423,108)</b>	<b>41,088,007</b>	<b>(41,084,455)</b>

Most of this loss is due to the conversion of forestland to shrub/scrub. Shrub/scrub naturally increases its share of overall ecosystem service value in the “with pipeline” scenario. Those gains are dwarfed, however, by the loss of much more productive forests. Similarly, the ecosystem-service value of cropland falls due to its assumed transition to pasture/forage. While there is some gain in the pasture/forage category, there is a net loss of ecosystem service value from the two agricultural land uses of between \$1,000 and \$28,000 per year.<sup>17</sup>

**TABLE 6: Ecosystem Service Value Lost Each Year Post Construction in Right-Of-Way, Relative to Baseline, by Ecosystem Service (2015\$)**

Ecosystem Service	Study Region			
	Baseline (low)	Loss (low)	Baseline (high)	Loss (high)
Aesthetic Value	2,985,838	(2,945,731)	12,089,964	(12,040,073)
Air Quality	248,102	(222,539)	251,931	(222,539)
Biological Control	4,062	(1,673)	10,554	(8,166)
Climate Regulation	68,141	(32,887)	75,238	(39,900)
Erosion Control	4,926	12,931	51,847	(26,014)

<sup>17</sup> Note that due to differences in the range of dollars-per-acre estimates available for the various combinations of land use and ecosystem service, there are some instances where an apparent gain at the low end turns into a loss at the high end. For example, and based on the estimates available from the literature, the minimum value for erosion control from shrub/scrub acres is higher than the minimum for forests. Because we assume that forests return to shrub/scrub after the pipeline is in operation, this translates into a net increase in erosion regulation. At the high end, however, available estimates show a higher erosion control value for forests than for shrub/scrub. Thus, the high estimate shows a net loss of erosion control benefits. It is important, therefore, to keep in mind that these estimates are sensitive to the availability of underlying per-acre estimates.

<b>Protection from Extreme Events</b>	536,977	(529,386)	547,721	(529,386)
<b>Food Production</b>	3,308	(1,043)	3,308	(1,043)
<b>Pollination</b>	137,114	(133,628)	160,576	(153,309)
<b>Raw Materials</b>	16,306	(16,278)	110,739	(110,711)
<b>Recreation</b>	18,729	1,738	355,391	(332,073)
<b>Soil Formation</b>	4,641	(4,083)	15,136	(14,579)
<b>Waste Treatment</b>	8,197	(7,182)	194,147	37,326
<b>Water Supply</b>	31,478	(31,450)	859,334	(857,620)
<b>Water Flows</b>	155,301	(152,619)	536,635	(529,356)
<b>Total</b>	4,223,118	(4,063,831)	15,262,520	(14,827,442)

Finally, the establishment of permanent access roads and other surface installations will entail the conversion of land from various uses to what, from an ecosystem services perspective, will function as barren land. These areas amount to a total of only 76 acres across the study region, so the effect on ecosystem service values are correspondingly small, at least when compared to the impact of the construction zone and ROW. As with the ROW, however, these effects would occur year after year for as long as the MVP exists. The annual loss of ecosystem service value from these areas under a “with MVP” scenario would range from \$350,000 to \$1.2 million.

It bears repeating the benefit transfer method applied here is useful for producing first-approximation estimates of ecosystem service impacts. For several reasons, we believe this approximation of the effect of the MVP’s construction and operation on ecosystem service values is too low rather than too high. These reasons include:

- The estimates include only the loss of value that would otherwise emanate from the ROW, construction corridors, access roads, temporary workspaces, and other surface installations themselves.

The estimates do not account for the extent to which the construction and long-term presence of the MVP could damage the ecosystem service productivity of adjacent land. During construction, the construction corridor itself could be a source of air and water pollution that may compromise the ability of surrounding or downstream areas to deliver ecosystem services of their own. For example, if sediment from the construction zone that reaches surface waters, the sediment will cause those streams and rivers to lose some of their ability to provide clean water, food (fish), recreation, and other valuable services. This reduced productivity may persist well after construction is complete.<sup>18</sup>

- Over the long term, the right-of-way would serve as a pathway by which invasive species or wildfire could more quickly penetrate areas of interior forest habitat, thereby reducing the natural

<sup>18</sup> This is not a small risk. As noted by the Dominion Pipeline Monitoring Coalition “pipeline construction over steep Appalachian mountains creates significant runoff and slope-failure problems” (Webb, 2015b). In one example, multiple problems during and after construction of a relatively small pipeline on Peters Mountain in Giles County caused extensive erosion and damage to waterways (Webb, 2015a). The coalition points out that “the potential for water resource problems will be greatly multiplied for the proposed larger projects [like the MVP], both in terms of severity and geographic extent.”

productivity of those areas and imposing direct costs on communities and landowners in the form of fire suppression costs, lost property, and the costs of controlling invasive species.

- Finally, these estimates reflect only those changes in natural benefits that occur due to changes in conditions on the surface of the land. Particularly because the proposed pipeline would traverse areas of karst topography there is well-founded concern that subsurface hydrology could be affected during construction and throughout the lifetime of the pipeline (Jones, 2015; Pyles, 2015). Blasting and other activities during construction could alter existing underground waterways and disrupt water supply. There is also a risk that sediment and other contaminants could reach groundwater supplies if sinkholes form near the pipeline during construction or afterwards.

## EFFECTS ON PROPERTY VALUE

### Land Price Effects

To say the impacts and potential impacts of the MVP on private property value are important to people along its proposed route would be an extreme understatement. The Pipeline Information Network (2015) reviewed all MVP comments submitted to FERC in the first three months of 2015. Some 60% of these comment letters mentioned property value or property rights concerns. Landowners and Realtors along the proposed route of the Mountain Valley Pipeline report have abandoned building plans, seen lower than expected appraisals, and have had buyers walk away from properties potentially affected by the MVP (Adams, 2016). At least one ROW landowner has been told by two insurance agencies that rates would likely increase for properties like hers if, indeed, coverage remains available at all (Roston, 2015).

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*“I never met a client who would choose, for a family home, a property with a 42” pipeline full of explosive gas over a similar property without such an environmental and personal-safety hazard.”*

*– Patricia Tracy, Realtor  
Blacksburg, Virginia*

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While it is impossible to know precisely how large an effect the specter of the MVP has already had on land prices, there is strong evidence from other regions that the effect would be negative. In a systematic review, Kielisch (2015) presents evidence from surveys of Realtors, home buyers, and appraisers demonstrating natural gas pipelines negatively affect property values for a number of reasons. Among his key findings relevant to the MVP:

- 68% of Realtors believe the presence of a pipeline would decrease residential property value.
- Of these Realtors, 56% believe the decrease in value would be between 5% and 10%. (Kielisch does not report the magnitude of the price decrease expected by the other 44%.)
- 70% of Realtors believe a pipeline would cause an increase in the time it takes to sell a home. This is not merely an inconvenience, but a true economic and financial cost to the seller.
- More than three quarters of the Realtors view pipelines as a safety risk.

- In a survey of buyers presented with the prospect of buying an otherwise desirable home with a 36-inch diameter gas transmission line on the property, 62.2% stated that they would no longer buy the property at any price. Of the remainder, half (18.9%) stated that they would still buy the property, but only at a price 21%, on average, below what would otherwise be the market price. The other 18.9% said the pipeline would have no effect on the price they would offer.

Not incidentally, the survey participants were informed that the risks of “accidental explosions, terrorist threats, tampering, and the inability to detect leaks” were “extremely rare” (2015, p. 7).

Considering only those buyers who are still willing to purchase the property, the expected loss in market value would be 10.5%.<sup>19</sup> This loss in value provides the mid-level impact in our estimates. A much greater loss (and higher estimates) would occur if one were to consider the fact that 62% of buyers are effectively reducing their offer prices by 100%, making the average reduction in offer price for all potential buyers 66.2%.<sup>20</sup> In our estimates, however, we have used the smaller effect (-10.5%) based on the assumption that sellers will eventually find one of the buyers still willing to buy the pipeline-easement-encumbered property.

- Based on five “impact studies” in which appraisals of smaller properties with and without pipelines were compared, “the average impact [on value] due to the presence of a gas transmission pipeline is -11.6%” (Kielisch, 2015, p. 11). The average rises to a range of -12% to -14% if larger parcels are considered, possibly due to the loss of subdivision capability.

These findings are consistent with economic theory about the behavior of generally risk-averse people. While would-be landowners who are informed about pipeline risks and nevertheless decide to buy property near the proposed MVP corridor could be said to be “coming to the nuisance,” one would expect them to offer less for the pipeline-impacted property than they would offer for a property with no known risks.

Kielisch’s findings demonstrate that properties on natural gas pipeline rights-of-way suffer a loss in property value. Boxall, Chan, and McMillan (2005), meanwhile, show that pipelines also decrease the value of properties lying at greater distances. In their study of property values near oil and gas wells, pipelines, and related infrastructure, the authors found that properties within the “emergency plan response zone” of sour gas<sup>21</sup> wells and natural gas pipelines faced an average loss in value of 3.8%, other things being equal.

The risks posed by the MVP would be different – it would not be carrying sour gas, for example—but there are similarities between the MVP scenario and the situation in the study that makes their finding particularly relevant. Namely, the emergency plan response zones (EPZs) are defined by the health and safety risks posed by the gas operations and infrastructure. Also, in contrast to MVP-cited studies

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<sup>19</sup> Half of the buyers would offer 21% less, and the other half would offer 0% less; therefore the expected loss is  $0.5(-21\%) + 0.5(0\%) = -10.5\%$ .

<sup>20</sup> This is the expected value calculated as  $0.622*(-100\%)+0.189*(-21\%)+0.189*(0\%)$ .

<sup>21</sup> “Sour” gas contains high concentrations of hydrogen sulfide and poses an acute risk to human health.

showing no price effects (see “Claims that pipelines have no effect on property value may be invalid,” below), the Boxall study examines prices of properties for which landowners must inform prospective buyers when one or more EPZs intersect the property.

The MVP has both a high consequence area (HCA) and an evacuation zone radiating from both sides of the pipeline defined by health and safety risks. Whether disclosed or not by sellers, prospective buyers are likely to become informed regarding location of the property relative to the MVP’s HCA and evacuation zones or, at a minimum, regarding the presence of the MVP in the study region.

In addition to the emerging body of evidence that there is a negative relationship between natural gas infrastructure and property value, there have been many analyses demonstrating the opposite analog. Namely, it is well-established that amenities such as scenic vistas, access to recreational resources, proximity to protected areas, cleaner water, and others convey positive value to real property.<sup>22</sup> There are also studies demonstrating a negative impact on land value of various other types of nuisance that impose noise, light, air, and water pollution, life safety risks, and lesser human health risks on nearby residents (Bixuan Sun, 2013; Bolton & Sick, 1999; Boxall et al., 2005). The bottom line is that people derive greater value from, and are willing to pay more for, properties that are closer to positive amenities and farther from negative influences, including health and safety risks.

**Claims that pipelines have no effect on property value may be invalid.**

Both FERC and MVP LLC have cited several studies purporting to show that natural gas pipelines (and in one case a liquid petroleum pipeline) have at most an ambiguous and non-permanent effect on property values. In its final EIS regarding the Constitution Pipeline, for example, FERC cited two articles concluding, in brief, that effects on property value from the presence of a pipeline can be either positive or negative, and that decreases in values due to a pipeline explosion fade over time (Diskin, Friedman, Peppas, & Peppas, 2011; Hansen, Benson, & Hagen, 2006). In its filing, MVP LLC cites additional studies drawing similar conclusions based on comparison of market and/or assessed prices paid for properties “on” or “near” a pipeline versus those farther away (Allen, Williford & Seale Inc., 2001; Fruits, 2008; Mountain Valley Pipeline LLC, 2015b; Palmer, 2008).

While the studies differ in methods, they are similar in that each fails to take into account two factors potentially voiding their conclusions entirely. First, the studies do not consider that the property value data used do not represent prices arising from transactions in which all buyers have full information about the subject properties. Second, for the most part, the definition of nearness to the pipelines may be inappropriate or inadequate for discerning actual effects on property value of that nearness.

Economic theory holds that for an observed market price to be considered an accurate gauge of the value of a good, all parties to the transaction must have full information about the good. If, on the other hand, buyers lack important information about a good, in this case whether a property is near a potential hazard, they cannot bring their health and safety concerns—their risk aversion—to bear on

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<sup>22</sup> Phillips (2004) is one such study that includes an extensive review of the literature on the topic.

their decision about how much to offer for the property. As a result, buyers' offer prices will be higher than they would be if they had full information.

As Albright (2011) notes in response to the article by Disken, Friedman, Peppas, & Peppas (2011):

The use of the paired-sales analysis makes the assumption of a knowing purchaser, but I believe this analysis is not meaningful unless it can be determined that the purchaser had true, accurate and appropriate information concerning the nature and impact of the gas pipeline on, near or across their property. ... I believe that the authors' failure to confirm that the purchasers in any of the paired sales transactions had full and complete knowledge of the details concerning the gas transmission line totally undercut the authors' work product and the conclusions set forth in the article. (p.5)

Of the remaining studies, only Palmer (2008) gives any indication that any buyers were aware of the presence of a pipeline on or near the subject properties. For Palmer's conclusion that the pipeline has no effect on property value to be valid, however, it must be true that **all** buyers have full information, and this was not the case.

The study by Hansen, Benson, and Hagen (2006) actually reinforces the conclusion that when buyers know about a nearby pipeline, market prices drop. The authors found that property values fell after a deadly 1999 liquid petroleum pipeline explosion in Bellingham, Washington. They also found that the negative effect on prices diminished over time. This makes perfect sense if, as is likely, information about the explosion dissipated once the explosion and its aftermath left the evening news and the physical damage from the explosion had been repaired.

We do not think it is appropriate to conclude from this study (as FERC did in the case of the Constitution Pipeline) that natural gas transmission pipelines would have no effect on land prices in today's market. In contrast to Bellingham homebuyers in the months and years after the 1999 explosion, today's homebuyers can query Zillow to see the history of land prices near the pipeline and explore online maps to see what locally undesirable land uses exist near homes they might consider buying. They also have YouTube and repeated opportunities to find and view news reports, citizens' videos, and other media describing and depicting such explosions and their aftermath. Whether the pre-explosion prices reflected the presence of the pipeline or not, it is hard to imagine that a more recent event and the evident dangers of living near a fossil fuel pipeline would be forgotten so quickly by today's would-be homebuyers.

Online based tools have changed the ways people shop for homes. We are now in a real world much closer to the competitive economic model that assumes all buyers have full information about the homes they might purchase. Anyone with an eye toward buying property near the proposed MVP corridor would quickly learn that the property is in fact near the corridor, that there is a danger the property could be adversely affected by the still-pending project approval, and that fossil fuel pipelines and related infrastructure have an alarming history of negative health and environmental effects. Accordingly, the price buyers would offer for a home near the MVP will be lower than the price offered for another farther away or in another community or region entirely.

The second problem with the studies is that while they purport to compare the price of properties near a pipeline to properties not near a pipeline, many or in some cases all of the properties counted as “not near” the pipelines are, in fact, near enough to the subject pipelines that health and safety concerns could influence prices. In both studies written by the Interstate Natural Gas Association of America (INGAA) the authors compare prices for properties directly on a pipeline right-of-way to prices of properties off the right-of-way. However, in almost all cases the geographic scope of the analysis was small enough that most or all of the properties not on the right-of-way are still within the pipelines’ respective evacuation zones (Allen, Williford & Seale Inc., 2001; Integra Realty Resources, 2016).<sup>23</sup>

The 2016 INGAA study suffers from the same problems, including the comparison of properties “on” and “off” the six pipelines analyzed when a majority of the “off” properties are within the pipelines’ evacuation zones. In eight of the case studies—those for which a specific distance from pipeline was reported—an average of 72.5% of the “off” properties were actually within the evacuation zone. (We estimated the evacuation zone based on available information about the pipelines’ diameter and operating pressure.) For the other two pipelines, the study reported a simple “yes” or “no” to indicate whether the property abutted the pipeline in question. For these cases, we assume the author’s methods, while flawed, are at least consistent from one case study to the next meaning it is likely at least 50% or more of the comparison properties (the “off” properties) are in fact within the evacuation zone.

To adequately compare the price of properties with and without a particular feature, there needs to be certainty that properties either have or do not have the feature. It is a case where one actually does need to compare apples to oranges. However, because there is no variation in the feature of interest (i.e., the majority of properties are within the evacuation zone), the study is only looking at and comparing “apples.” In this case, the feature of interest is the presence of a nearby risk to health and safety. With no variation in that feature, one would not expect a systematic variation in the price of the properties. By comparing apples to apples when it should be comparing apples to oranges, the INGAA study reaches the forgone and not very interesting conclusion that properties that are similar in size, condition, and other features including their location within the evacuation zone of a natural gas pipeline have similar prices.

To varying degrees, the other studies cited by FERC and in MVP LLC’s filing suffer from the same problem. Fruits (2008), who analyzes properties within one mile of a pipeline that has a 0.8-mile-wide-evacuation zone (0.4 miles on either side), offers the best chance that a sizable portion of subject properties are in fact “not near” the pipeline from a health and safety standpoint. He finds that distance from the pipeline does not exert a statistically significant influence on the property values, but he does not examine the question of whether properties within the evacuation zone differ in price from comparable properties outside that zone. A slightly different version of Fruits’ model, in other words, could possibly detect such a threshold effect. Such an effect would show up, of course, only if the

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<sup>23</sup> This is based on a best estimate of the location of the pipelines derived from descriptions of the pipelines location provided in the study (only sometimes shown on the neighborhood maps) and an approximation of the evacuation zone based on pipeline diameter and operating pressure (Pipeline Association for Public Awareness, 2007).

buyers of the properties included in the study had been aware of their new property's proximity to the pipeline.

In short, one cannot conclude from these flawed studies' failure to identify a negative effect of pipelines on property value that no such effect exists. To evaluate the effects of the proposed MVP on property value, FERC and others must look to studies (including those summarized in the previous section) in which buyers' willingness to pay is fully informed about the presence of nearby pipelines and in which the properties bought are truly different in terms of their exposure to pipeline-related risks.

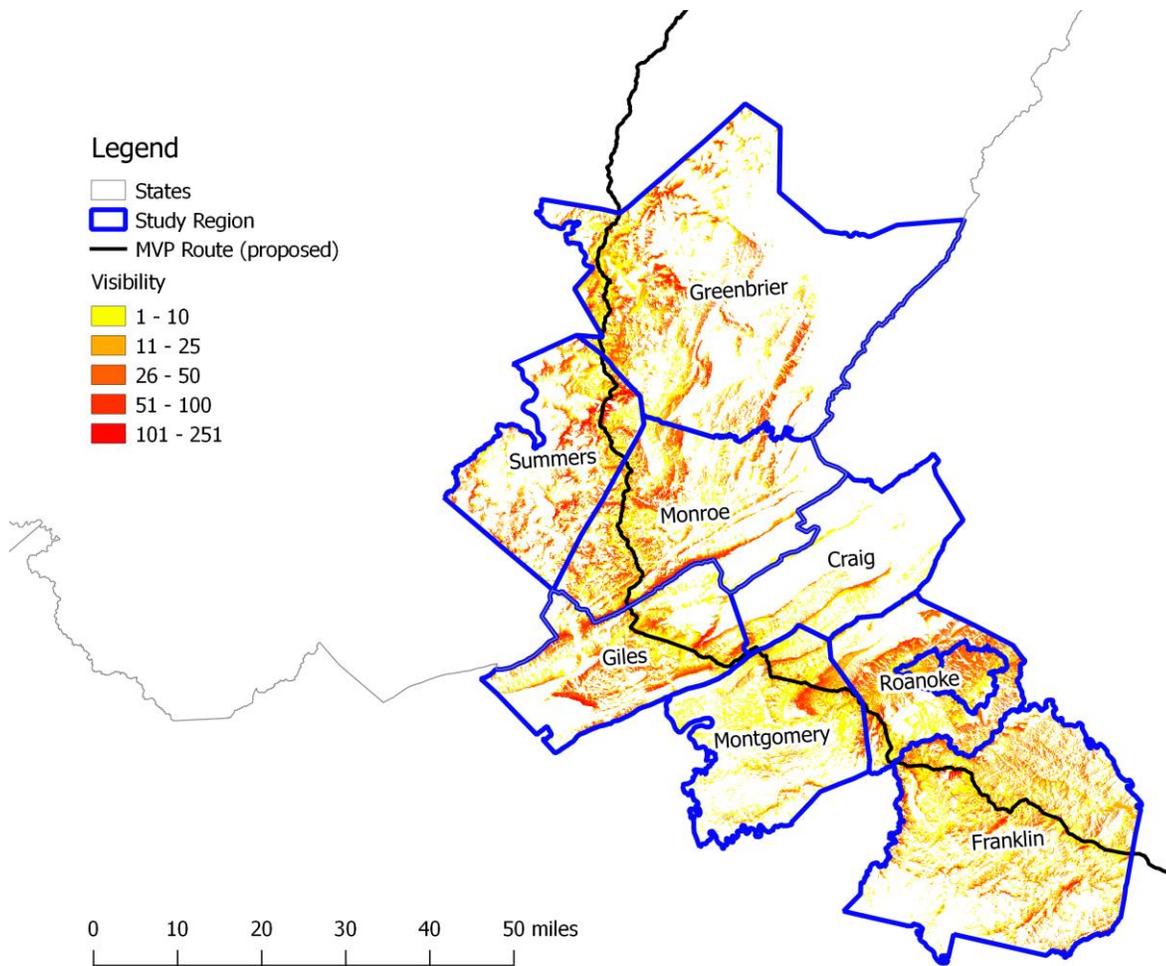
## Visual Effects and Viewshed Analysis

Information about how the visual effects of natural gas transmission pipelines are reflected in property value is scarcer than information related to health and safety effects. On one hand, we know better views increase property value. Conversely, utility corridors from which power lines can be seen decrease property values (by 6.3% in one study) (Bolton & Sick, 1999). This suggests that a pipeline corridor reduces property value either by impairing a good view or, if like power lines, by simply being unattractive. It is reasonable to conclude that the proposed MVP would have effects on property value that are mediated through visual effects, but the literature to date does not offer clear guidance on how large or strong the effects may be. We therefore have not included separate estimates of the impact of the MVP on property value in the viewshed. Moreover, we do not wish to double-count a portion of the impact of the MVP on "Aesthetics," which is already included among the ecosystem service value effects.

We do want to know, however, how many properties might suffer a portion of that lost aesthetic value. To keep the estimate conservative, we only count properties with a higher-than-average likelihood the MVP corridor could be seen from them. To determine this for each parcel, a GIS-based visibility analysis provides an estimate of how many points along the pipeline could potentially be seen from each 30m-by-30m spot in the study region. To keep the computing needs manageable, we analyzed a sample of points placed at 100m intervals along the proposed MVP route.

Because weather, smog, and other conditions limit the distance at which one can see anything in the mountains and valleys of Virginia and West Virginia, we restricted the scope of analysis for any given point on the pipeline to spots in the study region that lie within a 25-mile radius. We analyzed a section of the MVP beginning 25 miles north of the western boundary of Greenbrier County, West Virginia that extended to a point 25 miles east of the eastern boundary of Franklin County, Virginia.

By tallying the number of points on the pipeline corridor that could be seen from each spot in the study region and then connecting those spots to parcel boundaries, we obtain an estimate of how much of the pipeline could be seen from some spot within a given parcel. In Figure 6, yellow spots on the maps are points where between 1 and 10 points on the pipeline are visible, whereas orange and red spots have a view of up to as many as 251 points. Since each point represents 100 meters of pipeline, there are places in the study region where 25.1 km, or 15.6 miles, of pipeline corridor could be visible.



**FIGURE 7: Visibility of the Proposed Mountain Valley Pipeline**

The color of each point on the map indicates the number of waypoints, spaced 100m apart along the MVP route and within 25 miles, that could be seen from each point. Note that the analysis is based on elevation only and does not take into account the extent to which buildings or trees may mask views of the pipeline corridor.

Sources: MVP route digitized from online maps and MVP LLC filings (<http://mountainvalleypipeline.info/maps/>); Counties from USGS (<http://nationalmap.gov>); Visibility analysis thanks to Bryan Behan and Stockton Maxwell of Radford University.

Taking into account those spots on nearly every parcel from which the MVP corridor is not visible, the average of the maximum number of points visible from a parcel is 10. This serves as our threshold for identifying parcels from which the pipeline would be “visible.” Parcels containing no locations (again each spot is a 30m-by-30m square) from which more than 10 pipeline points are visible are considered to have no view of the pipeline. By this rule, and out of 253,880 parcels in the study region, 78,553 parcels, or just under one-third, would have a potential view of the pipeline.<sup>24</sup> The total value of these properties is currently \$16.8 billion.

This a potential view of the pipeline because other visual obstructions, such as trees or buildings, are not taken into account. In particular, smaller parcels in more densely developed areas could be at elevations relative to the pipeline which would make it possible to see the MVP corridor, but the house

<sup>24</sup> Because GIS parcel maps are unavailable for Craig and Monroe Counties, those counties are not included in these figures.

next door may block that view. The restriction of our analysis to those parcels that have comparatively many spots from which to potentially see the pipeline mitigates this limitation of our GIS analysis. The reason is simply that smaller urban lots have very few 30-meter-square spots to begin with. A parcel has to be at least 10 spots in size (2.2 acres), with the pipeline visible from every spot, to cross the 10-spot threshold.

## Parcel Values

For five of the eight counties in the study region, GIS data on parcel boundaries and corresponding tabular data with parcel value was obtained from the jurisdictions' public records. For the remaining three counties, electronic data on parcel boundaries, parcel values, or both were unavailable. In those cases, we adopted variations on a second-best approach to ensure more complete coverage of land value effects.

- Summers County, WV parcel boundaries were available, but the corresponding parcel values were not. We therefore used median house value from the US Census Bureau's American Community Survey (ACS) (2014) as a proxy. After adjusting the ACS figures for inflation, we attached those values to each parcel, according to which block group the parcel occupies.<sup>25</sup>
- Monroe County, WV parcel boundaries are viewable via the County's online map service, which allowed us to develop a list of parcels crossed by the ROW and those that overlap the evacuation zone. Similar to Summers County, we used median house value from ACS as a proxy for parcel value.
- For Craig County, parcel maps and corresponding parcel values are not available. MVP's route map, however, does show the 10 parcels crossed by the (ROW) through the County's southwest corner. We assume that 10 more parcels would be within the evacuation zone. For parcel value, we use the same proxy from ACS.

Two other features of the parcel data required adjustments prior to performing any land value impact calculations. First, the Giles County data had instances in which two or more individual tracts in different parts of the County are listed on a single tax record with a single property value. The consequence is that the value of all of the land connected to such multi-tract tax records would be swept up with the value of just those tracts actually crossed by the proposed ROW, or in the evacuation zone. To avoid overstating impacts, we split the multi-tract parcels into separate tax records and assigned each tract its own value based on its size and the per-acre value of the original multi-tract parcel.

The second remaining issue deals with public land that is unlikely to be sold and therefore does not possess any market value. To ensure these properties would not inflate overall property value effects, we used the "Protected Areas Database" from the National Gap Analysis Program to identify fee-owned conservation properties, such as portions of the Jefferson National Forest and state, county, and

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<sup>25</sup> Because many parcels overlap block group boundaries, each parcel is assigned to a block according to whether its centroid, or geometric center, lies within the block group.

municipal parks (Conservation Biology Institute, 2012). Once identified, we set the value of all such properties equal to zero.

With all of these adjustments made, there remains the comparatively straightforward matter of identifying parcels of six types for which one could expect some effect of the MVP on the value. In order of increasing distance from the pipeline itself, these are:

1. Parcels crossed by the right-of-way  
(716 parcels, with total value (before MVP) of \$125.9 million)
2. Parcels crossed by the construction corridor  
(768 parcels, with total value (before MVP) of \$132.6 million)
3. Parcels at least partially within the high consequence area (HCA)  
(2,333 parcels, with total value (before MVP) of \$320.6 million)
4. Parcels at least partially within the evacuation zone  
(8,221 parcels, with total value (before MVP) of \$972.6 million)
5. Parcels from which the pipeline would be visible (as defined in the previous section)  
(78,553, with total value (before MVP) of \$16.8 billion, not counting Monroe or Craig County)<sup>26</sup>

Note there is overlap among these zones. All ROW parcels are within the construction, HCA, and evacuation zones, for example. To avoid double counting we apply only one land value effect to any given parcel. ROW parcels are assumed to suffer no further reduction in value due to their location within the evacuation zone.

We have not considered the construction corridor separately this analysis. Even though the additional 52 parcels and \$6.7 million in value (relative to parcels in the ROW) are not trivial, we do not have a basis for estimating a change in value that is separate from or in addition to the change due to the parcels' proximity to the ROW or their location within the evacuation zone.

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*[Upon learning of the proposed MVP route through my property,] I immediately put the land on the market, disclosing its [bisection] by the pipeline...I was told by a realtor that a sale was out of the question, as the land had lost its value for building.... As of now I have not received any offers except ones that make a purchase contingent on the pipeline not being built. Apparently buyers do care.*

*- Christian M. Reidys, Ph.D.  
Montgomery County Landowner*

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Furthermore, we treat parcels in the HCA and in the evacuation zone the same way and apply a single land value change to all parcels in the evacuation zone. Arguably, there should be a larger effect on parcels in the HCA than those only in the evacuation zone. Living with the possibility of having to evacuate one's home at any time day or night could have a

smaller effect on property value than living with the possibility of not surviving a "high consequence" event and, therefore, not having the chance to evacuate at all. We do not have data or previous study

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<sup>26</sup> Monroe and Craig County are excluded because we do not have the necessary GIS parcel boundary data.

results that allow us to draw such a distinction, so instead we apply the lower evacuation zone effect to all HCA and evacuation zone parcels.

To summarize, Table 7 repeats a portion of Table 1, but with the property value effects in place of check marks.

**TABLE 7: Summary of Marginal Property Value Effects**

Values / Effects	Right-of-Way (Low, Medium, & High Effects)	High Consequence Area	Evacuation Zone	Pipeline Viewshed
Land / Property Value	-4.2% <sup>a</sup> -10.5% <sup>b</sup> -13.0% <sup>c</sup>		-3.8% <sup>d</sup>	Impact included with Ecosystem Services

Notes:

- a. Kielisch, Realtor survey in which 56% of respondents expected an effect of between -5% and -10% ( $0.56 \times -7.5\% = -4.2\%$ ).
- b. Kielisch, buyer survey in which half of buyers still in the market would reduce their offer on a property with a pipeline by 21% ( $0.50 \times -0.21 = -10.5\%$ ).
- c. Kielisch, appraisal/impact studies showing an average loss of between -12% and -14% (-13% is the midpoint)
- d. Boxall, study in which overlap with an emergency planning zone drives, on average, a 3.8% reduction in price. We apply this reduction ONLY to those parcels in the evacuation zone that are not also in the ROW or within one half mile of the compressor station.

### Estimated Land Value Effects

Following the procedures outlined in the previous section, our conservative estimate for costs of the proposed MVP would include between \$42.2 million and \$53.3 million in diminished property value. Some of the most intense effects will be felt by the owners of 716 parcels in the path of the right-of-way, who collectively would lose between \$5.3 million and \$16.4 million in property value. Some 8,221 additional parcels lie outside the ROW but are within or touching the evacuation zone. These parcels’ owners would lose an estimated \$37.0 million (Table 8). A far greater number of parcels, 78,553, would experience a loss in value due to diminished quality of the view from their properties.

Based on median property tax rates in each county, these one-time reductions in property value would result in reductions in property tax revenue of between \$243,500 and \$308,400 per year (Table 9). To keep their budgets balanced in the face of this decline in revenue, the counties would need to increase tax rates, cut back on services, or both. The loss in revenue would be compounded by the likelihood that the need for local public services, such as road maintenance, water quality monitoring, law enforcement, and emergency preparedness/emergency response could increase. The MVP could drive up expenses while driving down the counties’ most reliable revenue stream.<sup>27</sup>

<sup>27</sup> We recognize that MVP anticipates making tax payments, but because those payments are tied to net income from the operation of the pipeline, they may fluctuate from year to year or disappear entirely if pipeline operations become unprofitable.

**TABLE 8: Summary of Land Value Effects, by Zone and County**

Area	Effects in Right-of-Way			Effects in Evacuation Zone
	Realtor Survey (4.2%)	Buyer Survey (10.5%) <sup>a</sup>	Impact Studies (13.0%)	Boxall Study (3.8%)
<b>Study Region</b>	-5,288,289	-13,220,723	-16,368,514	-36,958,088
<b>Virginia Portion</b>	-4,484,041	-11,210,102	-13,879,174	-30,656,302
<b>Craig</b>	-60,223	-150,557	-186,404	-54,487
<b>Franklin</b>	-2,138,174	-5,345,434	-6,618,157	-14,855,120
<b>Giles</b>	-792,099	-1,980,248	-2,451,735	-4,174,604
<b>Montgomery</b>	-714,101	-1,785,252	-2,210,312	-7,009,533
<b>Roanoke</b>	-779,444	-1,948,611	-2,412,566	-4,562,557
<b>West Virginia Portion</b>	-804,248	-2,010,620	-2,489,339	-6,301,786
<b>Greenbrier</b>	-186,961	-467,402	-578,688	-1,438,278
<b>Monroe</b>	-382,228	-955,571	-1,183,088	-3,321,634
<b>Summers</b>	-235,059	-587,647	-727,563	-1,541,874

**TABLE 8: Continued**

Area	Total of ROW and Evacuation Zone Effects		
	Low	Medium	High
<b>Study Region</b>	-42,246,377	-50,178,810	-53,326,601
<b>Virginia Portion</b>	-35,140,343	-41,866,404	-44,535,476
<b>Craig</b>	-114,710	-205,045	-240,892
<b>Franklin</b>	-16,993,293	-20,200,554	-21,473,277
<b>Giles</b>	-4,966,703	-6,154,852	-6,626,339
<b>Montgomery</b>	-7,723,634	-8,794,785	-9,219,845
<b>Roanoke</b>	-5,342,002	-6,511,168	-6,975,123
<b>West Virginia Portion</b>	-7,106,034	-8,312,406	-8,791,125
<b>Greenbrier</b>	-1,625,239	-1,905,680	-2,016,966
<b>Monroe</b>	-3,703,862	-4,277,204	-4,504,721
<b>Summers</b>	-1,776,933	-2,129,522	-2,269,438

In addition to factors that make our estimates of the effects on property value conservative,<sup>28</sup> there is one other factor that makes the estimates of effects on property taxes lower than expected if the MVP is permitted. Some portion of properties in the ROW are currently undeveloped but still assessed at a

<sup>28</sup> These factors include using the lower expected price reduction from the buyer survey and applying the same price reduction to the entire evacuation zone (including the HCA).

value that assumes a single house site. Depending on where and how the ROW crosses these properties, it is likely that some will lose their potential usefulness for future residential or other development. In those cases, the assessed value (which by law reflects market value) will fall, and tax revenue generated by future development will never materialize.

**TABLE 9: Effects on Local Property Tax Revenue**

Area	Median Tax Rate (% of Value) <sup>a</sup>	Lost Property Tax Revenue		
		Low	Medium	High
<b>Study Region</b>		-243,476	-289,966	-308,414
<b>Virginia Portion</b>		-217,097	-259,111	-275,783
<b>Craig</b>	0.50%	-574	-1,025	-1,204
<b>Franklin</b>	0.47%	-79,868	-94,943	-100,924
<b>Giles</b>	0.72%	-35,760	-44,315	-47,710
<b>Montgomery</b>	0.67%	-51,748	-58,925	-61,773
<b>Roanoke</b>	0.92%	-49,146	-59,903	-64,171
<b>West Virginia Portion</b>		-26,379	-30,855	-32,631
<b>Greenbrier</b>	0.42%	-6,826	-8,004	-8,471
<b>Monroe</b>	0.36%	-13,334	-15,398	-16,217
<b>Summers</b>	0.35%	-6,219	-7,453	-7,943

a. Source: Property Taxes By State (Virginia Counties and Independent Cities) (propertytax101.org, 2015).

## EFFECTS ON ECONOMIC DEVELOPMENT

Across the study region, county-level economic development plans recognize the importance of a high quality of life, a clean environment, and scenic and recreational amenities to the economic future of people and communities. Franklin County’s Comprehensive Plan, for example, states that “the County wishes to maintain its rural character and scenic views...” (Franklin County Planning Commission, 2007). Greenbrier County’s Comprehensive Plan notes the County’s melding of old and new economy businesses (farming and high tech, for example) and recognizes that “a healthy environment is central to citizens' health, welfare, and quality of life” (Greenbrier County Planning Commission, 2014).

The MVP would undermine the progress toward these visions if the loss of scenic and recreational amenities, the perception and the reality of physical danger, and environmental and property damage were to discourage people from visiting, relocating to, or staying in the study region. Workers, businesses, and retirees who might otherwise choose to locate along the MVP’s proposed route will instead pick locations retaining their rural character, productive and healthy landscapes, and promise for a higher quality of life.

This is already occurring in the region. With the possibility of the MVP looming, business plans have stalled and the real estate market has slowed. Study region residents are also concerned about the effect the MVP could have on the economy. Based on the Pipeline Information Network’s review of comment letters submitted in the first three months of 2015, more than half mentioned the economy,

### **Forgone Economic Development: Sustainable Agriculture**

Owners Patti and Constantine Chlepas describe their 23-acre Birdsong Farm as “pristine land in the heart of Monroe County.” They use organic practices to produce natural raw honey and natural beeswax products. In part because pesticides are threatening honeybee operations worldwide, Birdsong Farm is an oasis from which the Chlepas can sell bees to and serve as mentors for apiarists in other places that have been hit hard. With the proposed MVP right-of-way adjacent to their property—and the likelihood that the ROW would be maintained using chemical defoliant that could harm bees—the owners are concerned that their core business would be wiped out. The Chlepas have put on hold their planned investment in a pick-your-own strawberry operation and a new line of business selling locally-grown fresh strawberries, strawberry plugs, and value-added products to sell in an on-site store. Birdsong Farm was planning to hire employees to help run their local operation. However, because of the MVP, they cancelled their grant to build a high tunnel greenhouse, and estimate the long-term loss in revenue to the County may run as high as half a million dollars.

with property value, tourism, recreation, and agriculture looming large in citizens’ concerns (Pipeline Information Network, 2015).

These fears are consistent with research results from this region and around the country demonstrating that quality of life is often of primary importance when people choose places to visit, live, or do business. As Niemi and Whitelaw state, “as in the rest of the Nation, natural-resource amenities exert an influence on the location, structure, and rate of economic growth in the southern Appalachians. This influence occurs through the so-called people-first-then-jobs mechanism, in which households move to (or stay in) an area because they want to live there, thereby triggering the development of businesses seeking to take advantage of the households’ labor supply and consumptive demand” (1999, p. 54). They note that decisions affecting the supply of amenities “have ripple effects throughout local and regional economies” (p. 54).

Along similar lines, Johnson and Rasker (1995) found that quality of life is important to business owners deciding where to locate a new facility or enterprise and whether to stay in a location already chosen. This is not surprising. Business owners value safety, scenery, recreational opportunities, and quality of life factors as much as residents, vacationers, and retirees.

It is difficult to predict just how large an effect the MVP would have on decisions about visiting, locating to, or staying in the study region. Even so, based on information provided by business owners to FERC and as part of this research, we can consider reasonable scenarios for how the MVP might affect key portions of the region’s overall economy.

The study region’s residents believe the MVP will harm the travel and tourism industry. In the words of the owner of one recreation and tourism business in Summers County, West Virginia, the MVP would “completely destroy the use, purpose, business operation, well, commercial septic system, two rental houses, and public campground on [the] property,” with one-time losses valued at \$800,000, not to mention the owners loss of livelihood and employment (Berkley, 2015). While more systematic research could provide refined estimates of the impact of natural gas transmission pipelines on recreation and tourism spending, one plausible scenario is that the impact is at

least as high as the minimum of these business owners' reported expectations. If the MVP were to cause a 10% drop in recreation and tourism spending from the 2014 baseline, the MVP could mean \$96.8 million less in travel expenditures each year. Those missing revenues would otherwise support roughly \$24.3 million in payroll, \$2.6 million in local tax revenue,

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***Recognizing that a healthy environment is central to citizens' health, welfare, and quality of life, Greenbrier County strongly supports the wise stewardship of our natural environment, including air and water resources, agricultural and forest resources, and geologic resources, with special emphasis on the protection of environmentally sensitive areas and features (springs, sinkholes, caves, other karst features, floodplains, and wetlands) which contribute to overall environmental health and citizens' quality of life.***

*—Greenbrier County Comprehensive Plan*

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\$4.8 million in state tax revenue, and 1,073 jobs in the eight-county region's recreation and tourism industry each year.<sup>29</sup> In the short run, these changes multiply through the broader economy as recreation and tourism businesses buy less from local suppliers and fewer employees spend their paychecks in the local economy. As with the reduction in local property taxes, lost tax revenue from a reduction in visitation and visitor spending would squeeze local governments trying to meet existing public service needs as well as those additional demands created by the MVP.

Along similar lines, retirement income is an important economic engine that could be adversely affected by the MVP. In county-level statistics from the US Department of Commerce, retirement income shows up in investment income and as age-related transfer payments, including Social Security and Medicare payments. In the study region, investment income grew by 0.8% per year from 2000 through 2014, and age-related transfer payments grew by 5.8% per year. During roughly the same time period (through 2013), the number of residents age 65 and older grew by 15.1% (1.2% per year), and this age cohort now represents 15.5% of the total population.<sup>2</sup>

It is difficult to precisely quantify the effect of the MVP on retirement income, but given the expression of concern from residents about changes in quality of life, safety, and other factors influencing retirees' location decisions, it is important to consider that some change is likely. Here, we consider what just a *10% slowing of the rate of increase* might entail. Such a scenario entails an annual decrease in investment income and age-related transfer payments of approximately \$15.6 million. That loss would ripple through the economy as the missing income is not spent on groceries, health care, and other services such as restaurant meals, home and auto repairs, etc.

The same phenomenon also applies to people starting new businesses or moving existing businesses to communities in the study region. This may be particularly true of sole proprietorships and other small businesses who are most able to choose where to locate. As noted, sole proprietors account for a large and growing share of jobs in the region. If proprietors' enthusiasm for starting businesses in the study

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<sup>29</sup> Raw data on travel expenditures is from the Virginia Tourism Corporation (2015) and Dean Runyan Associates (2015). This reduction in economic activity would be in addition to the lost recreation benefits (the value to the visitors themselves over and above their expenditures on recreational activity) that are included with ecosystem service costs above.

region were dampened to the same degree as retirees' enthusiasm for moving there, the 10% reduction in the rate of growth would mean 722 fewer jobs and \$2.0 million less in personal income.

For "bottom line" reasons (e.g., cost of insurance) or due to owners' own personal concerns, businesses in addition to sole proprietorships might choose locations where the pipeline is not an issue. If so, further opportunities for local job and income growth will be missed.

These are simple scenarios and the actual magnitude of these impacts of the MVP will not be known unless and until the pipeline is built. Even so, and especially because the pipeline is promoted by supporters as bringing some jobs and other economic benefits to the region, it is important to consider the potential for loss.

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***A pipeline route through here will destroy our farm business. Our customers drive here for the scenery and tranquility as much as for the fresh blueberries. Construction of a pipeline this large does not fit into this picture. Our customers would recoil and take their business elsewhere.***

*—Shirley & Lewis Woodall  
Craig County, Virginia*

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## CONCLUSIONS

The full costs of the proposed Mountain Valley Pipeline in the eight-county study area and beyond are wide-ranging. They include one-time costs like reductions in property value and lost ecosystem services during pipeline construction, which we estimate to be between \$65.1 and \$135.5 million. Plus there are ongoing costs like lost property tax revenue, diminished ecosystem service value, and dampened economic growth that would recur year after year for the life of the pipeline. Our estimates of the annual costs range from \$119.1 to \$130.8 million per year. Most of these costs would be borne by residents, businesses, and institutions in Craig, Franklin, Giles, Montgomery, Roanoke, Greenbrier, Monroe, and Summers Counties.

By contrast, the MVP's one local benefit is much smaller. It is an estimated average tax payment of \$6.1 million per year (for the five Virginia counties) and \$4.5 million per year (for the 3 West Virginia counties) through 2025 (Ditzel, Fisher, & Chakrabarti, 2015a, p. 15, 2015b, p. 13). Other MVP-promoted benefits, such as jobs from the MVP's construction and operation and those stemming from lower energy costs, would accrue primarily in other places (Ditzel et al., 2015a, 2015b).<sup>30</sup>

The decision to approve or not approve the MVP does not hinge on a simple comparison of estimated benefits and estimated costs. The scope and magnitude of the costs outlined here, however, reflect an important component of the full extent of the MVP's likely environmental effects that must be considered when making the decision. Impacts on human well-being, including but not limited to those that can be expressed in dollars-and-cents, must be taken into account by the Federal Energy Regulatory Commission and others weighing the societal value of the Mountain Valley Pipeline.

If these considerations and FERC's overall review result in selection of the "no-action" alternative and the Mountain Valley Pipeline is never built, most of the costs outlined in this report will be avoided. It

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<sup>30</sup> Due to issues with the methods and assumptions used in the MVP-sponsored studies, the benefit estimates they present may be inflated. See Phillips (2015b) for a review.

is *most*, but not *all* costs because there has already been the cost of delaying implementation of business plans, the cost of houses languishing on the market, and the cost to individuals of the stress, time, and energy diverted to concern about the pipeline rather than what would normally (and more productively) fill their lives.

Another possible scenario is that the FERC, considering the impacts of the MVP *as currently proposed* on ecosystem services, property values, and economic development, would conduct a thorough analysis of all possible alternatives. Those alternatives may include using existing gas transmission infrastructure (with or without capacity upgrades), routing new gas transmission lines along existing utility and transportation rights-of-way, and/or scaling down permitted new pipeline capacity to match regional gas transmission needs (as opposed to permitting pipelines on a company-by-company basis). In this case, estimates of these impacts should inform the choice of a preferred alternative that minimizes environmental damage and, thereby, minimizes the economic costs to individuals, businesses, and the public at large.

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## APPENDIX A:

### CANDIDATE PER-ACRE VALUES FOR LAND-USE AND ECOSYSTEM SERVICE COMBINATIONS

As explained under “Effects on Ecosystem Service Value,” the benefit transfer method applies estimates of ecosystem service value from existing studies of “source areas” to the “study area,” which in this case is the proposed MVP corridor. This application is done on a land-use-by-land-use basis. So, for example, values of various ecosystem services associated with forests in the source area are applied to forests in the study area. The table below lists all of the values from source area studies considered for our calculations.

Land Use	Ecosystem Service	Minimum \$/acre/year	Maximum \$/Acre/year	Source Study
Cropland	Aesthetic	35.01	89.23	(Bergstrom, Dillman, & Stoll, 1985)
	Biological Control	15.21	15.21	(Brenner Guillermo, 2007) *
	Biological Control	14.38	204.95	(Cleveland et al., 2006)
	Erosion	27.31	72.55	(Pimentel et al., 2003) *
	Food	33.25	33.25	(Lex & Groover, 2015)
	Pollination	10.14	10.14	(Brenner Guillermo, 2007) *
	Pollination	13.89	13.89	(Robinson, Nowogrodzki, & Morse, 1989)
	Pollination	47.43	1,987.97	(Winfree, Gross, & Kremen, 2011)
	Recreation	18.77	18.77	(Brenner Guillermo, 2007) *
	Recreation	2.16	5.02	(Knoche & Lupi, 2007)
	Soil Fertility	7.28	7.28	(Pimentel, 1998) *
	Soil Fertility	115.23	115.23	(Pimentel et al., 2003)
	Waste	132.26	132.26	(Perrot-Maître & Davis, 2001) *
Grasslands	Aesthetic	102.38	116.61	(Ready, Berger, & Blomquist, 1997)
	Biological Control	15.21	15.21	(Brenner Guillermo, 2007) *
	Climate	3.55	3.55	(Brenner Guillermo, 2007) *
	Erosion	17.48	17.48	(Barrow, 1991) *
	Erosion	68.28	68.28	(Sala & Paruelo, 1997) *
	Food	15.50	15.50	(Lex & Groover, 2015) *
	Pollination	16.23	16.23	(Brenner Guillermo, 2007) *
	Soil Fertility	3.55	3.55	(Brenner Guillermo, 2007) *
	Waste	55.28	55.28	(Brenner Guillermo, 2007) *
	Waste	5.88	64.40	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Water Flows	2.54	2.54	(Brenner Guillermo, 2007) *
Pasture	Aesthetic	102.38	116.61	(Ready et al., 1997)
	Biological Control	15.21	15.21	(Brenner Guillermo, 2007) *
	Climate	3.55	3.55	(Brenner Guillermo, 2007) *
	Erosion	17.48	17.48	(Barrow, 1991) *
	Erosion	68.28	68.28	(Sala & Paruelo, 1997) *
	Food	15.50	15.50	(Lex & Groover, 2015)
	Pollination	16.23	16.23	(Brenner Guillermo, 2007) *
	Soil Fertility	3.55	3.55	(Brenner Guillermo, 2007) *

Land Use	Ecosystem Service	Minimum \$/acre/year	Maximum \$/Acre/year	Source Study
Pasture, cont'd	Waste	55.28	55.28	(Brenner Guillermo, 2007) *
	Waste	5.88	64.40	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Water Flows	2.54	2.54	(Brenner Guillermo, 2007) *
Shrub/Scrub	Air Quality	37.26	37.26	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Climate	7.27	7.27	(Croitoru, 2007) *
	Erosion	22.75	22.75	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Pollination	1.41	7.10	(Robert Costanza, Wilson, et al., 2006)
	Recreation	3.95	3.95	(Haener & Adamowicz, 2000)
	Waste	46.35	46.35	(Croitoru, 2007) *
	Waste	0.10	324.35	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
Forest	Aesthetic	4,439.71	18,141.99	(Nowak, Crane, Dwyer, & others, 2002)
	Air Quality	372.57	372.57	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Biological Control	8.91	8.91	(Wilson, 2005) *
	Biological Control	2.54	2.54	(Brenner Guillermo, 2007) *
	Climate	67.45	67.45	(Brenner Guillermo, 2007) *
	Climate	56.89	56.89	(Robert Costanza, d'Arge, et al., 2006)
	Erosion	61.87	61.87	(Brenner Guillermo, 2007) *
	Erosion	3.09	36.09	(Zhou, Al-Kaisi, & Helmers, 2009)
	Extreme Events	797.66	797.66	(Weber, 2007)
	Food	0.13	0.13	(Wilson, 2005) *
	Pollination	202.87	202.87	(Brenner Guillermo, 2007) *
	Raw Materials	24.53	24.53	(Wilson, 2005) *
	Raw Materials	166.82	166.82	(Weber, 2007)
	Recreation	152.66	152.66	(Brenner Guillermo, 2007) *
	Recreation	1.29	4.55	(Cruz & Benedicto, 2009) *
	Recreation	1.56	1.56	(Kniivila, Ovaskainen, & Saastamoinen, 2002) *
	Recreation	37.13	45.50	(Prince & Ahmed, 1989)
	Recreation	2.79	503.97	(Shafer, Carline, Guldin, & Cordell, 1993)
	Soil Fertility	6.09	6.09	(Brenner Guillermo, 2007) *
	Soil Fertility	19.97	19.97	(Weber, 2007)
	Waste	55.28	55.28	(Brenner Guillermo, 2007) *
	Waste	8.66	8.66	(Cruz & Benedicto, 2009) *
	Waste	265.79	266.89	(Lui, 2006)
	Water	204.39	204.39	(Brenner Guillermo, 2007) *
	Water	47.39	47.39	(Cruz & Benedicto, 2009) *
	Water	1,292.23	1,292.23	(Weber, 2007)
	Water Flows	230.01	230.01	(Mates, 2007)
Water Flows	797.66	797.66	(Weber, 2007)	

Land Use	Ecosystem Service	Minimum \$/acre/year	Maximum \$/Acre/year	Source Study
Water	Recreation	446.31	446.31	(Brenner Guillermo, 2007) *
	Recreation	155.36	914.10	(Cordell & Bergstrom, 1993)
	Recreation	304.18	437.19	(Mullen & Menz, 1985)
	Recreation	148.68	148.68	(Postel & Carpenter, 1977)
	Waste	10.72	10.72	(Gibbons, 1986) *
	Water	512.74	512.74	(Brenner Guillermo, 2007) *
	Water	22.98	22.98	(Gibbons, 1986) *
Wetland	Aesthetic	38.46	38.46	(Amacher & Brazee, 1989) *
	Air Quality	75.50	98.02	(Jenkins, Murray, Kramer, & Faulkner, 2010)
	Climate	1.84	1.84	(Wilson, 2005) *
	Climate	157.73	157.73	(Brenner Guillermo, 2007) *
	Extreme Events	228.06	369.85	(Wilson, 2005) *
	Extreme Events	110.06	4,583.26	(Brenner Guillermo, 2007) *
	Extreme Events	304.18	304.18	(Robert Costanza, Farber, & Maxwell, 1989)
	Extreme Events	278.77	278.77	(Robert Costanza & Farley, 2007)
	Extreme Events	1,645.59	7,513.98	(Leschine, Wellman, & Green, 1997)
	Raw Materials	50.16	50.16	(Everard, Great Britain, & Environment Agency, 2009)
	Recreation	80.71	80.71	(Bergstrom, Stoll, Titre, & Wright, 1990)
	Recreation	1,716.76	1,761.89	(Brenner Guillermo, 2007) *
	Recreation	109.30	429.97	(Robert Costanza et al., 1989)
	Recreation	1,041.04	1,041.04	(Creel & Loomis, 1992)
	Recreation	88.06	994.50	(Gren & Söderqvist, 1994) *
	Recreation	71.11	71.11	(Gren, Groth, & Sylven, 1995) *
	Recreation	208.01	208.01	(Kreutzwiser, 1981)
	Recreation	209.51	209.51	(Lant & Roberts, 1990) *
	Recreation	648.57	4,203.82	(Whitehead, 1990)
	Waste	141.56	141.56	(Wilson, 2005) *
	Waste	67.02	67.02	(Breau, Farber, & Day, 1995)
	Waste	1,050.34	1,050.34	(Brenner Guillermo, 2007) *
	Waste	170.05	170.05	(Gren & Söderqvist, 1994) *
	Waste	35.20	35.20	(Gren et al., 1995) *
	Waste	551.02	551.02	(Jenkins et al., 2010)
	Waste	209.51	209.51	(Lant & Roberts, 1990) *
	Waste	5,027.28	5,027.28	(Meyerhoff & Dehnhardt, 2004) *
	Waste	10,881.15	10,881.15	(Lui, 2006)
	Water	1,934.84	2,407.52	(Brenner Guillermo, 2007) *
	Water	622.77	622.77	(Creel & Loomis, 1992)
	Water	18.19	18.19	(Folke & Kaberger, 1991) *
	Water Flows	3,741.87	3,741.87	(Brenner Guillermo, 2007) *
Water Flows	3,920.69	3,920.69	(Leschine et al., 1997)	
Water Flows	4,329.70	4,329.70	(UK Environment Agency, 1999)	

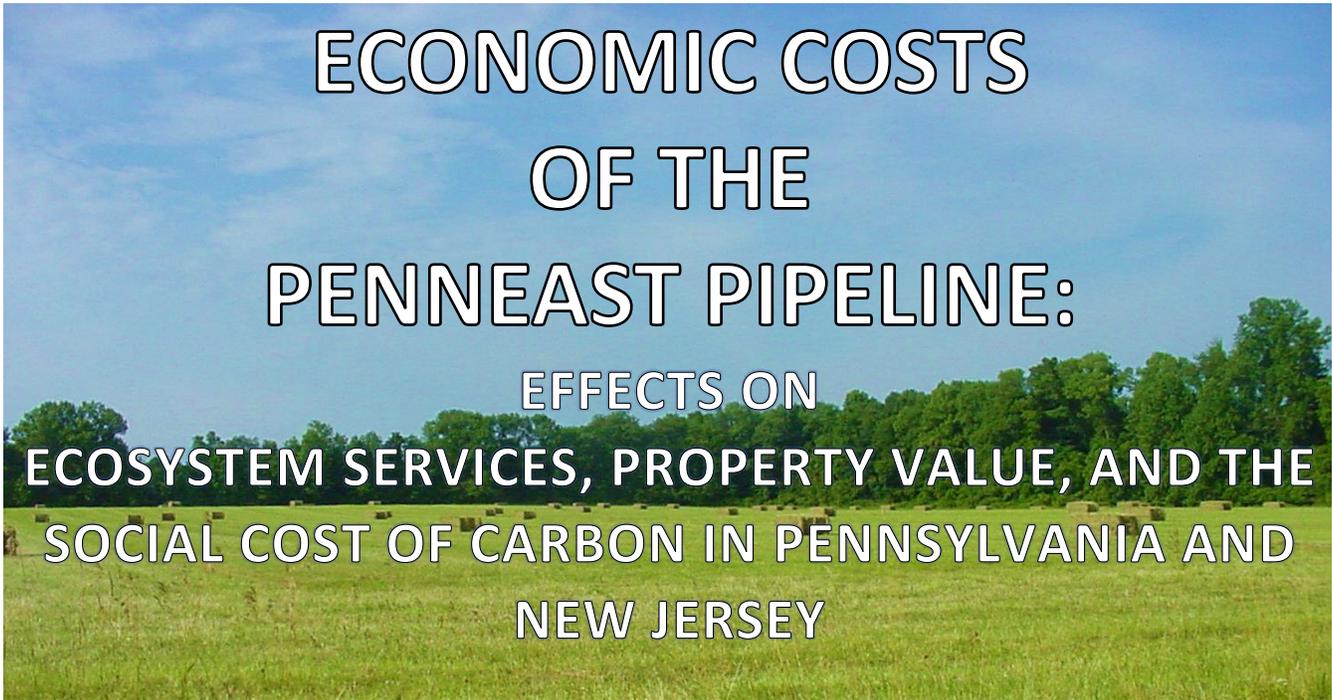
Land Use	Ecosystem Service	Minimum \$/acre/year	Maximum \$/Acre/year	Source Study
Urban Open Space	Aesthetic	1,006.06	1,322.31	(Qiu, Prato, & Boehrn, 2006)
	Air Quality	32.46	32.46	(G. McPherson, Scott, & Simpson, 1998)
	Air Quality	192.35	192.35	(G. E. McPherson, 1992)
	Climate	1,134.38	1,134.38	(G. E. McPherson, 1992)
	Extreme Events	315.52	597.01	(Streiner & Loomis, 1995)
	Water Flows	8.32	8.32	(G. E. McPherson, 1992)
	Water Flows	138.22	187.58	(The Trust for Public Land, 2010)
Urban Other	Climate	420.95	420.95	(Brenner Guillermo, 2007) *
	Recreation	2,670.74	2,670.74	(Brenner Guillermo, 2007) *
	Water Flows	7.61	7.61	(Brenner Guillermo, 2007)

All values are adjusted for inflation to 2014 dollars.

\* Indicates source is from the TEEB database.

**People's Dossier: FERC's Abuses of Power and Law  
→ Public Participation Undermined**

**Public Participation Undermined Attachment 18, Key-  
Log Economics, LLC, *Economic Costs of the PennEast  
Pipeline*, January 2017.**



**ECONOMIC COSTS  
OF THE  
PENNEAST PIPELINE:  
EFFECTS ON  
ECOSYSTEM SERVICES, PROPERTY VALUE, AND THE  
SOCIAL COST OF CARBON IN PENNSYLVANIA AND  
NEW JERSEY**

*JANUARY 2017*

Spencer Phillips, PhD

Sonia Wang

Cara Bottorff



*Research and strategy for the land community.*

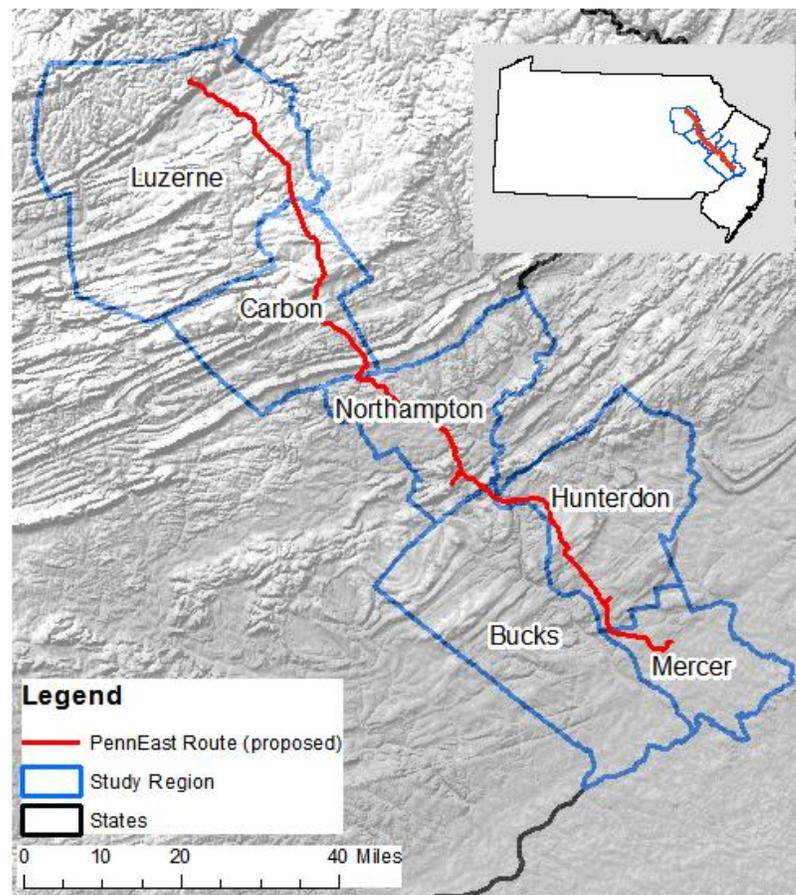
[keylogeconomics.com](http://keylogeconomics.com)

## EXECUTIVE SUMMARY

The PennEast Pipeline (PE), a proposed 36-inch diameter high-pressure natural gas pipeline, would transport 1.1 million dekatherms/Mcf, per day of natural gas from the Marcellus Shale region approximately 118 miles through four counties in Pennsylvania and two counties in New Jersey. PennEast Pipeline LLC (PE LLC), a joint venture of AGL Resources, NJR Pipeline Company, PSEG Power, SJI Midstream, Spectra Energy Partners, and UGI Energy Services, would be in charge of constructing and operating the pipeline.

The Federal Energy Regulatory Commission (FERC) is the federal agency responsible for reviewing PE LLC's proposal and either approving or rejecting the project. Under its own policy and the more comprehensive requirements of the National Environmental Policy Act (NEPA), FERC's review must look at the economic benefits, but also consider the full range of environmental effects of the proposed project. These costs include, but are not limited to, the different ways in which the environmental effects from the pipeline would result in changes in human well-being—including economic benefits and costs.

PE LLC promotes the project based on its own estimates of economic benefits, including job creation during the construction period and operation of the pipeline in the long term. FERC, however, concludes that the PennEast pipeline would have "minor" and "minor to moderate" positive effects in the form of jobs, payroll taxes, workers' expenditures, and local governments' tax revenues (Federal Energy Regulatory Commission, 2016b, p. ES-12). While even these minor benefits may be overstated,<sup>1</sup> the major problem over the public consideration of the PennEast Pipeline is that there are also important costs that, to date, PE LLC and FERC have discounted or ignored. The information provided by PE LLC and by FERC in the Draft Environmental Impact Statement falls severely short of systematically considering the potential negative economic effects, or more simply, the economic costs of the PE project.



**FIGURE 1: PennEast Pipeline (Proposed)**

Sources: PennEast route obtained from the Delaware Riverkeeper Network; Study Region (counties), federal lands, and hill shade from USGS (U.S. Department of Interior & U.S. Geological Survey, 2015).

<sup>1</sup> See Phillips, [Spencer], (2016, September 9), Comment on Draft Environmental Impact Statement, FERC Docket No. CP15-558-000; PennEast Pipeline Company, LLC, FERC/EIS-0271D, for explanation.

Delaware Riverkeeper Network commissioned this report to fill that information gap and provide research into some of the key economic and environmental costs that will certainly occur if the PE pipeline is approved. In this report, we provide quantitative estimates of several types of costs and consider other important costs FERC should evaluate before rendering its decision on the proposed pipeline.

The construction, operation, and presence of the pipeline would 1) Diminish ecosystem service value, 2) Reduce property value along the pipeline, and 3) Create economic damages associated with increases in carbon dioxide emissions (the social cost of carbon) (U.S. EPA, Climate Change Division, 2016). The construction of the pipeline corridor, as well as the establishment of a permanent easement, would alter existing land use/land cover and diminish ecosystem services, causing a loss of between \$6.3 and \$22.1 million during construction and an annual loss between \$2.4 and \$9.0 million during operation. Affected properties, those touched by the 50 foot right-of-way (ROW), the 1.2-mile-wide evacuation zone, and within half a mile of the proposed Kidder Compressor Station, could lose between a total of between \$159.7 and \$177.3 million in property value. The pipeline could also undermine scenic and quality of life amenities contributing to decreases in visitation, in-migration, tourism, and small business development. (See “At a Glance,” page iv for details.)

The estimated one-time costs for the study region range from \$166.0 to \$199.4 million. These one-time costs are comprised of diminished ecosystem services and property value lost during the construction period. Annual costs, costs that would begin following the construction period and recur each year for as long as the PE ROW exists, total between \$5.3 and \$12.8 million for lower ecosystem service productivity in the pipeline ROW, and lower property tax revenue due to the initial drop in property value. There is also an annual cost associated with the social cost of carbon, varying with the year in which the emissions would occur and the assumed rate at which future costs are discounted. Using a 5% discount rate, the social cost of carbon ranges from \$291.9 to \$608.1 million per year between 2019 and 2048. With a 2.5% discount rate, the annual social cost of carbon ranges from \$1.5 to \$2.3 billion.

Putting the streams of annual costs into present value terms<sup>2</sup> and adding the one-time costs, the total estimated economic cost of the PE pipeline in the study region is between \$13.3 and \$56.6 billion. Contrasting, and as we explain more thoroughly in this report, the costs are several times larger than the proposed benefits.

For reasons explained in the body of this report, these are conservative estimates of the external costs for the proposed PennEast Pipeline. One reason is simply that categories of impacts exist that are beyond the scope of this study. One example includes changes to sites or landscapes that possess historical or cultural significance. Like lost aesthetic quality or a decrease in the capacity of the landscape to retain soil, filter water, or sequester carbon (examples of ecosystem service values that the estimates DO include), historical and cultural impacts matter to humans and, therefore, could be expressed in monetary terms.

Further, and due to data limitations, we did not quantify public health costs to residents that may experience negative health impacts from compressor stations. We also did not estimate increased costs to communities

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<sup>2</sup> The present value of a perpetual stream of costs is the one-year cost divided by the real discount rate recommended by the Office of Management and Budget for cost-benefit and cost-effectiveness analysis of public projects and decisions (Office of Management and Budget, 2015). For our analysis, we used the recommended real discount rate for each year the project is expected to be in operation—i.e., for up to 30 years, or until 2048. These discount rates were applied to the estimated annual loss in tax revenue and ecosystem service value in each of those years. The social cost of carbon calculations have discounting built in. The total present discounted value for all costs is then the one-time costs, plus the social cost of carbon for 30 years, plus the separately discounted costs due to lost property taxes and ecosystem services.

from potential increases in demand for emergency services, more road maintenance and repair, and potential impacts on public or private water supplies, or other costs that may accompany construction.

Another important category of cost not counted here is “passive use value.” Passive use value includes the value to people of simply knowing an unspoiled natural area exists and the value of keeping those places unspoiled for the sake of some future direct or active use. In light of this, it is important to consider the estimates of economic costs provided here as a fraction of the total economic value put at risk by the proposed PennEast Pipeline.

Finally, while this report covers some of the costs that *will* occur if the PennEast Pipeline is constructed and operating, it does not include an assessment of natural resource damage and other effects that *might* occur during construction and operation. For example, there is a probability that erosion of steep slopes and resulting sedimentation of streams and rivers will occur during construction. There is also the likelihood that a leak or explosion could occur somewhere along the length of the pipeline during its lifetime. If, when, and where these events occur, there will be cleanup and remediation costs, costs of fighting fires and reconstructing homes, businesses, and infrastructure, the cost of lost timber, wildlife habitat, and other ecosystem services, and most tragically, the cost of lost human life and health.<sup>3</sup>

The magnitude of these damages, multiplied by the probability of occurrence, yields additional “expected costs” which add even more to the certain costs estimated in this study. To be clear, the costs estimated here—the effect on ecosystem services from clearing land for the pipeline corridor, the impact on land values resulting from buyers’ concerns about the pipeline, and the social cost of carbon—will occur with or without any discreet or extreme events like landslides or explosions ever happening. These impacts and their monetary equivalents are simply part of what will happen in Pennsylvania and New Jersey if the PennEast Pipeline is approved, built, and operates without incident.

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<sup>3</sup> While no one was killed in the incident, the recent explosion of Spectra Energy’s Texas Eastern gas transmission line in Pennsylvania is an example of these impacts. See, for example, “PA Pipeline Explosion: Evidence of Corrosion Found” (Phillips [Susan], 2016).

### At a Glance:

The PennEast Pipeline in Pennsylvania and New Jersey  
*Bucks, Carbon, Luzerne, and Northampton Counties in PA and  
Hunterdon and Mercer Counties in NJ*

- **Miles of pipeline:** 118
- **Impacted acres (area converted temporarily or permanently from its existing use or cover):**
  - In the permanent right-of-way (ROW): 717.3
  - In the construction zone (the construction corridor, new temporary roads, pipeyards, and temporary aboveground infrastructure): 1,852.7
  - In new permanent access roads and aboveground infrastructure: 55.8
  - The most heavily affected land cover types: forest (386.8 acres) and cropland (147.0 acres) (ROW only)
- **Parcels:**
  - In the ROW: 730
  - In the 1.2-mile-wide evacuation zone: 18,097
  - Within half a mile of the compressor station: 40
- **Residents and housing units in the evacuation zone:** 54,579 people, 23,293 homes
- **Lost ecosystem service value, such as for water and air purification, aesthetics, and recreation:**
  - Over the one-year construction period (a one-time cost): \$6.3 to \$22.1 million
  - In the ROW and in other permanent infrastructure (annual): \$2.6 to \$9.8 million
- **Property value:**
  - Baseline—that is, in a “no pipeline” scenario—property value at risk (and the expected one-time cost due to the pipeline in the following parentheses):
    - In the ROW: \$200.5 million (\$8.4 to \$26.1 million)
    - In the 1.2-mile-wide evacuation zone: \$3.9 billion (\$149.9 million)
    - Within half a mile of the compressor station: \$5.6 million (\$1.4 million)
  - Total property value lost (a one-time cost): \$159.7 to \$177.3 million
  - Resulting loss in property tax revenue (annual): \$2.7 to \$3.0 million
- **The social cost of carbon:**
  - The project would contribute to an equivalent of 21.3 million metric tons of carbon dioxide a year. Using a 5% discount rate, the social cost of carbon ranges from \$291.9 to \$608.1 million per year between 2019 and 2048. Using a 2.5% discount rate for the same time period, the social cost of carbon ranges between \$1.5 and \$2.3 billion per year.
- **Other impacts for consideration:**
  - Visual impacts:
    - The ROW for the pipeline and laterals can potentially be seen from approximately 35% of the study region. At least 1 km (0.62 miles) of pipeline ROW is visible from roughly 20% of the study region. (While these visual impacts have financial implications, we do not estimate these strictly in property value terms. Instead, the economic cost of impaired views for homeowners, as well as losses experienced by recreational visitors, and others would be captured as part of the “lost ecosystem service value”)
  - Economic activity that depends on the region’s scenic, recreational, and quality-of-life: (We consider scenarios in which visitor spending declines by 10% from current levels, and the rate of growth in retirement and proprietor’s income slows by 10%)
    - Annual loss of recreation tourism expenditures of \$448.0 million that would otherwise support 4,090 jobs and generate \$38.8 million in state and local tax receipts
    - Annual loss of personal income of \$55.6 million due to slower growth in the number of retirees
    - Annual loss of personal income of \$16.3 million due to slower growth in sole proprietorships
- **Total estimated costs:**
  - One-time costs (lost property value plus lost ecosystem service value during construction) would total between \$166.0 and \$199.4 million
  - Annual costs (costs that recur year after year) would range from \$5.3 to \$12.8 million PLUS the social cost of carbon, which varies by year, and ranges between \$291.9 million and \$2.3 billion per year
    - Present discounted value of all future annual costs (including the social cost of carbon): \$13.1 to \$56.4 billion
  - One-time costs plus the discounted value of all future annual costs: \$13.3 to \$56.6 billion

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## ABBREVIATIONS AND TERMS

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**BTM:** Benefit Transfer Method, a method for estimating the value of ecosystem services in a study region based on values estimated for similar resources in other places

**Construction Zone:** Refers to the construction corridor, new temporary roads, pipeyards, and temporary aboveground infrastructure

**EIS:** Environmental Impact Statement, a document prepared under the National Environmental Policy Act analyzing the full range of environmental effects, including on the economy, of proposed federal actions, which in this case would be the approval of the PennEast Pipeline (Related DEIS and FEIS for Draft and Final EIS, respectively)

**ESV:** Ecosystem Service Value, the effects on human well-being of the flow of benefits from an ecosystem endpoint to a human endpoint at a given extent of space and time, or more briefly, the value of nature's benefits to people

**FERC or the Commission:** Federal Energy Regulatory Commission, the agency responsible for preparing the EIS and deciding whether to grant a certificate of public convenience and necessity (i.e., whether to permit the pipeline)

**HCA:** High Consequence Area, the area within which both the extent of property damage and the chance of serious or fatal injury would be expected to be significant in the event of a rupture failure

**PE:** PennEast Pipeline, which in this report generally refers to the pipeline corridor itself

**PE LLC:** PennEast Pipeline Company, LLC, a joint venture of AGL Resources, NJR Pipeline Company, PSEG Power, SJI Midstream, Spectra Energy Partners, and UGI Energy Services

**NEPA:** National Environmental Policy Act of 1970, which requires the environmental review of proposed federal actions, preparation of an EIS, and, for actions taken, appropriate mitigation measures

**ROW:** Right-of-Way, the permanent easement in which the pipeline is buried

## AUTHORS' NOTE

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Delaware Riverkeeper Network commissioned this report to help ensure that the likely costs of the PennEast Pipeline project are not left out of the public debate. Delaware Riverkeeper Network has been working throughout the Delaware River Watershed for over 25 years. Using independent advocacy, and backed by accurate facts, science, and law, Delaware Riverkeeper Network champions the rights of communities to a Delaware River and tributary streams that are free flowing, clean, healthy, and abundant with a diversity of life. Please visit [www.delawariverkeeper.org](http://www.delawariverkeeper.org) to learn more about their work.

Key-Log Economics is an independent consultancy that brings more than 50 years of combined experience analyzing the economic features of land and resource use and related policy. We are grateful for the assistance of Delaware Riverkeeper Network in identifying local information sources and making contacts in the study region.

Key-Log Economics remains solely responsible for the content of this report, the underlying research methods, and the conclusions drawn. We used the best available data and employed appropriate and feasible estimation methods but nevertheless make no claim regarding the extent to which these estimates will match the actual magnitude of economic effects that will be realized if the PennEast Pipeline is approved.

*Cover Photo from Carla Kelly-Mackey, Hunterdon County, New Jersey.*



## BACKGROUND

According to documents filed by PennEast Pipeline LLC (PE LLC), the proposed PennEast Pipeline (PE) would be 36-inches in diameter over most of its 118-mile length. PE LLC intends on transporting up to 1.1 million dekatherms/Mcf per day of natural gas from the Marcellus Shale region in northern Pennsylvania to New Jersey, eastern and southern Pennsylvania, and via connection to existing pipelines (PennEast Pipeline Company, LLC, 2015a). The project would start in Luzerne County, Pennsylvania and travel through Carbon, Northampton, and Bucks Counties in Pennsylvania, then enter Hunterdon, New Jersey, and end in Mercer County, New Jersey. Proponents of the project tout the project as necessary to meet market demand for natural gas in Pennsylvania and New Jersey (PennEast Pipeline Company, LLC, 2015a), however, reports in response to the Draft Environmental Impact Statement (DEIS) (2016) and to the proposal conclude there is in fact no need for the pipeline (Berman, 2015; New Jersey Division of Rate Counsel, 2016). For example, the New Jersey Division of Rate Counsel (2016) found that “forecasted demands of the LDCs that PennEast is designed to supply are already being met by existing gas supply arrangements and available transportation capacity” (p. 8).

The route would cross important waterways such as the Delaware—the longest undammed river east of the Mississippi—, Lehigh, and Susquehanna rivers, pristine streams, the Appalachian Trail, wetlands, forests, and established public and private conservation lands. The D&R Greenway Land Trust estimates that the proposed route in New Jersey “will touch lands that have been preserved over time with public funding totaling over \$37 million” (D&R Greenway Land Trust, 2015). In addition, the project would potentially harm the habitat of several federally listed endangered species (Federal Energy Regulatory Commission, 2016b).

The permanent right-of-way (ROW), the temporary construction corridor of the pipeline—50 and 100 feet wide, respectively—, and the proposed 47,700 horsepower (hp) compressor station in Kidder Township would impose additional external costs on local residents and businesses, including costs that accrue due to safety concerns. Pipeline leaks and explosions are expensive, cause substantial physical damage (Table 1), and occur more frequently than in the past (Pipeline Safety Trust, 2015). According to an analysis conducted by the Pipeline Safety Trust (2015), more incidents associated with gas transmission pipelines occur for pipelines installed after 2010. Larger magnitude incidents require evacuation of wide swaths (up to 1.2 miles across for the PE), disrupting tens of thousands of homes, farms, and businesses. Still wider, but more difficult to gauge and estimate, are the zones within which the construction, operation, and presence of the pipeline would affect human well-being by changing the availability of ecosystem services such as clean air, water supply, and

**TABLE 1. Pipeline Incidents, Impacts, and Costs, 1996 to 2015. Includes gas distribution, gas gathering, gas transmission, hazardous liquid, and LNG lines.**

Source: Pipeline and Hazardous Materials Safety Administration (2016).

Place	Incidents	Fatalities	Injuries	Total Cost
U.S.	11,198	360	1,377	\$6.9 Billion
Pennsylvania	297	20	73	\$114.9 Million
New Jersey	177	5	34	\$49.7 Million

recreational opportunities. This would occur as the pipeline creates an unnatural linear feature on a landscape that otherwise remains largely natural or pastoral and dampens the attractiveness of the affected region as a place to live, visit, retire, or do business.

To date, these negative effects and estimates of their attendant economic costs have not received much attention in the otherwise vigorous public debate surrounding the proposed PE. This report is both an attempt to understand the nature and potential magnitude of the economic costs of the PE in the six-county region, as well as to provide an example for FERC as it proceeds with its process of analyzing and weighing the full effects of the proposed PE along its entire length.

## Policy Context

Before construction can begin, the PE must be approved by the Federal Energy Regulatory Commission (FERC). That approval, while historically granted to pipeline projects, depends on FERC's judgment that the pipeline would meet a public purpose and need. Because the approval would be a federal action, FERC must also comply with the procedural and analytical requirements of the National Environmental Policy Act (NEPA). These include requirements for arranging public participation, conducting environmental impact analysis, and writing an Environmental Impact Statement (EIS) that evaluates all of the relevant effects. Of particular interest here, such relevant effects include direct, indirect, and cumulative effects on or mediated through the economy. As the NEPA regulations state,

Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial (emphasis added, 36 CFR 1508.b).

It is important to note NEPA does not require that federal actions—which in this case would be the approval or denial of PennEast LLC's application—necessarily balance or even compare benefits and costs. NEPA is not a decision-making law, but rather a law requiring decisions be supported by an as full as possible accounting of the reasonably foreseeable effects of federal actions on the natural and human environment. It also requires that citizens have opportunities to engage in the process of analyzing and weighing those effects. NEPA therefore requires that decision-making agencies (i.e., FERC) develop or obtain and then consider information about the costs associated with the decisions they make.

Moreover, FERC's own policy regarding the certification of new interstate pipeline facilities (88 FERC, para. 61,227) requires adverse effects of new pipelines on "economic interests of landowners and communities affected by the route of the new pipeline" be weighed against "evidence of public benefits to be achieved [by the pipeline]" (88 FERC, para. 61,227; Hoecker, Breathitt, & He'bert Jr., 1999, pp. 18–19). Further, "...construction projects that would have residual adverse effects would be approved only where the public benefits to be achieved from the project can be found to outweigh the adverse effects" (p. 23).

In principle, this policy—what FERC calls an "economic test"—is in line with the argument, on economic efficiency grounds, that the benefits of a project or decision should be at least equal to its cost, including external costs. However, the policy's guidance regarding what adverse effects must be considered and how they are measured is deeply flawed. The policy states, for example, "if project sponsors...are able to acquire all or substantially all, of the necessary right-of-way by negotiation prior to filing the application...it would not adversely affect any of the three interests," which are pipeline customers, competing pipelines, and

“landowners and communities affected by the route of the new pipeline” (Hoecker et al., 1999, pp. 18, 26). FERC’s policy contends the only adverse effects that matter are those affecting owners of properties in the right-of-way. Even for a policy adopted in 1999, this contention is completely out of step with long-established understanding that development that alters the natural environment has negative economic effects.

A further weakness of the FERC policy is that it relies on applicants to provide information about benefits and costs. The policy’s stated objective “is for the applicant to develop whatever record is necessary, and for the Commission to impose whatever conditions are necessary, for the Commission to be able to find that the benefits to the public from the project outweigh the adverse impact on the relevant interests” (Hoecker et al., 1999, p. 26). The applicant therefore has an incentive to be generous in counting benefits<sup>4</sup> and parsimonious in counting the costs of its proposal. Under these circumstances, it seems unlikely that the Commission’s policy will prevent the construction of pipelines for which the full costs are greater than the public benefits they would actually provide. Indeed, until March 2016, FERC had never rejected a pipeline proposal (Woodall, 2016). (For the rejection, the Jordan Cove energy project (Federal Energy Regulatory Commission, 2016a) failed to demonstrate demand for the gas that would have been transported—that is, there would be no public or private benefits.)

Due to these weaknesses and as evidenced by FERC’s track record, the “economic test” does not provide a robust evaluation of the public merits of natural gas transmission projects.<sup>5</sup> It is a “test” in which difficult questions (such as ones about external costs involving all stakeholders) are not asked, and where those taking the test (the applicants) provide the answer key. In the case of the PennEast proposal, PE LLC has failed to acquire a sufficient portion of the right-of-way, so by FERC’s policy (and due to the interests of other federal agencies in how the PE would affect resources under their stewardship), FERC prepared an EIS (Federal Energy Regulatory Commission, 2016b). The process began with a series of scoping meetings where members of the public could express their general thoughts on the pipeline as well as what effects should fall under the scope of the EIS. Interested parties also had the opportunity to submit comments online and through the mail.

Much of what FERC heard from citizens echoed and expanded upon the list of potential environmental effects listed in its Notice of Intent to prepare an EIS (Federal Energy Regulatory Commission, 2015). In a review of comments collected through the DEIS, 99.4% of people who mentioned recreation and tourism businesses, 100% of commenters mentioning health (either related to the pipeline or the compressor station), and 93.3% of people mentioning the environment believed the PE would have a negative effect. In the DEIS, which came out in July 2016, FERC recognized that common topics mentioned during the scoping period include loss of property value, added responsibility for small emergency response teams, limited evacuation routes for local residents, human health and environmental impacts from compressor stations, and forest fragmentation (Federal Energy Regulatory Commission, 2016b). These effects can take the form of economic costs external to PE LLC that would be borne by individuals, businesses, and communities throughout the landscape the PE would traverse.

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<sup>4</sup> PE LLC has published estimates of economic benefits in the form of employment and income stemming from the construction and operation of the PE (PennEast Pipeline Company, LLC, 2015b). These studies suffer from errors in the choice and application of methods and in assumptions made regarding the long-run economic stimulus represented by the PE. Most significantly, the studies make no mention of likely economic costs, and their projections of long-term benefits extend far beyond the time period (of a year or so) within which economic impact analysis is either useful or appropriate. See Phillips, [Spencer], (2016, September 9), Comment on Draft Environmental Impact Statement, FERC Docket No. CP15-558-000; PennEast Pipeline Company, LLC, FERC/EIS-0271D, for explanation.

<sup>5</sup> See, for example, FERC’s Draft and/or Final Environmental Impact Statements the Constitution Pipeline (CP13-499), Mountain Valley Pipeline (CP16-10), Atlantic Coast Pipeline (CP15-554) and PennEast Pipeline (CP-15-558).

## Study Objectives

Given the policy setting and what may be profound effects of the proposed PennEast Pipeline on the people and communities of Pennsylvania and New Jersey, we have undertaken this study to provide information of two types:

1. An example of the scope and type of analyses that FERC could, and should, undertake as part of its assessment of the environmental (including economic) effects of the PE.
2. An estimate of the potential magnitude of economic effects in this region where the PE's environmental effects will be felt.

The estimates presented below, however, represent less than the total of all potential costs that would attend the construction, operation, and presence of the pipeline. The reason is that there are several categories of cost for which the scope of the project or the availability of data preclude direct quantification of those costs. These categories are:

- "Passive use value," including the value of preserving the landscape without a pipeline for future direct use.
- Probabilistic damages to natural resources, property, and human health and lives in the event of mishaps during construction and leaks/explosions during operation.
- Increases in the costs of community service like road maintenance and emergency response.<sup>6</sup> We discuss these costs under the heading of "Community Service Costs" (page 36), but we do not have sufficient data on which to base numeric estimates of these costs.

Our overall estimates, therefore, should be understood to be conservative, lower-bound estimates of the true total cost of the PE in the region.

## Current Economic Conditions in the Study Region

Our geographic focus is the six-county region the PennEast Pipeline is proposed to cross. This study region encompasses Bucks, Carbon, Luzerne, and Northampton counties in Pennsylvania, as well as Hunterdon and Mercer counties in New Jersey. This 2,961-square-mile region supports diverse land uses, including the Delaware, Lehigh, and Susquehanna Rivers, thriving cities and townships, wetlands, and parks. These natural, cultural, and economic assets are among the reasons more than 1.8 million people call this six-county region home and an even larger number visit each year for hiking, fishing, festivals, kayaking, horseback riding, weddings, and other events.

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<sup>6</sup> Similar to communities impacted by the shale gas boom, communities along the pipeline can expect spikes in crime as transient workers come and go, more damage to roads under the strain of heavy equipment, increases in physical and mental illnesses including asthma, depression, anxiety, and others triggered by exposure to airborne pollutants, to noise, and to emotional, economic, and other stress. See, for example, Ferrar et al. (2013), Healy (2013), Fuller (2007), Campoy, (2012), and Mufson (2012).

## PASSIVE USE VALUE

Passive use values include *option* value, or the value of preserving a resource unimpaired for one's potential future use; *bequest* value, which is the value to oneself of preserving the resource for the use of others, particularly future generations; and *existence* value, which is the value to individuals of simply knowing that the resource exists, absent any expectation of future use by oneself or anyone else. In the case of the PE, people who have not visited the Poconos or otherwise spent vacation time and dollars in the region, are better off knowing that the setting for their planned activities is a beautiful aesthetically pleasing landscape. What future visitors would be willing to pay to maintain that possibility would be part of the "option value" of a PE-free landscape.

Statistics from the Center for the Study of Rural America, part of the Federal Reserve Bank of Kansas City, highlight the extent to which the region possesses the right conditions for resilience and economic success in the long run (Low, 2004). These data show that the study region has a higher human amenity index (based on scenic amenities, recreational resources, and access to health care), and strong entrepreneurship relative to the average for Pennsylvania and New Jersey counties.<sup>7</sup>

More traditional measures of economic performance suggest the counties are generally strong and resilient, though there are some differences among the Pennsylvania and New Jersey counties.

From 2000 through 2014, for example:<sup>8</sup>

- Population in the study region grew by 5.2%, compared to a 4.9% increase for Pennsylvania and New Jersey overall.
  - Population in the Pennsylvania section of the study region grew by 5.3%, compared to a 4.1% increase for the state of Pennsylvania.
  - Population in the New Jersey section of the study region grew by 5.0%, compared to a 6.0% increase for the state of New Jersey.
- Employment in the study region grew by 12.6%, compared to an 8.0% increase for Pennsylvania and New Jersey overall.
  - Employment in the Pennsylvania section of the study region grew by 12.7%, compared to a 7.3% increase for the state of Pennsylvania.
  - Employment in the New Jersey section of the study region grew by 12.3%, compared to a 9.0% increase for state of New Jersey.
- Personal income in the study region grew by 16.9%, compared to a 16.1% increase in personal income for Pennsylvania and New Jersey overall.
  - Personal income in the Pennsylvania section of the study region grew by 19.7%, compared to an 18.4% increase for the state of Pennsylvania.
  - Personal income in the New Jersey section of the study region grew by 11.5%, compared to a 19.7% increase for the state of New Jersey.
- On average, earnings per job in the study region are lower, by about \$3,500/year, than the average for Pennsylvania and New Jersey overall.<sup>9</sup>
  - Earnings per job in the Pennsylvania section of the study region are lower, by about \$7,000/year, than the average for the state of Pennsylvania.
  - Earnings per job in the New Jersey section of the study are higher, by about \$5,600/year than the average for the state of New Jersey.
- Per capita income, by contrast, is higher in the study region, by \$3,600/year, than the average for Pennsylvania and New Jersey overall.<sup>10</sup>
  - Per capita income in the Pennsylvania section of the study region is higher, by about \$4,200/year, than the average for the state of Pennsylvania.
  - Per capita income in the New Jersey section of the study region is higher, by about \$6,800/year, than the average for the state of New Jersey.

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<sup>7</sup> Note that the Kansas City Fed's statistics have not been updated since 2004-2006, and conditions in and outside the study region have undoubtedly changed. Some of these relative rankings may no longer hold.

<sup>8</sup> These data are from the U.S. Department of Commerce (2015a) as reported in Headwaters Economics' Economic Profile System.

<sup>9</sup> It is not uncommon for wages to be lower in high-amenity areas, as workers can view amenities as a "second paycheck." See, for example, Roback (1988) and Niemi and Whitelaw (1999).

<sup>10</sup> Per capita income reflects non-labor income, such as from investments and social security, in addition to the wages and salaries included in earnings per job.

- The unemployment rate in the study region is 5.8%, compared to 6.2% for Pennsylvania and New Jersey overall.
  - The unemployment rate in the Pennsylvania section of the study region is 5.9%, compared to an unemployment rate of 5.8% for the state of Pennsylvania.
  - The unemployment rate in the New Jersey section of the study region is 5.5%, compared to an unemployment rate of 6.6% for the state of New Jersey.

In addition, several trends suggest entrepreneurs and retirees are moving to (or staying in) this region, bringing their income, expertise, and job-creating energy with them. Namely,

- The region’s population growth has been primarily due to in-migration,
- The proportion of the population 65 years and older has increased from 14.3% to 15.8%,
- Proprietors’ employment is up by 47.7%, and
- Non-labor income (primarily investment returns and age-related transfer payments like Social Security) is up by 26.7%.

Temporary residents—tourists and recreationists attracted to the natural amenities of the region—and the businesses that serve them are also important parts of the region’s economy. Tourists spent about \$4.5 billion in the study region in 2015. The companies that directly served those tourists employed 40,896 people, or 5.7% of total private employment in the region (Tourism Economics, 2015 & 2016).

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***“I wouldn’t have the opportunity to have my animal farm for income and it would also devastate the bucolic landscape that has driven the tourism that supports my town, bike riding and fundraisers (5k runs, cycling and others). It would also take away a safe place for my children to play and have a childhood. I would have no other choice than to leave and it would be a life without a home we own, without our farm animals and the money we made from them. Without a studio for me to earn another source of income. How could PennEast possibly mitigate this for me and my community?”***

*-Jacqueline Evans, Landowner  
Hunterdon, NJ*

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It is in this context the potential economic impacts of the PE must be weighed and the apprehension of the region’s residents understood. Many believe the construction and operation of the pipeline will kill, or at least dampen, the productivity of the proverbial goose that lays its golden eggs in the region. This could result in a slower rate of growth in the region and worse economic outcomes. More dire is the prospect that businesses will not be able to maintain their current levels of employment. Just as retirees and many businesses can choose where to locate, visitors and potential visitors have practically unlimited choices for places to spend their vacation time and expendable income. If the study region loses its amenity edge, other things being equal, people will go elsewhere, and this region could contract.

Instead of a “virtuous circle” with amenities and quality of life attracting/retaining residents and visitors, who improve the quality of life, which then attracts more residents and visitors, the PE could tip the region into a downward spiral. In that scenario, loss of amenity and risk to physical safety would translate into a diminution or

outright loss of the use and enjoyment of homes, farms, and recreational and cultural experiences. Some potential in-migrants would choose other locations and some long-time residents would move away, draining the region of some of its most productive citizens. Homeowners would lose equity as housing prices follow a stagnating economy. With fewer people to create economic opportunity, fewer jobs and less income will be generated. Communities could become hollowed out, triggering a second wave of amenity loss, out-migration, and further economic stagnation.

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*“This pipeline would directly impact our spring fed farm, our physical safety, farming yield, and overall proposes environmental harm to flora, fauna, water, and soil.”*

*-Rosemary Litschauer, Landowner  
Rieglesville, PA*

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## ENVIRONMENTAL-ECONOMIC EFFECTS AND WHERE THEY WOULD OCCUR

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In the remainder of this report, we follow this potential cycle and consider four distinct types of economic consequences.

1. **Effects on Ecosystem Service Value:** Corresponding to the direct biophysical impacts of the proposed pipeline are effects on ecosystem services—the benefits nature provides to people for free, like purified water or recreational opportunities, that will become less available and/or less valuable due to the PE’s construction and operation.
2. **Effects on Property Value:** Estimating the loss of private property value as owners and would-be owners choose properties farther from the pipeline’s right-of-way, evacuation zone, compressor station, and viewshed.
3. **The Social Cost of Carbon:** The economic cost of harm associated with the emission of carbon.
4. **Effects on Economic Development:** More general economic effects caused by a dampening of future growth prospects or even a reversal of fortune for some industries.
5. **Other Impacts Not Quantified:** We examine the impacts to public health due to the operation of the pipeline and compressor station, the potential impact of pipeline construction and operation on municipal and county community services, and provide an overview of how the pipeline’s visual impact may decrease property value.

We begin with an exploration of the geographic area over which these various effects will most likely be felt.

### Impact Zones within the Study Region

#### Right-of-Way and Construction Corridor

Construction of the pipeline corridor itself would require clearing an area at least 100 feet (30.5 m) wide. After construction, the permanent right-of-way would be 50 feet (15.2 m) wide along the entire length of the pipeline.

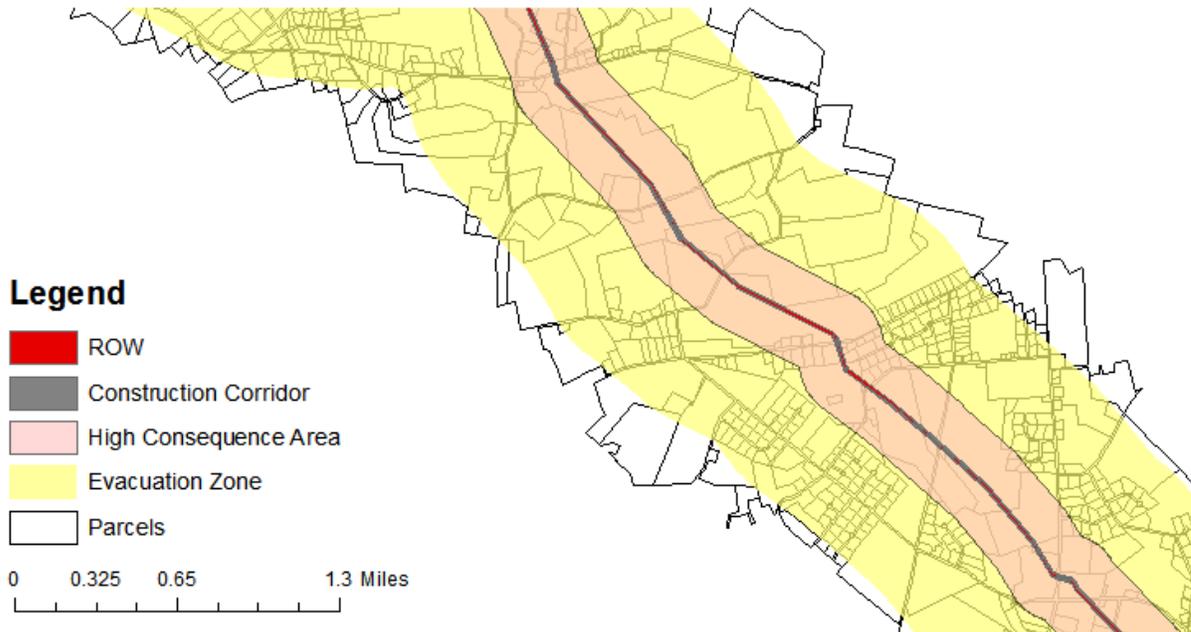
#### High Consequence Area

Operated at its intended pressure and due to the inherent risk of leaks and explosions, the pipeline would present the possibility of having significant human and ecological consequences within a large High Consequence Area (HCA). A High Consequence Area is “the area within which both the extent of property damage and the chance of serious or fatal injury would be expected to be significant in the event of a rupture failure” (Stephens, 2000, p. 3). Using Stephens’ formula, the HCA for this pipeline would have a radius of 949 feet (289.26 m).

## Evacuation Zone

The evacuation zone is defined by the distance beyond which an unprotected human could escape burn injury in the event of the ignition or explosion of leaking gas (Pipeline Association for Public Awareness, 2007, p. 29).

There would be a potential evacuation zone with a radius of at least 3,157 feet (962.48 m).<sup>11</sup> (See map, Figure 2, for a close-up of these zones in part of the study region.)



**FIGURE 2: Right-of-Way, Construction Corridor, High Consequence, and Evacuation Areas for a Section in Northampton, PA.**

Note that the overlay of the HCA (in pink) and the evacuation zone (in yellow) shows up as the salmon band in the map. The ROW covers much of the construction corridor, leaving a thin band of red/grey visible. Also, we only had data for parcels as far out as the edge of the evacuation zone for a few counties.

Sources: PE route obtained from the Delaware Riverkeeper Network; Counties from USGS (U.S. Department of Interior & U.S. Geological Survey, 2015); Parcels from Northampton obtained from the Northampton County GIS Department.

Within the construction corridor and right-of-way is where the greatest disruption of ecosystem processes will occur, so these corridors are where reductions in ecosystem service value (ESV) emanate. Because we estimate ecosystem service values at their point of origin, we focus on the ROW, the construction zone (the construction corridor, new temporary roads,<sup>12</sup> pipeyards, and temporary aboveground infrastructure), new permanent access roads,<sup>12</sup> and permanent aboveground infrastructure. An explosion would undoubtedly affect ecosystem processes within the HCA and possibly the evacuation zone, but given the probability of an explosion at a

<sup>11</sup> The maximum operating pressure proposed for the PE is 1,480 PSIG, but the source data for the evacuation distance is a table with pressure in 100 PSIG increments. The full evacuation distance would be between 3,071 feet and 3,179 feet, the distances recommended for a 36" pipeline operated at 1,400 and 1,500 PSIG. The exact evacuation distance is determined by subtracting the 1500 PSI 36" distance value from the 1400 PSI 36" value, taking 80% of that value, and adding it to the 1400 value to determine the appropriate evacuation distance for a 1480 PSI 36" pipeline. The upshot for this study is a slightly more conservative estimate of the effect of the PE on property value.

<sup>12</sup> We estimate lost ESV only for *new* temporary and permanent access roads because it is for these roads that other land uses (forest, cropland, etc.) will be converted to road surfaces. Where existing roads will be used for access, even if improved by paving, we assume there is no change in their function as sources of ecosystem service value and, therefore, there would be no decrease in that value due to their use related to the PE.

particular point along the pipeline at a given time is small, we do not include the additional effects *on ecosystem service value* due to explosion in the cost estimates.

Effects on land value are another matter, and it is reasonable to consider land value impacts within the evacuation zone. As Kielisch (2015) stresses, the value of land is determined by human perception, and property owners and would-be owners have ample reason to perceive risk to property near high-pressure natural gas transmission pipelines. Traditional and new media reports attest to the occurrence and consequences of pipeline leaks and explosions, which are even more prevalent for newer pipelines than for those installed decades ago (Smith, 2015). Information about pipeline risks translates instantly into buyers' perceptions and their willingness to pay for properties exposed to those risks. For would-be sellers, this dynamic reduces the price they could expect to receive for their homes and makes it harder to find a buyer in the first place. Property owners who do not wish to move would experience a loss of economic value due to diminished enjoyment of their homes (Freybote & Fruits, 2015).

### **Compressor Station**

The proposed compressor station is likely to have separate effects on property value and on human health. Based on the experience of homeowners near a compressor station in Hancock, New York, we consider the possibility of a property value effect within one half mile of the proposed compressor station in Kidder Township, Carbon County (Catskill Citizens for Safe Energy, 2015). This zone overlaps the ROW and the evacuation zone, and because we assume that the more acute and ever present effect of proximity to the compressor station would dominate all other effects, we ignore the ROW and evacuation zone effects for these particular properties.

Compressor stations have also been associated with various human health effects at distances up to two miles away from compressor stations (Subra, 2009, 2015). Further epidemiological research would allow estimation of the costs of those effects for the proposed station in Kidder Township, however, without such research, we do not include the potential public health costs in the present study.

### **Viewshed**

Beyond the areas where the proposed pipeline would alter land use and present the risk of physical danger, the pipeline would change the aesthetic qualities of the region. Residents and visitors will see the pipeline corridor as a break in a once completely forested hillside, and the lower aesthetic quality would translate into further loss of value for properties from which the corridor is visible. In this study, that effect is captured as lost aesthetic value under the heading of ecosystem services. Therefore, while we do map the areas from which the pipeline could be visible, we do not separately estimate impacts on properties at those locations. The cost, in other words, is estimated from the pipeline corridor where the aesthetic quality is impaired, not the points at which the diminished aesthetic quality is experienced.

### **Boroughs, Townships, Cities, and Counties**

If PE is built, there will likely be increases in the costs of community service, such as for traffic control and extra law enforcement capacity needed during construction and for emergency preparedness/emergency services during operation. As borough, township, city, and county governments, as well as volunteer fire companies meet these needs, costs for services would increase. In the DEIS, FERC states that they do not expect a change in the level of services provided by law enforcement and fire protection during pipeline construction and that PennEast will work to coordinate local community service departments in case of an emergency response situation (Federal Energy Regulatory Commission, 2016b). Neither PE LLC nor FERC have confirmed in Resource Reports or the DEIS that they interviewed officials responsible for such services. Based on comment letters

submitted to FERC from local emergency service groups raising questions and concerns over the proposed project, however, it does not seem likely PE LLC reached out. From that assumption, FERC’s statement appears to be based entirely on PennEast’s assurance and not on any real data, which should be rectified before the final decision regarding the pipeline.

**Region-Wide Effects**

Beyond the loss of ecosystem services stemming from the conversion of land in the ROW, the loss of property value resulting from the chance of biophysical impacts (leaks and explosions), or the certainty of impacts on aesthetics, the proposed PE would also diminish physical ecosystem services, scenic amenity, and passive use value that are realized or enjoyed beyond the evacuation zone and out of sight of the pipeline corridor. The people affected include residents, businesses, and landowners throughout the study region, as well as past, current, and future visitors to the region. The impacts on human well-being would be reflected in economic decisions such as whether to stay in or migrate to the study region, whether to choose the region as a place to do business, and whether to spend scarce vacation time and dollars near the PE instead of in some other place.

**TABLE 2: Geographic Scope of Effects**

A check mark indicates the zones/effects for which estimates are included in this study. The “?”s indicate cost categories for future study and for which quantitative estimates are not included in this report.

Values/Effects	ROW & Construction Zone	HCA & Evacuation Zone	Near the Compressor Station	Pipeline Viewshed	Entire Study Region	Beyond the Study Region
Ecosystem Services	✓	a,b	✓	a,b	? <sup>a,b</sup>	?
Human Health and Safety	?	?	✓	?	?	?
Land/Property Value	✓ <sup>c</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>	✓ <sup>e</sup>	?	?
Community Services	?	?	?	?	?	?
Economic Development	f	f	f	f	✓	?

Notes:

- a. Changes in ecosystem services felt beyond the ROW and construction zone may be key drivers of “Economic Development Effects,” but they are not separately estimated to avoid double counting.
- b. With the exception of the impact on visual quality, we do not estimate the spillover effects associated with altering the ecosystem within the ROW on the productivity of adjacent areas. The ROW, for example, provides a travel corridor for invasive species that could reduce the integrity and ecosystem productivity of areas that without the PE would remain core ecological areas, interior forest habitat, etc.
- c. We estimate land value effects for the ROW but not for the construction zone.
- d. Properties in the HCA are treated as though there is no additional impact on property value relative to the impact of being in the evacuation zone. Also, we exclude properties in the compressor station zone from estimates of impacts related to the ROW and the evacuation zone because while the compressor station’s effects on land value may be similar (driven by health and safety concerns and possible loss of use), they are both more acute and certain. (Noise and air emissions from the compressor stations will be routine, while the probability of a leak occurring at a given time from the pipeline is rare.) We assume that the ongoing effects of the compressor station on use and enjoyment of properties nearby would overshadow or dominate the possibility of a high-consequence event or the need to evacuate.
- e. To avoid double-counting, changes in property value due to an altered view from the property are considered to be part of lost aesthetic value under the “Effects on Ecosystem Service Value” section.
- f. Economic development effects related to these subsets of the study region are included in estimates for the study region.

To the extent the PE causes such decisions to favor other areas, less spending and slower economic growth in the study region would be the result. A secondary effect of slower growth would be further reductions in land value, but in this study we consider the primary effects in terms of slower population, employment, and income growth in key sectors. Table 2, above, summarizes the types of economic values considered in this study and the zones in which they are estimated.

## EFFECTS ON ECOSYSTEM SERVICE VALUE

The idea that people receive benefits from nature is not at all new, but “ecosystem services” as a term describing the phenomenon is more recent, emerging in the 1960s (Millennium Ecosystem Assessment, 2003). “Benefits people obtain from ecosystems” is perhaps the simplest and most commonly heard definition of ecosystem services (Reid et al., 2005).

“Ecosystem services” is sometimes lengthened to “ecosystem goods and services” to make it explicit that some are tangible, like physical quantities of food, water for drinking, and raw materials, while others are truly services, like cleaning the air and providing a place with a set of attributes that are conducive to recreational experiences or aesthetic enjoyment. We use the simpler “ecosystem services” here. Table 3, lists the provisioning, regulating, and cultural ecosystem services included in this study.

**TABLE 3: Ecosystem Services Included in Estimates**

<b>Provisioning Services<sup>a</sup></b>
<b>Food Production:</b> The harvest of agricultural produce, including crops, livestock, and livestock by-products; the food value of hunting, fishing, etc. <b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Forest
<b>Raw Materials:</b> Fuel, fiber, fertilizer, minerals, and energy. <b>Associated land uses<sup>b</sup>:</b> Forest, Wetland
<b>Water Supply:</b> Filtering, retention, storage, and delivery of fresh water—both quality and quantity—for drinking, watering livestock, irrigation, industrial processes, hydroelectric generation, and other uses. <b>Associated land uses<sup>b</sup>:</b> Forest, Water, Wetland
<b>Regulating Services<sup>a</sup></b>
<b>Air Quality:</b> Removing impurities from the air to provide healthy, breathable air for people. <b>Associated land uses<sup>b</sup>:</b> Shrub/Scrub, Forest, Wetland, Urban Open Space
<b>Biological Control:</b> Inter- and intra-specific interactions resulting in reduced abundance of species that are pests, vectors of disease, or invasive in a particular ecosystem. <b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Forest
<b>Climate Regulation:</b> Storing atmospheric carbon in biomass and soil as an aid to the mitigation of climate change, and/or keeping regional/local climate (temperature, humidity, rainfall, etc.) within comfortable ranges. <b>Associated land uses<sup>b</sup>:</b> Pasture/Forage, Grassland, Shrub/Scrub, Forest, Wetland, Urban Open Space, Urban Other
<b>Erosion Control:</b> Retaining arable land, stabilizing slopes, shorelines, riverbanks, etc. <b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Shrub/Scrub, Forest

Regulating Services Continued
<p><b>Pollination:</b> Contribution of insects, birds, bats, and other organisms to pollen transport resulting in the production of fruit and seeds. May also include seed and fruit dispersal.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Shrub/Scrub, Forest</p>
<p><b>Protection from Extreme Events:</b> Preventing and mitigating impacts on human life, health, and property by attenuating the force of winds, extreme weather events, floods, etc.</p> <p><b>Associated land uses<sup>b</sup>:</b> Forests, Wetland, Urban Open Space</p>
<p><b>Soil Fertility:</b> Creation of soil, inducing changes in depth, structure, and fertility, including through nutrient cycling.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Forest</p>
<p><b>Waste Treatment:</b> Improving soil and water quality through the breakdown and/or immobilization of pollution.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Grassland, Shrub/Scrub, Forest, Water, Wetland</p>
<p><b>Water Flows:</b> Regulation by land cover of the timing of runoff and river discharge, resulting in less severe drought, flooding, and other consequences of too much or too little water available at the wrong time or place.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Forests, Wetland, Urban Open Space, Urban Other</p>
Cultural Services <sup>a</sup>
<p><b>Aesthetic Value:</b> The role that beautiful, healthy natural areas play in attracting people to live, work, and recreate in a region.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Pasture/Forage, Forest, Wetland, Urban Open Space</p>
<p><b>Recreation:</b> The availability of a variety of safe and pleasant landscapes—such as clean water and healthy shorelines—that encourage ecotourism, outdoor sports, fishing, wildlife watching, hunting, etc.</p> <p><b>Associated land uses<sup>b</sup>:</b> Cropland, Shrub/Scrub, Forest, Water, Wetland, Urban Open Space, Urban Other</p>

Notes:

- a. Descriptions follow Balmford (2010, 2013), Costanza et al. (1997), Reid et al. (2005), and Van der Ploeg, et al. (2010).
- b. “Associated land uses” are limited to those for which per-unit-area values are available in this study.

Different ecosystems (forest, wetland, cropland, urban areas, for example) produce different arrays of ecosystem services, and/or produce similar services to greater or lesser degrees. This is true for the simple reason that some ecosystems or land uses produce a higher flow of benefits than others.

At a conceptual level, we estimate the potential effects of the PE on ecosystem service values by identifying the extent to which the pipeline’s construction would affect, and how its long-term existence would perpetuate, a change in land cover or land use, which in turn results in a change in ecosystem service productivity. Lower productivity, expressed in dollars of value per acre per year, means fewer dollars’ worth of ecosystem service value produced each year.

Construction will strip bear the 100-foot-wide construction corridor and the rest of the construction zone. Once construction is complete and after some period of recovery, much of the 50-foot-wide right-of-way will be occupied by a different set of ecosystems (land cover types) than were present before



Permanent easement of Tennessee Gas Pipeline Company’s 300 line in Pike County, Pennsylvania.  
(Photo Credit: Wendy Selepouchin)

construction. By applying per-acre ecosystem service productivity estimates (denominated in dollars) to the various arrays of ecosystem services, we can estimate ecosystem service values produced per year in the periods before, during, and after construction. The difference between annual ecosystem service value *during* construction and the value *before* construction is the annual loss in ecosystem service value *of* construction. The difference between the annual ecosystem service value during ongoing operations (i.e., the value produced in the ROW) and the before-construction baseline (no pipeline) is the annual ecosystem service cost that will be experienced indefinitely.

In addition to the ROW and construction corridor, the PE would require the construction of various temporary and permanent access roads,<sup>13</sup> pipeyards,<sup>14</sup> and aboveground infrastructure.<sup>15</sup> These additional features are treated as though they are part of the construction zone. Permanent roads and permanent aboveground infrastructure are treated separately.<sup>13,16</sup> This overall process is illustrated in Figure 3 and the details of our methods, assumptions, and calculations are described in the following two subsections.

## Ecosystem Service Estimation Methods

Economists have developed widely used methods to estimate the monetary value of ecosystem services and/or natural capital. The most commonly known example is a study by Costanza et al. (1997) that valued the natural capital of the entire world. That paper and many others employ the benefit transfer method (BTM) to establish a value for the ecosystem services produced or harbored from a particular place.<sup>17</sup> According to the Organization for Economic Cooperation and Development, BTM is “the bedrock of practical policy analysis,” particularly in cases such as this when collecting new primary data is not feasible (OECD, 2006).

BTM takes a rate of ecosystem benefit delivery calculated for one or more “source areas” and applies that rate to conditions in the “study area.” As Batker et al. (2010) state, the method is very much like a real estate appraiser using comparable properties to estimate the market value of the subject property. It is also similar to using an existing or established market or regulated price, such as the price of a gallon of water, to estimate the value of some number of gallons of water supplied in some period of time. The key is selecting “comps” (data from source areas) that match the circumstances of the study area as closely as possible.

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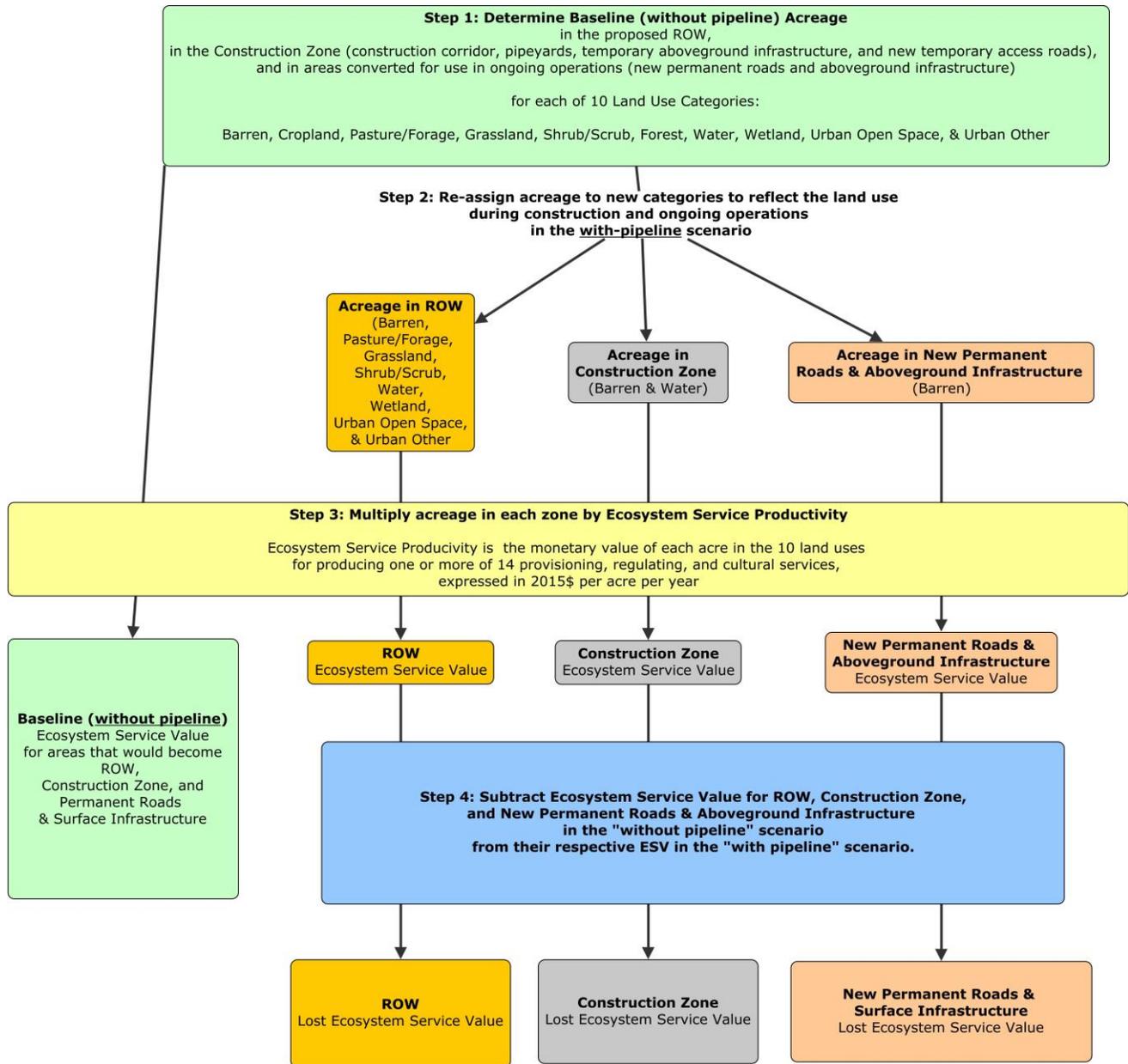
<sup>13</sup> As noted above, we only consider the ecosystem service conversion of *new* temporary and permanent access roads, not partially existing roads. Resource Report 1 (PennEast Pipeline Company, LLC, 2015a) provides the length and width of each road as well as the existing land condition, such as “grass” or “grass and trees.” We used this land condition as a proxy for the baseline land cover. For the “with PE” scenario, all of these areas would, for ecosystem services estimation purposes, be converted to the barren land category.

<sup>14</sup> Resource Report 1 (PennEast Pipeline Company, LLC, 2015a) gives the coordinates and total acreage disturbed by the construction of pipeyards, but it does not report their exact shape. To evaluate the land uses converted to barren land for pipeyards, we centered a circle of the corresponding area at the coordinate for each pipeyard and then estimated the acreage in the various land uses within that circle. To avoid double counting, we excluded any portions of these circles that overlapped with the construction corridor.

<sup>15</sup> As with pipeyards, Resource Report 1 (PennEast Pipeline Company, LLC, 2015a) gives the coordinates and amount of temporary acreage disturbed for aboveground infrastructure facilities, but it does not report their exact shape. For temporary aboveground infrastructure, we assumed a circular footprint for each facility and, after excluding any overlap with the construction corridor, we estimate the acreage in the various pre-construction land uses.

<sup>16</sup> As with pipeyards and temporary infrastructure, Resource Report 1 (PennEast Pipeline Company, LLC, 2015a) gives the coordinates and amount of permanent acreage disturbed on and off the ROW for aboveground infrastructure facilities, but not the exact footprint of the areas. For these facilities, we again assume a circular footprint of a size corresponding to each area and estimate the acreage of each land use disturbed within those circles. This estimation excludes any area of overlap with the ROW.

<sup>17</sup> See also Esposito et al. (2011), Flores et al. (2013), and Phillips and McGee (2014) for more recent examples.



**FIGURE 3: Ecosystem Service Valuation Process**

Typically, values are drawn from previous studies that estimate the value of various ecosystem services from similar land cover/biome types. Also, it is benefit (in dollars) per-unit-area-per-year in the source area that is transferred and applied to the number of hectares or acres in the same land cover/biome in the study area. For example, data for the source area may include the value of forestland for recreation. In that case, apply the per-acre value of recreation from the source area’s forestland to the number of acres of forestland in the study area. Multiply that value by the number of acres of forestland in the study area to produce the estimate of the value of the study area’s forests to recreational users. Furthermore, it is important to use source studies that are from regions with similar underlying economic, social, and other conditions to the study area.

Following these principles and techniques developed by Esposito et al. (2011), Esposito (2009), and Phillips and McGee (2014, 2016), and as illustrated in Figure 3, we employ a four-step process to evaluate the short-term and long-term effects of the PE on ecosystem service value in the study region.

The steps in summary:

1. Assign land and water in the study to one of 10 land uses based on remotely sensed (satellite) data in the National Land Cover Dataset (NLCD) (Fry et al., 2011). This provides the array of land uses for estimating baseline or “without PE” ecosystem service value.
2. Re-assign or re-classify land and water to what the land cover would most likely be during construction and during ongoing operation.
3. Multiply acreage by per-acre ecosystem service productivity (the “comps”) (in dollars per acre per year) to obtain estimates of annual aggregate ecosystem service value under the baseline/no PE scenario, for the construction zone (and period) and for the ROW during ongoing operation.  
For simplicity and given the 7-month construction period (Kornick, 2016a), we assume the construction zone will remain barren for at least 5 months after construction is completed (a one year construction period). We recognize revegetation will occur soon after the trench is closed and fill and soil are returned, but it will still be some time until something resembling a functioning ecosystem is restored.
4. Subtract baseline (no pipeline) ESV from ESV (with pipeline) for the construction period (in the construction zone) and from ESV during ongoing operations (in the ROW) to obtain estimates of the ecosystem service costs imposed annually during the construction and operations period, respectively.

## Step 1: Assign Land to Ecosystem Types or Land Uses

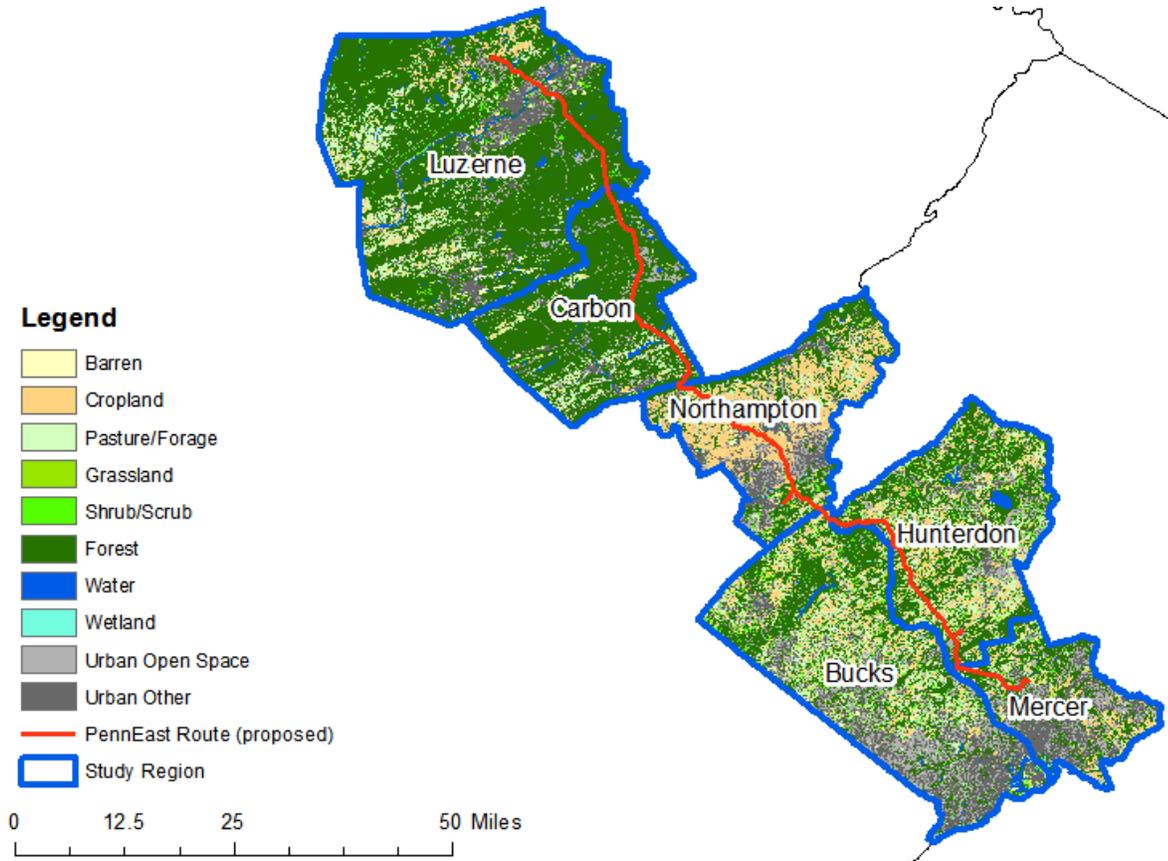
The first step in the process is to determine the area in the 10 land use groups in the study region. This determination is made using remotely sensed data from the National Land Cover Database (NLCD) (Fry et al., 2011). Satellite data provides an image of land in one of up to 21 land cover types at the 30-meter level of resolution;<sup>18</sup> 15 of these land cover types are present in the study region (Figure 4).

Looking forward to the final step, we will use land use categories to match per-acre ecosystem value estimates from source areas to the six-county study region. Unfortunately, value estimates are not available for all of the detailed land use categories present in the region. We therefore simplify the NLCD classification by combining a number of classifications into larger categories for which per-acre values are more available. Specifically, low-, medium-, and high-intensity development are grouped as “urban other,” and deciduous, evergreen, and mixed forest are grouped as “forest.” In addition, we add land in the NLCD category of “woody wetlands” to the “forest” category for two reasons. First, these wetlands would normally become forest in the study region (Johnston, 2014; Phillips & McGee, 2016). Second, wetlands possess some of the highest per-acre values for several ecosystem services. To avoid overestimating the ecosystem services contribution of “woody wetlands,” we count them as “forest” instead of “wetland.”

In the end, for baseline (no pipeline) conditions, we have land in 10 land uses (Figure 4 and Table 4). The total area that would be disturbed in the construction corridor, new temporary access roads, pipeyards, and temporary aboveground infrastructure is 1,852.7 acres, of which 715.0 acres would be occupied by the permanent right-of-way. An additional 55.8 acres would be devoted to new permanent access roads and permanent aboveground infrastructure. Figure 5 shows the distribution of acreage in the ROW, construction zone, and in land needed for permanent surface infrastructure pre-PE, or baseline land use.

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<sup>18</sup> Because 30 meters is wider than the right-of-way and not much narrower than the 100-foot construction corridor, we resample the NLCD data to 10m pixels, which breaks each 30m-by-30m pixel into 9 10m-by-10m pixels. This allows for a closer approximation of the type and area of land cover in the proposed ROW and construction corridor.



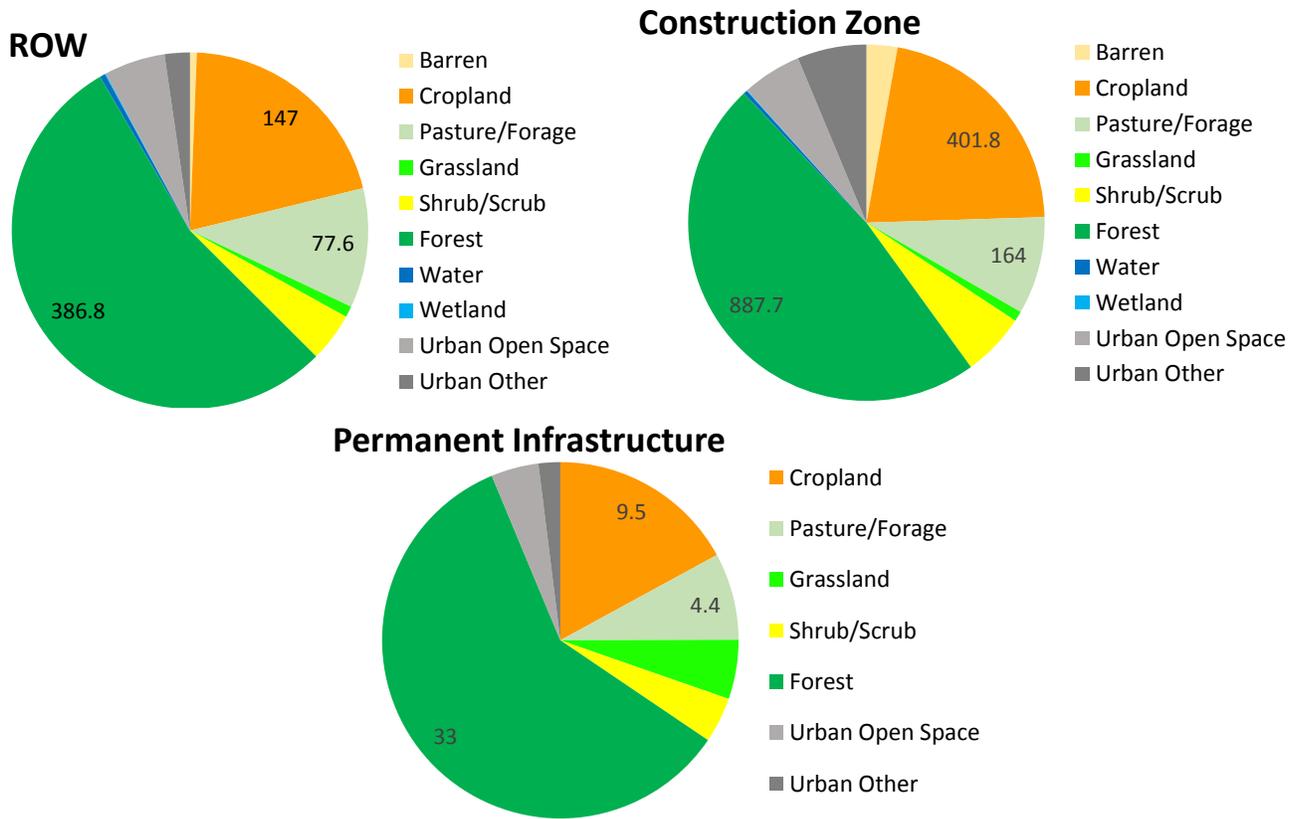
**FIGURE 4: Land Use in the Study Region, as Classified for Ecosystem Service Valuation**

Land cover for the entire study region is shown to display the overall range and pattern of land use. The ecosystem service valuation only covers portions of the study region occupied by the PE right-of-way and construction zone.

Sources: Land Cover from National Land Cover Database (Fry, et al. 2011); PE route obtained from the Delaware Riverkeeper Network; Counties from USGS (U.S. Department of Interior & U.S. Geological Survey, 2015).

**TABLE 4: Land Area Affected By PE, Study Region Total (See Also Figure 5)**

Land Use	Baseline acreage in ROW	Baseline acreage in the construction zone	Baseline acreage in permanent surface infrastructure and access roads
Barren	4.4	52.1	0
Cropland	147.0	401.8	9.5
Pasture/Forage	77.6	164.0	4.4
Grassland	7.2	17.1	3.0
Shrub/Scrub	31.8	106.6	2.3
Forest	386.8	887.7	33.0
Water	3.5	6.3	0
Wetland	0.7	1.1	0
Urban Open Space	39.6	99.9	2.4
Urban Other	16.4	116.2	1.1
<b>Total</b>	<b>715.0</b>	<b>1,852.7</b>	<b>55.8</b>



**FIGURE 5: Baseline (Pre-PE) Land Use in the ROW, Construction Zone, and Permanent Access Roads and Aboveground Infrastructure (Acres) (See also Table 4)**

## Step 2: Re-assign Acreage to New Land Cover Types for the Construction and Operation Periods

We assume all land in the construction corridor will be “barren” or at least possess the same ecosystem service productivity profile as naturally-occurring barren land for the duration of the construction period. Water will remain water during construction. Table 5 lists the reassignment assumptions in detail.

**TABLE 5: Land Cover Reclassification**

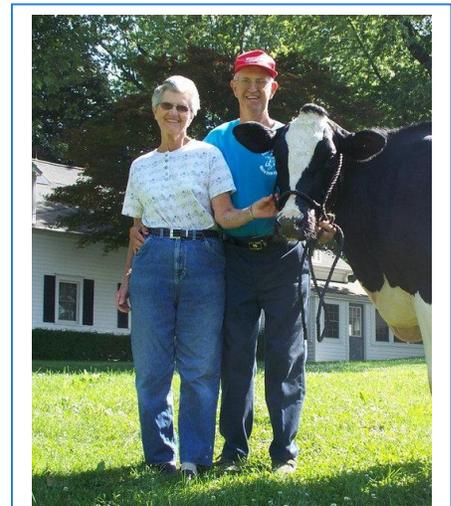
NLCD Category	Reclassification for Baseline	Reclassification for Construction	Reclassification for Ongoing Operation in the ROW	Reclassification for Ongoing Operation Roads and Aboveground Infrastructure
<b>Barren Land</b>	Barren	Barren	Barren	Barren
<b>Cultivated Crops</b>	Cropland	Barren	Pasture/Forage	Barren
<b>Pasture/Hay</b>	Pasture/Forage	Barren	Pasture/Forage	Barren
<b>Grassland/Herbaceous</b>	Grassland	Barren	Grassland	Barren
<b>Shrub/Scrub</b>	Shrub/Scrub	Barren	Shrub/Scrub	Barren
<b>Deciduous Forest</b>	Forest	Barren	Shrub/Scrub	Barren
<b>Evergreen Forest</b>	Forest	Barren	Shrub/Scrub	Barren
<b>Mixed Forest</b>	Forest	Barren	Shrub/Scrub	Barren

Table 5 Continued				
<b>Woody Wetlands</b>	Forest	Barren	Shrub/Scrub	Barren
<b>Open Water</b>	Water	Water	Water	Barren
<b>Emergent Herbaceous Wetlands</b>	Wetland	Barren	Wetland	Barren
<b>Developed, Open Space</b>	Urban Open Space	Barren	Urban Open Space	Barren
<b>Developed, Low Intensity</b>	Urban Other	Barren	Urban Other	Barren
<b>Developed, Medium Intensity</b>	Urban Other	Barren	Urban Other	Barren
<b>Developed, High Intensity</b>	Urban Other	Barren	Urban Other	Barren

Within the ROW, and for the indefinite period following construction—during ongoing operations—we assume pre-PE forestland converts to shrub/scrub, and cropland converts to pasture/forage. We recognize that cropland in the ROW could potentially revert back to cropland, but if there are restrictions on the weight of vehicles that can be operated on top of the buried pipeline easement, it may turn out to be the case that cropland reverts, at best, to pastureland. These include limits on the weight of equipment that could cross the corridor at any given point and difficulty using best soil conservation practices, such as tilling along a contour, which may be perpendicular to the pipeline corridor. (This would require extra time and fuel use that could render some fields too expensive to till, plant, or harvest.) Reclassifying cropland as pasture/forage (which is a generally less productive ecosystem service) recognizes these effects while also recognizing some sort of future agricultural production in the ROW (grazing and possibly haying) could be possible.

An additional effect not captured in our methods is long-standing harm to agricultural productivity due to soil compaction, soil temperature changes, and alteration of drainage patterns due to pipeline construction. Rob Fulper, a farmer in West Amwell, Hunterdon County, New Jersey, noticed that corn planted over two existing pipelines buried on his 100-year-old family farm during World War II that now transport natural gas produce lower yields (Colaneri, 2015). Separately, agronomist Richard Fitzgerald (2015) concludes, “it is my professional opinion that the productivity for row crops and alfalfa will never be regenerated to its existing present ‘healthy’ and productive condition [after installation of a pipeline].” Thus, the true loss in food and other ecosystem service value from pasture/forage acreage would be larger than our estimates reflect.

Permanent access roads and sites for mainline valves are assumed, post construction, to remain in the “barren” land use and produce the corresponding level of ecosystem services.



Bob and Sally Fulper at the Fulper Family Farmstead.  
(Photo Credit: Breanna ‘Fulper’ Lundy)

### Step 3: Multiply Acreage by Per-Acre Value to Obtain ESV

After obtaining acreage by land use in the construction zone and the ROW, we are ready to multiply those acres times per-acre-per-year ecosystem service productivity (in dollar terms) to obtain total ecosystem service value in each area and for with- and without-pipeline scenarios. Per-acre ecosystem service values are obtained primarily from a database of more than 1,300 estimates compiled as part of a global study known as “The Economics of Ecosystems and Biodiversity” or “the TEEB” (Van der Ploeg et al., 2010).<sup>19</sup> The TEEB database allows the user to select the most relevant per-unit-area values, based on the land use/land cover profile of the study region, comparison of general economic conditions in the source and study areas, and the general “fit” or appropriateness of the source study for use in the study area at hand. After eliminating estimates from lower-income countries and estimates from the U.S. that came from circumstances vastly different from Pennsylvania and New Jersey, we identified 91 per-acre estimates in the TEEB that adequately provide approximations of ecosystem service value in our study region.<sup>20</sup>

After selecting the best candidate studies and estimates in the TEEB database, we still had some key land use/ecosystem services values (such as food from cropland) without value estimates. To fill some of the most critical gaps, we turned to other studies that examined ecosystem service value in this general region (Phillips, 2015; Phillips & McGee, 2016) and to specific data on cropland and pasture/hayland value from the National Agricultural Statistics Service (USDA National Agricultural Statistics Service, 2016).

For several land cover-ecosystem service combinations, either multiple source studies were available or the authors of those studies reported a range of dollar-per-acre ecosystem service values. We are therefore able to report both a low and a high estimate based on the bottom and top end of the range of available estimates.

In the end, we have 165 separate estimates from 61 unique source studies covering 67 combinations of land uses and ecosystem services. (See Appendix A to this report for a full list of the values and sources that yielded these estimates.) This is still a fairly sparse coverage given there are 140 possible combinations of the 10 land uses and 14 services. Therefore, we know our aggregate estimates will be lower than they would be if dollar-per-acre values for all 14 services were available to transfer to each of the 10 land use categories in the study region. It is possible to live with that known underestimation, or it is possible to assign per-acre values from a study of one land-use-and-service combination to other combinations. Doing so would introduce unknown over- or perhaps under-estimation of aggregate values. We prefer to take the first course, knowing our estimates are low/conservative and urge readers to bear this in mind when interpreting this information for use in weighing the costs of the proposed PE.

After calculating acreage and per-acre ecosystem service values, we now calculate ecosystem service value-per-year for each of the four area/scenario combinations. To repeat, these annual values are:

- Baseline (no pipeline) ecosystem service value in the proposed construction zone
- Ecosystem service value in the construction zone during construction

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<sup>19</sup> Led by former Deutsche Bank economist, Pavan Sukhdev, the TEEB is designed to “[make] nature’s values visible” in order to “mainstream the values of biodiversity and ecosystem services into decision-making at all levels” (“TEEB - The Initiative,” n.d.). It is also an excellent example of the application of the benefit transfer method.

<sup>20</sup> Among those U.S. studies included in the TEEB database that we deemed inappropriate for use here were a study from Cambridge Massachusetts that reported extraordinarily high values for aesthetic and recreational value and the lead author’s own research on the Tongass and Chugach National Forests in Alaska. The latter was excluded due to the vast differences in land use, land tenure, climate, and other factors between the source area and the current study region.

- Baseline (no pipeline) ecosystem service value in the proposed right-of-way
- Ecosystem service value in the right-of-way during the (indefinite) period of ongoing operations<sup>21</sup>

Value calculations are accomplished according to the formula:

$$ESV = \sum_i, [(Acres_j) \times (\$/acre/year)_{i,j}]$$

Where:

$Acres_j$  is the number of acres in land use (j)

$(\$/acre/year)_{i,j}$  is the dollar value of each ecosystem service (i) provided from each land use (j) each year. These values are drawn from the TEEB database and other sources listed in Appendix A.

#### Step 4: Subtract Baseline “without PE” ESV from ESV in “with PE” Scenario

With steps 1-3 complete, we now estimate the cost in ecosystem service value of moving from the baseline (no pipeline) or status quo to a scenario in which the PE is built and operating. The cost of construction is the ESV from the construction zone during construction, minus the baseline ESV for the construction zone. PennEast, LLC estimates an approximate 7-month construction period (Kornick, 2016a). Our estimate of a one-year construction period assumes that the land disturbed during construction will remain barren for at least the next 5 months after construction. The ecosystem service cost of ongoing operations is ESV from the ROW in the “with PE” scenario minus the baseline ESV for the ROW. This will be an annual cost borne every year in perpetuity.

### Ecosystem Service Value Estimates

Ecosystem service value in the construction zone will be lost for one year and total between \$6.3 and \$22.1 million. Those one-time losses will be followed by annual losses in the ROW of between \$2.4 and \$9.0 million and annual losses from other permanent surface infrastructure of between \$218,186 and \$789,362. Most of this annual loss is due to the long-term conversion of more productive to less productive land uses in the ROW. The remainder is due to the displacement of natural land cover and functioning ecosystems by surface infrastructure and new permanent roads. By discounting the perpetual stream of annual losses we compute the present discounted value of all future losses to be between \$72.6 and \$272.4 million. Combined with the one-time loss during construction this puts the total loss of ecosystem service value due to the proposed PennEast Pipeline at \$78.9 to \$294.6 million.

In the baseline or “no pipeline” scenario, the land in the construction zone (including the construction corridor, new temporary roads, pipeyards, and temporary aboveground infrastructure) produces between \$6.3 and \$22.1 million per year in ecosystem service value. The largest contributors to this total (at the high end) are aesthetics, water, and pollination. Under a “with PE” scenario, and not surprisingly given the temporary conversion to bare/barren land, these figures drop to near zero, or between a total of \$640 and \$5,044 during the one year long construction period. Taking the difference as described in step 4, estimated per-year ecosystem service cost of the PE’s construction would be between \$6.3 and \$22.1 million (Table 6).

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<sup>21</sup> Note that while the ROW and construction corridors overlap in space, they do not overlap in time, at least not from an ecosystem services production standpoint. During construction, the land cover that would eventually characterize the ROW will not exist in the construction corridor. Thus, there is no double counting of ecosystem service values or of costs from their diminution as a result of either construction or ongoing operations.

**TABLE 6: Ecosystem Service Value Lost to the Construction Corridor, New Temporary Roads, Pipeyards, and Temporary Aboveground Infrastructure, Relative to Baseline, by Ecosystem Service**

Ecosystem Service	Study Region			
	Baseline (low) (2015\$)	Loss (low) (2015\$)	Baseline (high) (2015\$)	Loss (high) (2015\$)
Aesthetic Value	4,074,427	(4,074,427)	16,294,264	(16,294,264)
Air Quality	338,034	(338,034)	354,037	(354,037)
Biological Control	10,782	(10,782)	93,016	(93,016)
Climate Regulation	214,188	(214,188)	223,733	(223,733)
Erosion Control	19,310	(19,310)	98,867	(98,867)
Protection from Extreme Events	739,748	(739,748)	775,744	(775,744)
Food Production	30,692	(30,692)	30,692	(30,692)
Pollination	187,254	(187,254)	982,539	(982,539)
Raw Materials	21,827	(21,827)	148,140	(148,140)
Recreation	313,753	(312,823)	775,837	(770,123)
Soil Formation	8,970	(8,970)	64,670	(64,670)
Waste Treatment	62,009	(61,942)	347,929	(347,862)
Water Supply	42,231	(42,087)	1,152,907	(1,149,702)
Water Flows	210,333	(210,333)	732,789	(732,789)
<b>Total</b>	<b>\$6,273,559</b>	<b>(\$6,272,418)</b>	<b>\$22,075,164</b>	<b>(\$22,066,177)</b>

The ecosystem service costs for the ROW are predictably smaller on a per-year basis, but because they will persist indefinitely, the cumulative effect is much higher. In the baseline or “no pipeline” scenario, the land in the ROW produces between \$2.6 and \$9.4 million per year in ecosystem service value. Under the “with PE” scenario, using minimum values, the annual ecosystem service value from the ROW falls from \$2.6 million to about \$227,900 for an annual loss of over \$2.4 million. At the high end of the range, the ecosystem service value of the ROW falls from \$9.4 million to about \$454,400 for an annual loss of \$9.0 million in the study region (Table 7).

**TABLE 7: Ecosystem Service Value Lost Each Year Post Construction in Right-Of-Way, Relative to Baseline, by Ecosystem Service**

Ecosystem Service	Study Region			
	Baseline (low) (2015\$)	Loss (low) (2015\$)	Baseline (high) (2015\$)	Loss (high) (2015\$)
Aesthetic Value	1,770,919	(1,707,351)	7,092,570	(7,013,190)
Air Quality	146,631	(129,697)	152,973	(129,697)
Biological Control	4,386	(858)	34,868	(31,340)
Climate Regulation	74,333	(18,670)	78,531	(22,756)
Erosion Control	7,419	6,159	41,118	(15,759)

<b>Table 7 Continued</b>				
Protection from Extreme Events	321,090	(308,529)	337,532	(308,529)
Food Production	11,780	(6,330)	11,780	(6,330)
Pollination	81,381	(77,026)	372,309	(365,572)
Raw Materials	9,523	(9,487)	64,559	(64,523)
Recreation	45,399	709	247,900	(196,163)
Soil Formation	3,725	(2,902)	24,965	(24,142)
Waste Treatment	23,357	(21,891)	146,293	12,247
Water Supply	18,423	(18,329)	503,337	(499,826)
Water Flows	92,316	(88,592)	319,393	(308,156)
<b>Total</b>	<b>\$2,610,683</b>	<b>(\$2,382,794)</b>	<b>\$9,428,127</b>	<b>(\$8,973,736)</b>

Most of this loss is due to the conversion of forestland to shrub/scrub. Shrub/scrub naturally increases its share of overall ecosystem service value in the “with pipeline” scenario. Those ecosystem service value gains are dwarfed, however, by the loss of much more productive forests. Similarly, the ecosystem service value of cropland falls due to its assumed transition to pasture/forage. While there is some gain in the pasture/forage category, there is a net loss of ecosystem service value from the two agricultural land uses of between \$15,300 and \$348,900 per year.<sup>22</sup>

*“With this pipeline construction through my property, the disruption of my spring is only one of my concerns. We do not have air conditioning and rely on the mature trees to provide shade to keep the house cool in the summer months. Many of these trees will be taken down if this project is approved.”*

*-Jeremy Hayes, Landowner  
Bath, PA*

Finally, the establishment of new permanent access roads and other aboveground infrastructure will entail the conversion of land from various uses to what, from an ecosystem services perspective, will function as barren land. These areas amount to a total of 55.8 acres across the study region, so the effect on ecosystem service values are correspondingly small, at least when compared to the impact of the construction zone and ROW. As with the ROW, however, these effects would occur year after year for as long as the PE exists. The annual loss of ecosystem service value from these areas under a “with PE” scenario would range from \$218,186 to \$789,362.

<sup>22</sup> Note that due to differences in the range of dollars-per-acre estimates available for the various combinations of land use and ecosystem service, there are some instances where an apparent gain at the low end turns into a loss at the high end. For example, and based on the estimates available from the literature, the minimum value for erosion control from shrub/scrub acres is higher than the minimum for forests. Because we assume that forests return to shrub/scrub after the pipeline is in operation, this translates into a net increase in erosion regulation. At the high end, however, available estimates show a higher erosion control value for forests than for shrub/scrub. Thus, the high estimate shows a net loss of erosion control benefits. It is important, therefore, to keep in mind that these estimates are sensitive to the availability of underlying per-acre estimates.

**TABLE 8: Ecosystem Service Value Lost Each Year Post Construction in Permanent Infrastructure, Relative to Baseline, by Ecosystem Service**

Ecosystem Service	Study Region			
	Baseline (low) (2015\$)	Loss (low) (2015\$)	Baseline (high) (2015\$)	Loss (high) (2015\$)
Aesthetic Value	150,016	(150,016)	603,428	(603,428)
Air Quality	12,456	(12,456)	12,847	(12,847)
Biological Control	333	(333)	2,347	(2,347)
Climate Regulation	5,173	(5,173)	5,522	(5,522)
Erosion Control	543	(543)	3,290	(3,290)
Protection from Extreme Events	27,085	(27,085)	27,774	(27,774)
Food Production	672	(672)	672	(672)
Pollination	6,913	(6,913)	25,644	(25,644)
Raw Materials	809	(809)	5,503	(5,503)
Recreation	3,108	(3,108)	19,848	(19,848)
Soil Formation	296	(296)	1,776	(1,776)
Waste Treatment	1,582	(1,582)	11,282	(11,282)
Water Supply	1,563	(1,563)	42,629	(42,629)
Water Flows	7,636	(7,636)	26,800	(26,800)
<b>Total</b>	<b>\$218,186</b>	<b>(\$218,186)</b>	<b>\$789,362</b>	<b>(\$789,362)</b>

It bears repeating that the BTM as applied here is useful for producing first-approximation estimates of ecosystem services. For several reasons, we believe this approximation of the effect of the PE’s construction and operation on ecosystem service values is too low rather than too high. These reasons include:

- The estimates only include the loss of value that would otherwise emanate from the ROW, construction zone, and aboveground infrastructure. The estimates do not account for the extent to which the construction and long-term presence of the PE could damage the ecosystem service productivity of *adjacent* land. During construction, the construction zone could be a source of air and water pollution potentially compromising the ability of surrounding or downstream areas from delivering their own ecosystem services. For example, if construction contributes to sedimentation of surface waters, those streams and rivers may lose some ability to provide clean water, food (fish), recreation, and other valuable services. This reduced productivity may persist after construction is complete.
- Over the long term, the ROW could serve as a pathway for invasive species or wildfire to more quickly penetrate areas of interior forest habitat, thereby reducing the natural productivity of those areas and imposing direct costs on communities and landowners in the form of fire suppression costs, lost property, and the costs of controlling invasive species.
- Finally, these estimates only reflect changes in natural benefits occurring due to changes in conditions on the lands surface. Activities during construction could alter existing underground waterways and disrupt water supply. There is also a risk that sediment and other contaminants could reach surface water or groundwater supplies if sinkholes form near the pipeline during construction or afterwards.

## EFFECTS ON PROPERTY VALUE

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### Land Price Effects

To say the impacts and potential impacts of the PennEast Pipeline on private property value are important to people along its proposed route would be an extreme understatement. Key-Log Economics and Delaware Riverkeeper Network are conducting an analysis of all comments submitted through the closing of the DEIS comment period on September 12, 2016. Of 1977 total comments reviewed thus far (a sample), 99.8% of comments mentioning property value believed the PE would have a negative impact.

Landowners and Realtors along the proposed route of the Mountain Valley Pipeline, a 42" high-pressure natural gas pipeline designated to transport gas from fracked wells in the Marcellus through West Virginia and Virginia, report abandoned building plans, lower than expected appraisals, and buyers walking away from properties potentially affected by the construction (Adams, 2016). At least one ROW landowner was told by insurance agencies that their rates would likely increase if coverage remains available at all (Roston, 2015).

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***“Real estate brokers have indicated that the value of our farm with the pipeline running across it would see an 80%-100% drop in value relative to its value absent the pipeline—if the property is sellable at all.”***

*-Richard Kohler, Owner of Cedar Lane Farm, Inc.  
Hunterdon, NJ*

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While it is impossible to know precisely how large an effect the specter of the PE has already had on land prices, there is strong evidence from other regions that the effect would be negative. In a systematic review, Kielisch (2015) presents evidence from surveys of Realtors, home buyers, and appraisers demonstrating natural gas pipelines negatively affect property values for a number of reasons. Among his key findings relevant to the PE:

- 68% of Realtors believe the presence of a pipeline would decrease residential property value.
- Of these Realtors, 56% believe the decrease in value would be between 5% and 10%. (Kielisch does not report the magnitude of the price decrease expected by the other 44%.)
- 70% of Realtors believe a pipeline would cause an increase in the time it takes to sell a home. This is not merely an inconvenience, but a true economic and financial cost to the seller.
- More than three quarters of the Realtors view pipelines as a safety risk.
- In a survey of buyers presented with the prospect of buying an otherwise desirable home with a 36-inch diameter gas transmission line on the property, 62.2% stated that they would no longer buy the property at any price. Of the remainder, half (18.9%) stated that they would still buy the property, but only at a price 21%, on average, below what would otherwise be the market price. The other 18.9% said the pipeline would have no effect on the price they would offer.

Not incidentally, the survey participants were informed that the risks of “accidental explosions, terrorist threats, tampering, and the inability to detect leaks” were “extremely rare” (2015, p. 7). The survey participants had, in other words, realistic information about the probability of pipeline accidents and were not responding out of overblown fears.

Considering only those buyers who are still willing to purchase the property, the expected loss in market value would be 10.5%.<sup>23</sup> This loss in value provides the mid-level impact in our estimates. A much greater loss (and higher estimates) would occur if one were to consider the fact that 62% of buyers are effectively reducing their offer prices by 100%, making the average reduction in offer price for all potential buyers 66.2%.<sup>24</sup> In our estimates, however, we have used the smaller effect (-10.5%) based on the assumption that sellers will eventually find one of the buyers still willing to buy the pipeline-easement-encumbered property.

- Based on five “impact studies” in which appraisals of smaller properties with and without pipelines were compared, “the average impact [on value] due to the presence of a gas transmission pipeline is -11.6%” (Kielisch, 2015, p. 11). The average rises to a range of -12% to -14% if larger parcels are considered, possibly due to the loss of subdivision capability.

These findings are consistent with economic theory about the behavior of generally risk-averse people. While would-be landowners who are informed about pipeline risks and nevertheless decide to buy property near the proposed PE corridor could be said to be “coming to the nuisance,” one would expect them to offer less for the pipeline-impacted property than they would offer for a property with no known risks.

Kielisch’s findings demonstrate that properties on natural gas pipeline rights-of-way suffer a loss in property value. Boxall, Chan, and McMillan (2005), meanwhile, show that pipelines also decrease the value of properties lying at greater distances. In their study of property values near oil and gas wells, pipelines, and related infrastructure, the authors found that properties within the “emergency plan response zone” (EPZs) of sour gas<sup>25</sup> wells and natural gas pipelines faced an average loss in value of 3.8%, other things being equal.

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***“I am entering retirement and am also deeply concerned about my future and what the property value of my only nest egg will be when it comes time for me to sell it. Local realtors tell me that properties along the proposed route are already not selling and sitting on the market. Realtors also tell me that I will have to sell my house for much less than I would without the pipeline.”***

*-Janice Hofreiter, Landowner  
Mercer, NJ*

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The risks posed by the PE would be different—it would not be carrying sour gas, for example—but there are similarities between the PE scenario and the situation in the study that makes their finding particularly relevant. The emergency plan response zones, for example, are defined by the health and safety risks posed by the gas operations and infrastructure. Also, in contrast to PE-cited studies showing no price effects (see “Claims that pipelines have no effect on property value may be invalid,” below), the Boxall study examines prices of properties for which landowners must inform prospective buyers when one or more EPZs intersect the property.

The PE has both a high consequence area and an evacuation zone radiating from both sides of the pipeline defined by health and safety risks. Whether disclosed or not by sellers, prospective buyers are likely to become informed regarding location of the property relative to the PE’s HCA and evacuation zones or, at a minimum, regarding the presence of the PE in the study region.

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<sup>23</sup> Half of the buyers would offer 21% less, and the other half would offer 0% less; therefore the expected loss is  $0.5(-21\%) + 0.5(0\%) = -10.5\%$ .

<sup>24</sup> This is the expected value calculated as  $0.622*(-100\%) + 0.189*(-21\%) + 0.189*(0\%)$ .

<sup>25</sup> “Sour” gas contains high concentrations of hydrogen sulfide and poses an acute risk to human health.

The compressor station proposed for Kidder Township in Carbon County would likely cause its own more severe reduction in the value of nearby properties. We apply the percentage reduction awarded in the Hancock, New York case (25%) to properties that are (as the properties were in that case) within half a mile of the proposed compressor station (“Proximity of Compressor Station Devalues Homes by as much as 50%,” 2015). The stations can also be noisy, with low-frequency noise cited as a constant nuisance (“Proximity of Compressor Station Devalues Homes by as much as 50%,” 2015). These issues led some homeowners to pull-up stakes and move away and to reduced property value assessments for others (Cohen, 2015; “Proximity of Compressor Station Devalues Homes by as much as 50%,” 2015).

Existing studies suggest negative impacts on land value from various types of nuisances that impose noise, light, air, and water pollution, life safety risks, and lesser human health risks on nearby residents (Sun, 2013; Bolton & Sick, 1999; Boxall et al., 2005). In addition to the emerging body of evidence demonstrating a negative relationship between natural gas infrastructure and property value, well established analyses strongly reveal the opposite analog. Namely, amenities such as scenic vistas, access to recreational resources, proximity to protected areas, cleaner water, and others convey positive value to property.<sup>26</sup> The bottom line is that people derive greater value from, and are willing to pay more for, properties that are closer to positive amenities and farther from negative influences, including health and safety risks.

## Claims That Pipelines Have No Effect on Property Value Are Invalid

The DEIS (Federal Energy Regulatory Commission, 2016b) and PE LLC cite studies purporting to show that natural gas pipelines (and in one case a liquid petroleum pipeline) have at most an ambiguous and non-permanent effect on property values (Allen, Williford & Seale Inc., 2001; Fruits, 2008; Palmer, 2008; Diskin et al. 2011). While the studies differ in methods, they are similar in that they fail to take into account two factors potentially voiding their conclusions entirely.

First, the studies fail consider that the property price data employed in the studies do not reflect buyers’ true willingness to pay for properties closer to or farther from natural gas pipelines. For prices to reflect willingness to pay (and therefore true economic value), buyers would need to have full information about the subject properties, including whether the properties are near a pipeline. Second, the studies that find no difference in prices for properties closer to or farther away from pipelines are not actually comparing prices for properties that are “nearer” or “farther” by any meaningful measure.<sup>27</sup> The studies compare similar properties and, not surprisingly, find that they have similar prices. Their conclusions are neither interesting nor relevant to the important question of how large an economic effect the proposed pipeline would have.

*When the pre-conditions for a functioning market are not met, observed property prices do not (and cannot) indicate the true economic value of the property*

Economic theory holds that for an observed market price to be considered an accurate gauge of the economic value of a good, all parties to the transaction must have full information about the good. If, on the other hand, buyers lack important information about a good, in this case whether a property is near a potential hazard, they cannot bring their health and safety concerns to bear on their decision about how much to offer for the

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<sup>26</sup> Phillips (2004) is an example of a study that includes an extensive review of the literature on the topic.

<sup>27</sup> This is based on a best estimate of the location of the pipelines derived from descriptions of the pipelines location provided in the study (only sometimes shown on the neighborhood maps) and an approximation of the evacuation zone based on pipeline diameter and operating pressure (Pipeline Association for Public Awareness, 2007).

property. As a result, buyers' offering prices will be higher than both what they would offer if they had full information and, most importantly, the true economic value of the property to the buyer.

As Albright (2011) notes in response to the article by Disken, Friedman, Peppas, & Peppas (2011):

"The use of the paired-sales analysis makes the assumption of a knowing purchaser, but I believe this analysis is not meaningful unless it can be determined that the purchaser had true, accurate and appropriate information concerning the nature and impact of the gas pipeline on, near or across their property... I believe that the authors' failure to confirm that the purchasers in any of the paired sales transactions had full and complete knowledge of the details concerning the gas transmission line totally undercut the authors' work product and the conclusions set forth in the article" (p. 5).

Of the remaining studies, only Palmer (2008) gives any indication that any buyers were aware of the presence of a pipeline on or near the subject properties. For Palmer's conclusion that the pipeline has no effect on property value to be valid, however, it must be true that **all** buyers have full information, and this was not the case.

In some cases, however, the location and hazards of petroleum pipelines become starkly and tragically known. For example, a 1999 liquid petroleum pipeline exploded in Bellingham, Washington, killing three, injuring eight, and causing damage to property and the environment. In that case and as Hansen, Benson, and Hagen (2006) found, property values fell after the explosion, which is to say, once would-be buyers became aware of the pipeline in the neighborhood. The authors also found that the negative effect on prices diminished over time. This makes perfect sense if, as is likely, information about the explosion dissipated once the explosion and its aftermath left the evening news and the physical damage from the explosion had been repaired.

Today's market is quite different. In contrast to Bellingham homebuyers in the months and years after the 1999 explosion, today's homebuyers can query Zillow to see the history of land prices near the pipeline and explore online maps to see what locally undesirable land uses exist near homes they might consider buying. They also have YouTube and repeated opportunities to find and view news reports, landowners' videos, and other media describing and depicting such explosions and their aftermath. Whether the pre-explosion prices reflected the presence of the pipeline or not, it is hard to imagine that a more recent event and the evident dangers of living near a fossil fuel pipeline would be forgotten so quickly by today's would-be homebuyers.

In Resource Report 5 (2015b), PE LLC claims that "it has never been commonplace for consumers to identify the presence of natural gas pipelines as part of their real estate transaction diligence and therefore, it can be argued the presence of natural gas pipelines is not a significant determinant to the value for real estate transactions" (p. 5-23). This is grossly misleading and plainly illogical. It is wrong to conclude a lack of a negative effect from the fact that home sellers do not typically—and against their own self-interest—disclose information that could induce a drop in the sale price. There are many attributes of homes offered for sale that are not typically included in the information displayed on real estate marketing sites. Drafty windows or unpleasant neighbors are but two examples of things home sellers do not typically include in their description of a home on the market. They are nevertheless two attributes of a home that would diminish the value to prospective buyers and, once known by those buyers, would also diminish the price offered.

PE LLC would instead have FERC believe that all persons selling real estate always disclose any and all features of their property that could possibly reduce the offers they may receive. If that were true, there would be no need for the laws that require homeowners to disclose, for example, whether the basement is damp or if the property is included in a homeowners association. Either PE LLC does not understand rational buyer/seller behavior, or they expect that FERC and the public do not.

What Zillow.com or other sites do accomplish is lowering the effort required for homebuyers to visualize the location of properties relative to other land uses, including pipeline rights-of-way. Combined with other information, such as maps of pipeline routes and other searchable online information, real estate marketing tools make it more likely that prospective buyers will gain information about the hazard they could be buying into.

With more vocal/visible opposition to large, high-pressure natural gas pipelines, it also seems likely that prospective home buyers will not have to wait for an incident involving the PennEast Pipeline to learn of it and, therefore, for the pipeline to affect their willingness to pay (and actual offer prices) for properties nearby. A drive down the street and a quick online search for information about a community one is considering a move to would likely reveal “no pipeline” signs, municipal ordinances opposing the pipeline, and Facebook groups created by local community members formed to raise awareness about the pipeline. Anyone with an eye toward buying property near the proposed PennEast corridor could quickly learn that the property is in fact near the corridor, that there is a danger the property could be adversely affected by the still-pending project approval, and that fossil fuel pipelines and related infrastructure have an alarming history of negative health, safety, and environmental effects.

When people possess more complete information about a property, they are able to express their willingness to pay when it comes time to make an offer. Accordingly, the prices buyers offer for homes near the PennEast Pipeline will be lower than the prices offered for other homes farther away or in another community or region.

*Due to fundamental flaws, studies concluding that proximity to pipelines do not result in different property values are not actually comparing prices for properties that are different*

While the studies cited in Resource Report 5 and the DEIS purport to compare the price of properties near a pipeline to properties not near a pipeline, many or in some cases all, of the properties counted as “not near” the pipelines are, in fact, near enough to have health and safety concerns that could influence prices. In both studies written by the Interstate Natural Gas Association of America (INGAA) the authors compare prices for properties directly on a pipeline right-of-way to prices of properties off the right-of-way (Allen, Williford & Seale Inc., 2001; Integra Realty Resources, 2016). However, in almost all of the case studies the geographic scope of the analysis was small enough where most or all of the properties not on the right-of-way were still within the pipelines’ respective evacuation zones (Allen, Williford & Seale Inc., 2001; Integra Realty Resources, 2016).<sup>28</sup>

INGAA analyzed six case studies in the 2016 study. In four of the case studies where an exact distance between the property and the pipeline was given, an average of 72.5% of the “off” properties were actually within the evacuation zone and, like the “on” properties, are likely to suffer a loss in property value relative to properties farther away.<sup>29</sup>

For the other two case studies analyzed in the 2016 INGAA study, the study reported a simple “yes” or “no” to indicate whether the property abutted the pipeline in question. For these two case studies, we assume the

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<sup>28</sup> Proximity of properties to pipelines is based on best estimate of the location of the pipelines derived from descriptions of the pipelines’ locations provided in the studies and an approximation of the evacuation zone based on pipeline diameter and operating pressure (Pipeline Association for Public Awareness, 2007).

<sup>29</sup> We estimated the evacuation zone based on available information about the pipeline diameter and operating pressure (Pipeline Association for Public Awareness, 2007).

***“PennEast can trumpet the study and try to convince landowners how beneficial their pipeline would be for everyone concerned, but the truth of the matter, based on my own personal experience, is that nobody wants a property with a pipeline.”***

*-Joyce Sherman, Resident  
Stockton, NJ*

author’s methods, while flawed, are at least consistent from one case study to the next meaning it is likely at least 50% or more of the comparison properties (the “off” properties) are in fact within the evacuation zone.

To adequately compare the price of properties with and without a particular feature, there needs to be certainty that properties either have or do not have said feature. The feature of interest in this case is the presence of a nearby risk to health and safety. INGAA instead relied upon case studies with little to no variation in the feature of interest (i.e., the majority of properties are within the evacuation zone), and found, unsurprisingly, that there was no systematic variation in the subsequent price of properties.

This is a situation where comparing apples and oranges is not only reasonable, but also essential. The INGAA case studies are only looking at and comparing all “apples.” By comparing apples to apples rather than comparing apples to oranges, the INGAA studies reach the obvious and not very interesting conclusion that properties that are similar in size, condition, and other features including their location within the evacuation zone of a natural gas pipeline have similar prices.

To varying degrees, the other studies cited by FERC and PE LLC suffer from the same problem. Fruits (2008), who analyzes properties within one mile of a pipeline with a 0.8-mile-wide-evacuation zone (0.4 miles on either side), offers the best chance that a sizable portion of subject properties are in fact “not near” the pipeline from a health and safety standpoint. He finds that the distance from the pipeline does not exert a statistically significant influence on the property values, but he does not examine the question of whether properties within the evacuation zone differ in price from comparable properties outside that zone. A slightly different version of Fruits’ model, in other words, could possibly have detected such a threshold effect. (Such an effect would show up only if the buyers of the properties included in the study had been aware of their new property’s proximity to the pipeline.)

In short, the conclusion that pipelines do not negatively affect property values cannot be drawn from these flawed studies. To evaluate the effects of the proposed PennEast Pipeline on property value, FERC and others must look to studies (including those summarized in this report) in which buyers’ willingness to pay is fully informed about the presence of nearby pipelines and in which the properties examined are truly different in terms of their exposure to pipeline-related risks.

## Land Value Effects of Compressor Stations

Compressor stations like the three-unit, 47,700 hp station proposed for Kidder Township can cause decreases in home values and have even forced some homeowners to move away from the noise, smells, and illnesses associated with living near stations. In one case from Minisink, New York, a family of six moved to escape the effects of a much smaller (12,600 hp) compressor station operated by Millennium Pipeline, L.L.C. After two years of headaches, eye irritation, and lethargy among the children and even lost vigor in their fruit trees, the couple, unable to find a buyer for their home, moved away, leaving their \$250,000 investment in the property on the table with their bank holding the balance of the mortgage (Cohen, 2015).

In Hancock, another New York town with a relatively small (15,000 hp) compressor station, three homeowners have had their property assessments reduced, two by 25% and one by 50%, due to the impact of truck traffic, noise, odors, and poor air quality associated with the compressor station (“Proximity of Compressor Station Devalues Homes by as Much as 50%”, 2015). The larger of these reductions was for a home very close to the station and reflected physical damage that led to an increase in radon concentrations above safe levels. The two properties devalued by 25% were approximately one half mile away (Ferguson, 2015).

As of this writing, there are no statistical studies demonstrating the relationship between a property’s value and its proximity to a compressor station. The mounting anecdotal information, however, suggests there is a negative relationship and depending on the particular circumstances, the effect can be large—up to the 100% loss sustained by the family in Minisink (minus whatever the bank might be able to recover at auction). FERC must therefore count the potential loss of property value associated with the compressor station proposed for location in Kidder Township.

For our estimates, we follow the example of the Hancock, New York case and assume that properties within one half mile of the Kidder Township compressor station would lose 25% of their value if the station is built.<sup>30</sup> We believe this assumption provides a conservative estimate in part because the Kidder compressor station would be more than three times the horsepower of the Hancock station. It is therefore likely that its noise, odor events, and other physical effects would be experienced at a greater distance and/or with greater intensity than in the New York case.

## Parcel Values

We obtained parcel data in electronic form from the Geographic Information System (GIS) departments from each of the six counties impacted by the proposed route. These included GIS layers for, at minimum, those parcels touched by the evacuation zone, as well as valuation/assessment data for those parcels. Because publicly owned conservation lands (parks, etc.<sup>31</sup>) are unlikely to be sold, they do not have any market value. To avoid overestimating property value effects, we set the value of any publicly owned parcels equal to zero.

Using the GIS data, we identified the five different types of parcels for which the pipeline would have an effect. In order of increasing distance from the pipeline itself, these are:<sup>32</sup>

1. Parcels crossed by the right-of-way  
(730 parcels, with total baseline value (without PE) of \$200.5 million)
2. Parcels crossed by the construction corridor  
(842 parcels, with total baseline value (without PE) of \$228.0 million)
3. Parcels at least partially within the high consequence area (HCA)  
(4,619 parcels, with total baseline value (without PE) of \$1.0 billion)
4. Parcels at least partially within the evacuation zone  
(18,097 parcels, with total baseline value (without PE) of \$3.9 billion)

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<sup>30</sup> For land value analysis of the compressor station, we buffered a half mile radius around the parcel containing the station.

<sup>31</sup> We used the “Protected Areas Database” from the National Gap Analysis Program to identify fee-owned conservation properties (Conservation Biology Institute, 2012).

<sup>32</sup> Ideally, one would also want to identify the parcels from which views would be impaired by the presence of the pipeline ROW. Such an analysis would require parcel maps for the entire study region. Our maps (GIS layers) for some counties, however, cover only the evacuation zone, making a parcel-by-parcel analysis of viewshed impacts impossible. See the section titled “Visual Effects” for a general analysis of the PE’s potential impact on viewsheds across the study region.

5. Parcels with their geographic center (centroid) within one-half mile of the parcel containing the compressor station  
(40 parcels, with total baseline value (without PE) of \$5.6 million)

Note there is overlap among the zones. All ROW parcels are within the construction corridor, the HCA, and the evacuation zone. All construction corridor parcels are within the HCA and the evacuation zone. And HCA parcels are within the evacuation zone. To avoid double counting parcel values, only one land value effect is applied to a given parcel.

For estimates of the ROW, we assume that the health and safety concerns associated with the compressor station dominate the effects within the ROW and the evacuation zone. Estimates of the impact of the ROW and evacuation zone exclude the compressor zone parcels, and we estimate a separate effect of the compressor station. ROW parcels are also assumed to suffer no further reduction in value due to their location within the evacuation zone.

We do not consider the construction corridor separately for the land value analysis. Even though the additional 112 parcels and \$27.5 million in value (relative to parcels in the ROW) are not trivial, we do not have a basis for estimating a change in value that is separate from, or in addition to, the change due to these parcels' proximity to the ROW or their location within the evacuation zone.

Furthermore, we treat parcels in the HCA and in the evacuation zone the same by applying a single land value change to all parcels in the evacuation zone. Arguably, there should be a larger effect on parcels in the HCA than those only in the evacuation zone. Living with the possibility of having to evacuate at any time day or night should have a smaller effect on property value than living with the possibility of not surviving a "high consequence" event and, therefore, not having the chance to evacuate at all. We do not have data or other study results that allow us to draw this distinction. We therefore apply the lower evacuation zone effect to all HCA and evacuation zone parcels (beyond the ROW).

To summarize, Table 9 repeats a portion of Table 2, but with the property value effects in place of check marks.

**TABLE 9: Summary of Marginal Property Value Effects**

Values/ Effects	Right-of-Way (Low, Medium, & High Effects)	High Consequence Area	Evacuation Zone	Compressor Station Zone	Pipeline Viewshed
Land/ Property Value	-4.2% <sup>a</sup> -10.5% <sup>b</sup> -13.0% <sup>c</sup>		-3.8% <sup>d</sup>	-25% <sup>e</sup>	Impact included with Ecosystem Services

Notes:

- a. Kielisch, Realtor survey in which 56% of respondents expected an effect of between -5% and -10% ( $0.56 \times -7.5\% = -4.2\%$ ).
- b. Kielisch, buyer survey in which half of buyers still in the market would reduce their offer on a property with a pipeline by 21% ( $0.50 \times -0.21 = -10.5\%$ ).
- c. Kielisch, appraisal/impact studies showing an average loss of between -12% and -14% (-13% is the midpoint).
- d. Boxall, study in which overlap with an emergency planning zone drives, on average, a 3.8% reduction in price. We apply this reduction ONLY to those parcels in the evacuation zone that are not also in the ROW or within one half mile of the compressor station.
- e. Based on examples from the town of Hancock, New York.

## Estimated Land Value Effects

Following the procedures outlined in the previous section, our conservative estimate for costs of the proposed PE would include between \$159.7 million and \$177.3 million in diminished property value. Some of the most intense effects will be felt by the owners of 730 parcels in the path of the right-of-way, who collectively would lose between \$8.4 million and \$26.0 million in property value. Some 18,097 additional parcels lie outside the ROW but are within or touching the evacuation zone. These parcels’ owners would lose an estimated \$149.9 million (Table 10). Finally, the compressor station proposed for Kidder Township in Carbon County, Pennsylvania would reduce the value of 40 properties by a total of \$1.4 million.

**Table 10: Summary of Land Value Effects, by Zone and County**

Area	Effects in Right-of-Way (2015\$)			Effects in Evacuation Zone (2015\$)
	Realtor Survey (4.2%)	Buyer Survey (10.5%) <sup>a</sup>	Impact Studies (13.0%)	Boxall Study (3.8%)
<b>Study Region</b>	<b>-8,420,100</b>	<b>-21,050,250</b>	<b>-26,062,214</b>	<b>-149,890,650</b>
<i>Pennsylvania Portion</i>	-4,400,237	-11,000,593	-13,619,782	-77,656,828
Bucks	-24,305	-60,761	75,228	-334,798
Carbon	-411,78	-1,029,459	-1,274,568	-3,690,122
Luzerne	-2,709,525	-6,773,812	-8,386,625	-36,044,026
Northampton	-1,254,624	-3,136,560	-3,883,360	-37,587,882
<i>New Jersey Portion</i>	-4,019,863	-10,049,657	-12,442,433	-72,233,822
Hunterdon	-2,326,511	-5,816,278	-7,201,106	-30,734,752
Mercer	-1,693,352	-4,233,380	-5,241,327	-41,499,070

**Table 10: Continued**

Area	Effects Near Compressor (2015\$)	Total of ROW, Compressor Station, and Evacuation Zone Effects (2015\$)		
	Hancock, NY Finding (25%)	Low	Medium	High
<b>Study Region</b>		<b>-159,698,484</b>	<b>-172,328,634</b>	<b>-177,340,598</b>
<i>Pennsylvania Portion</i>	-1,387,734	-83,444,799	-90,045,155	-92,664,344
Bucks	n/a	-359,103	-395,560	-410,027
Carbon	-1,387,734	-5,489,639	-6,107,315	-6,352,424
Luzerne	n/a	-38,753,551	-42,817,838	-44,430,651
Northampton	n/a	-38,842,506	-40,724,442	-41,471,242
<i>New Jersey Portion</i>	n/a	-76,253,685	-82,283,479	-84,676,255
Hunterdon	n/a	-33,061,263	-36,551,029	-37,935,857
Mercer	n/a	-43,192,422	-45,732,450	-46,740,397

Based on median property tax rates in each county, these one-time reductions in property value would result in reductions in property tax revenue of between \$2.7 and \$3.0 million per year (Table 11). The present value of this stream of lost revenue over the 2018-2048 operating period would be \$75.9 and \$84.2 million. To keep their budgets balanced in the face of this decline in revenue, counties would need to increase tax rates, cut back on services, or both. The loss in revenue would be compounded by the likelihood that the need for local public

services, such as road maintenance, water quality monitoring, law enforcement, and emergency preparedness/emergency response could increase. Thus, the PE could drive up expenses while driving down the counties’ most reliable revenue stream. (See also “Community Service Costs”, below.)

**Table 11: Effects on Local Property Tax Revenue**

Source: Property Taxes by State (propertytax101.org, 2016).

Area	Median Tax Rate (% of Home Value) <sup>a</sup>	Lost Property Tax Revenue (2015\$)		
		Low	Medium	High
<b>Study Region</b>		<b>-2,719,343</b>	<b>-2,932,534</b>	<b>-3,017,134</b>
<i>Pennsylvania Portion</i>		-1,215,386	-1,310,614	-1,348,403
Bucks	1.27%	-4,561	-5,024	-5,207
Carbon	1.56%	-85,638	-95,274	-99,098
Luzerne	1.40%	-542,550	-599,450	-622,029
Northampton	1.50%	-582,638	-610,867	-622,069
<i>New Jersey Portion</i>		-1,503,95	-1,621,920	-1,668,731
Hunterdon	1.91%	-631,470	-698,125	-724,575
Mercer	2.02%	-872,487	-923,795	-944,156

## THE SOCIAL COST OF CARBON: AN ADDITIONAL COST OF METHANE TRANSPORT

The social cost of carbon (SCC) is a comprehensive estimate of the economic cost of harm associated with the emission of carbon. The SCC is important for regulation because it helps agencies more accurately weigh the costs and benefits of a new rule or regulation. In April 2016, a federal court upheld the legitimacy of using the social cost of carbon as a viable statistic in climate change regulations (Brooks, 2016). In August 2016, The Council on Environmental Quality (CEQ) issued its final guidance for federal agencies to consider climate change when evaluating proposed Federal actions (Council on Environmental Quality, 2016). The CEQ states “agencies should consider applying this guidance to projects in the EIS preparation stage if this would inform the consideration of differences between alternatives or address comments raised through the public comment process with sufficient scientific basis that suggest the environmental analysis would be incomplete without application of the guidance, and the additional time and resources needed would be proportionate to the value of the information included” (Council on Environmental Quality, 2016).

EPA has also challenged FERC’s failure to consider climate change implications in a similar application process (Westlake, 2016). Citing the CEQ guidance, EPA notes that the Final EIS for the Leach Xpress, Columbia Gulf Transmission LLC-Rayne Xpress Expansion project “perpetuates the significant omission...with respect to a proper climate change analysis to inform the decision making process” and recommends that GHG emissions from end product combustion be counted among the environmental effects of each alternative” (p. 2).

PennEast, LLC estimates the pipeline would transport 401,500,000 dekatherms annually, contributing to an equivalent of 21.3 million metric tons of CO<sub>2</sub> emitted per year (U.S. EPA, 2016a). Because the SCC assumes a ton of carbon emitted in the future will have more dire impacts than a ton emitted in the present, we estimate the cost of carbon annually until 2048.<sup>33</sup> Using U.S. EPA estimates based on the average of impacts from three

<sup>33</sup> We assumed that if the PE were to be approved, construction would occur in 2018 and the first year of operation, or the first year the project would produce associated emissions, would be 2019. Based off of an email correspondence with a PennEast representative, “PennEast fully anticipates the PennEast Pipeline safely will transport enough natural gas for

assessment models and discount rates of 5% and 2.5% (U.S. EPA, Climate Change Division, 2016), the cost to society of the carbon transmitted through the PennEast Pipeline would total between \$12.9 and \$56.0 billion over 30 years. FERC must count this significant cost among the effects of the proposed pipeline.

## OTHER IMPACTS FOR CONSIDERATION

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### Public Health Effects

Natural gas transmission releases toxins, smog forming pollutants, and greenhouse gases that have a negative impact on public health (Fleischman, McCabe, & Graham, 2016). Emissions from the natural gas industry have been tied to a myriad of health concerns, however, more concrete epidemiological studies are needed to determine the extent to which natural gas transmission causes public health concerns.

More recent emerging literature is beginning to quantify just how large of an effect the industry can have on public health. For example, a study by the Clean Air Task Force (2016) estimated that in 2025, increases in ozone levels due to pollution from the oil and gas industry will cause 750,000 additional asthma attacks in children under the age of 18, add an additional 2,000 asthma-related emergency room visits and 600 respiratory related hospital admissions, cause children to miss 500,000 days of school annually, and cause adults to deal with 1.5 million days of forced rest or reduced activity due to ozone smog.

### Air Pollution from the Proposed Compressor Station

The PennEast Pipeline impacts air quality by converting forests, which remove normal levels of impurities from the air, to other land uses. There is also concern for impacts that would occur due to the dumping of excess impurities into the air in the first place. While there is a chance leaks could occur at any place along the proposed route, leaks and major releases of gas and other substances (lubricants, etc.) would certainly occur at the 47,700 hp compressor station proposed for Kidder Township, Carbon County, Pennsylvania. Leaks in seals on the moving parts of natural gas compressors produce a significant amount of VOC emissions (Fleischman, McCabe, & Graham, 2016).

The negative effects of the compressor station include noise and air pollution from everyday operations plus periodic “blowdowns,” or venting of gas in the system to reduce pressure. As a recent study by the New York Department of Environmental Conservation indicates, pollution around compressor stations is common and severe (Lucas, 2015). The five-state study found that “more than 40% of the air samples from compressor stations exceeded federal regulations for certain chemicals like methane, benzene, and hydrogen sulfide” (Lucas, 2015). The study also found high rates of illnesses such as nosebleeds and respiratory difficulties among people living near the stations.

While more definitive epidemiological studies are needed to determine the extent to which natural gas compressor stations add to background rates of various illnesses, these stations are implicated as contributing to a long list of maladies. According to Subra (2015), individuals living within 2 miles of compressor stations and metering stations experience respiratory impacts (71% of residents), sinus problems (58%), throat irritation (55%), eye irritation (52%), nasal irritation (48%), breathing difficulties (42%), vision impairment (42%), sleep disturbances (39%), and severe headaches (39%). In addition, some 90% of individuals living within 2 miles of these facilities also reported experiencing odor events (Southwest Pennsylvania Environmental Health Project,

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several decades” (Kornick, 2016b). For our analysis, we interpreted “several decades” as thirty years after the first year of construction.

2015). Odors associated with compressor stations include sulfur smell, odorized natural gas, ozone, and burnt butter (Subra, 2009). Furthermore, compressors emit constant low-frequency noise, which can cause negative physical and mental health effects (Luckett, Buppert, & Margolis, 2015).

In Carbon County, 560 people live within 2 miles of the proposed compressor station (U.S. Census Bureau, 2015). Translating the findings from Subra (2015), 504 people would experience odor events, 398 people would experience respiratory impacts, 325 people would experience sinus problems, and 218 people would experience sleep disturbances and/or severe headaches. In addition to the health impacts discussed above, this pollution can cause damage to agriculture and infrastructure. One study found that shale gas air pollution damages in Pennsylvania already amount to between \$7.2 and \$30 million, with compressor stations responsible for 60-75% of this total (Walker & Koplinka-Loehr, 2014). Using the low estimate of 60%, that is between \$4.32 and \$18 million in damages associated with compressor stations.

## Visual Effects

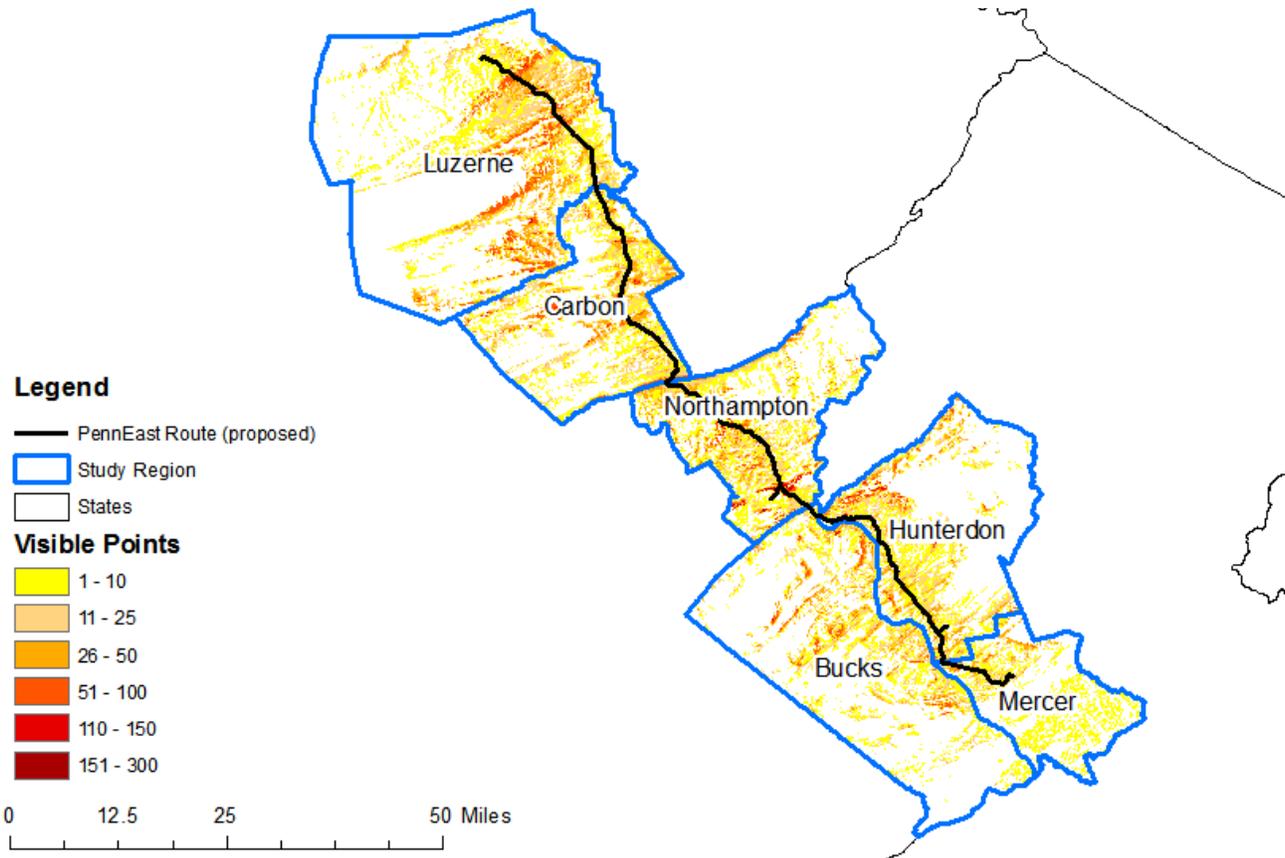
Information about how the visual effects of natural gas transmission pipelines are reflected in property values is scarcer than information related to health and safety effects. On one hand, we know better views increase property value. Conversely, utility corridors from which power lines are visible decrease property values (by 6.3% in one study) (Bolton & Sick, 1999). This suggests that a pipeline corridor reduces property value either by impairing a good view or, like power lines, by simply being unattractive. It is reasonable to conclude that the proposed PE would have effects on property value due to the visual effects, but the literature to date does not offer clear guidance on how large or strong the effects may be. We therefore did not include separate estimates of the impact of the PE on property value in the viewshed. Moreover, we do not wish to double-count a portion of the impact of the PE on “Aesthetics,” which is already included among the ecosystem service value effects.

However, it is important to know the places where the pipeline would be visible in the study region that might suffer a portion of lost aesthetic value. To determine the potential visibility, a GIS-based analysis provides an estimate of how many points along the pipeline could potentially be seen from each 30m-by-30m spot in the study region (Figure 6). To keep the computing needs manageable, we analyzed a sample of points placed at 100m intervals along the proposed PE route.

Because weather, smog, and other conditions may limit the distance of extended unobstructed views in Pennsylvania and New Jersey, we restricted the scope of analysis for any given point on the pipeline to spots in the study region that lie within a 25-mile radius or within the counties’ boundaries.

By tallying the number of points on the pipeline corridor that can be seen from each spot in the study region, we obtain an estimate for the amount of pipeline visible. In Figure 6, yellow spots on the map are points where between 1 and 10 points on the pipeline are visible, whereas red spots have a view of up to 300 points. Since each point represents 100 meters of pipeline, this analysis shows that there are places in the study region where 30 km, or 18.6 miles, of the pipeline corridor could be visible. One limitation is that this is a *potential* view of the pipeline because other visual obstructions, such as trees or buildings, are not taken into account.

Based on this GIS analysis, it would be possible to see at least one point (representing 100m) along the ROW from 36% of the six-county study region. For this 36% of the region, an average of 1.8 km (1.1 miles) of the PE ROW would be visible. For 20% of the study region, seeing 10 or more points, or 1 km (0.62 miles) of the ROW is possible. Note that what would be visible is not the pipeline itself, but rather the gap or break in otherwise intact forests, farm fields, or other more natural features through which the ROW passes.



**FIGURE 6: Visibility of the Proposed PennEast Pipeline**

The color of each point on the map indicates the number of waypoints, spaced 100m apart, along the PE route and within 25 miles that could be seen from each point. Note that the analysis is based on elevation only and does not take into account the extent to which buildings or trees may mask views of the pipeline corridor.

Sources: PE route obtained from the Delaware Riverkeeper Network; Counties from USGS (U.S. Department of Interior & U.S. Geological Survey,

## Community Service Costs

The construction and operation of the PennEast Pipeline is likely to impose various costs on local governments and, by extension, local taxpayers. The main categories of community services that the PE could affect are 1) Provision of Public and Private Water, 2) Roads and Traffic, 3) Emergency Services (Fire, Rescue, and EMS), and 4) Law Enforcement. For this report, we do not have a complete basis for providing estimates of the costs of community service for the counties and municipalities affected by the pipeline. However, we explain them below to provide a more complete picture of public services at stake and an example of indirect costs FERC should be further investigating and considering.

### Provision of Public and Private Water

Landowners all over the Marcellus region are increasingly worried about the potential degradation of water quality associated with the construction and operation of pipelines (Wheeler, 2014; Adams, 2015a). The construction of natural gas infrastructure causes erosion, sedimentation, and contamination of local waterways from runoff (Union of Concerned Scientists, n.d.). In an example from just earlier this year, the state of New York rejected the Constitution Pipeline because the project failed to address significant water resource impacts (New York State Department of Environmental Conservation, 2016).

The PennEast Pipeline would cross, at least, four principal bedrock aquifer systems, multiple surficial unconsolidated aquifers, two EPA-designated sole source aquifers, and three wellhead protection areas (Federal Energy Regulatory Commission, 2016b). The PennEast Pipeline would also cross the Delaware River, a major drinking water source for communities in NJ and PA.

To mitigate potential impacts to water quality, PennEast prepared a Well Monitoring Plan stating that the company will conduct pre- and post-construction water quality monitoring within 150 feet of the construction corridor. If PennEast deems the water supply quantity or quality is affected, they are prepared to provide alternate water supply sources or reparations to the landowner for a new, analogous well (Federal Energy Regulatory Commission, 2016b). The 150 feet buffer, however, does not protect all potentially impacted landowners. In response to the buffer identified by PE LLC and listed in the DEIS, the New Jersey Department of Environmental Protection commented that a monitoring distance of 150 feet of the pipeline is inadequate, suggesting a 1,000 feet monitoring radius instead (New Jersey Department of Environmental Protection, 2015).

The Environmental Protection Agency also submitted a comment letter outlining drinking water concerns and inadequacies in information noting that the DEIS fails to identify Source Water Protection Areas which are determined by contaminant time-of-travel and include areas more than 3 miles upstream of potable source water intakes (U.S. EPA, 2016b). Only three Wellhead Protection Areas (WHPAs) are identified in the DEIS, however, the EPA's comment letter notes 122 WHPAs within 5 miles of the pipeline's proposed path. To more thoroughly account for potential drinking water contamination, the EPA (2016b) suggests PE LLC work directly with state water agencies to locate the intersections between source water protection areas and WHPAs.

In New Jersey, two public supply wells in Alexandria Township in Hunterdon County are within 150 feet of the construction corridor (Federal Energy Regulatory Commission, 2016b). PE LLC has not currently identified the number or location of private wells in New Jersey but states that it will identify affected private wells using public records and interviews with landowners. Dozens of communities along the proposed route are already passing official resolutions against the pipeline. Many of them, for example Kingwood Township, a rural municipality located in Hunterdon County, New Jersey, strongly oppose the PE because of the potential impacts on landowners that predominantly rely on private water supplies (Township Committee of the Township of Kingwood, 2014).



Proposed PE crossing along the Alexauken Creek in New Jersey, a C1 stream.  
(Photo Credit: Faith Zerbe)

According to the DEIS, “based on review of the Pennsylvania Department of Conservation and Natural Resource (PA DCNR) Pennsylvania Groundwater Information System, no public and/or private water supply wells or springs are located within 150 feet of the pipeline construction workspace in Pennsylvania” (Federal Energy Regulatory Commission, 2016b). However, Delaware Riverkeeper Network found that community members and volunteer monitors have identified additional potential freshwater wells and springs within 150 feet of the route (Zerbe, 2016). In Pennsylvania, more than a million people rely on private wells, with 20,000 new wells drilled each year (PennState Extension, 2016), however, because the

state of Pennsylvania does not regulate private well use, testing for contamination falls on the homeowner. These well testing costs would be yet another external cost of the PE that would fall on landowners.

***“If your well is dry or poisoned, your family's well-being is at risk, and your property has become worthless, it won't matter how much PennEast is paying in taxes.”***

*-Mayor Susan Lockwood of Delaware Township, Mayor Kevin Kuchinski of Hopewell Township,  
Mayor Zach Rich of West Amwell Township, Mayor Richard Dodds of Kingwood Township,  
and Mayor Ray Krov of Holland Township*

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## Roads and Traffic

Although no current literature exists that provides estimates of the extent to which natural gas pipeline construction and operation would increase wear and tear on local roads, snarl traffic, or increase the rate of motor vehicle accidents, it is reasonable to assume some of these effects will occur based on documented instances in areas where unconventional natural gas drilling. The increase in traffic volume from fracking produces a strain on existing transportation infrastructure because damage to roads and bridges increases exponentially with vehicle weight (Abramzon et. al, 2014). Heavy vehicle traffic associated with fracking in the Barnett shale in Texas has already run up a repair bill of \$40 million, and New York State estimates potential fracking would require road and bridge upgrades of upwards of hundreds of millions to prepare for the punishment associated with increased vehicle volume and traffic (Efstathiou, 2012).

Damaged or worn-out roads, an increase in traffic volume involving those heavy vehicles, and an influx of out-of-area workers unfamiliar with local roads are also associated with increases in motor vehicle accidents (Muehlenbachs & Krupnick, 2014). Motor vehicle accidents impose a range of costs, from emergency response, medical care, time off of work, premature death, property damage, and the cost of time lost to traffic jams at accident scenes (National Highway Traffic Safety Administration, 2015).

Another reason to expect that PE's external costs would include transportation impacts is that PennEast LLC has stated that it will pay to restore local roads damaged during construction to their original or better condition (Federal Energy Regulatory Commission, 2016b). To help ensure that this does in fact happen, at least one Pennsylvania Township is taking steps and spending public funds to document current road conditions so that officials know how much PennEast-related damage would need to be repaired. According to Upper Nazareth Township zoning Officer John Soloe, “Our road system could be dramatically impacted” (Best, 2016). Since PennEast has pledged only to pay for the damage to roads, the costs of such surveys would be borne by municipalities. Similarly, PennEast would not be paying for the costs of time lost to traffic congestion, traffic accidents, or excess wear and tear on vehicles traversing damaged roads before they are repaired. By paying just a portion of the external transportation-related costs of the PE, the project would leave many costs unmitigated.

## Emergency Services (Fire, Rescue, and Emergency Medical Services)

With pipeline incidents becoming more and more frequent (Kelso, 2013), fire and rescue teams must devote additional time and resources for planning, training, and response. In Allentown, Pennsylvania, roughly 15 miles west of the proposed PennEast Pipeline, the process for responding to a natural gas incident is intensive and burdens the community (Kutz, 2012). When the fire station receives a pipeline related call it must dispatch a battalion chief, one truck company, and three engines with 13-15 firefighters in all. When the first units arrive on the scene, they close roads to all traffic for one square block, take samples, and wait for the utility company to arrive (Kutz, 2012). Fire departments that do not already have the requisite level of staffing, training, and equipment will need to invest to increase their capacity to serve their communities in the face of new risks.

Although incidents with larger transmission lines, such as PennEast, occur with lower frequency, potential accidents still require preparatory training and warrant concern. According to Tim Butters, former deputy administrator of the Pipeline and Hazardous Materials Safety Administration, emergency responders are often overwhelmed with the amount of information on various hazards and priorities in their jurisdiction, which may impact their ability to properly respond to an incident involving a larger transmission pipeline (Armstrong, Hall, & Butters, 2011). An investigation into a pipeline rupture in California that killed eight people, injured over 60, destroyed 38 homes, and damaged 70 others, for example, revealed that local responders were not prepared to handle the emergency (Armstrong, Hall, & Butters, 2011).

PennEast states that it does not expect construction to have an adverse impact on local and regional medical services (Federal Energy Regulatory Commission, 2016b). However, PennEast fails to answer critical questions in their filings relevant for emergency medical services (EMS). The chief of the Kingwood Rescue Squad raises concerns on whether or not rescue vehicles may drive or park over the pipeline, whether a helicopter would be able to land on site, how PennEast would address downed power lines near the PE, and what protective gear would be necessary for first responders to possess and be trained to use (Ponter, 2015).

## Law Enforcement

The increased cost to law enforcement stems from additional time and potential personnel needed to handle increased motor vehicle accidents and crime associated with temporary workers as demonstrated by the experience of communities where temporary workers are a regular presence due to shale gas operations. Pennsylvania localities have experienced a 46% increase in 911 call activity, even with their population declining (Detrow, 2011). The majority of 911 calls stem from heavy trucks jamming traffic on local roads and accidents involving heavy rigs, trucks, tractor-trailers, dump trucks, and trailers hauling hazardous materials, all of which will be present during pipeline construction.

Furthermore, a multi-state analysis found that counties with high drilling had statistically significant increases in violent crime and property crime (Multi-State Shale Research Collaborative, 2014). Temporary out-of-state workers have been associated with increased arrests, traffic violations, protection-from-abuse orders, and warrants for people failing to appear in court (Associated Press, 2011). In Bradford County, Pennsylvania, for example, DUI arrests rose 60%; the number of sentences handed for criminal offenses rose 35%; warrants for criminal activity such as protection-from-abuse rose 25% as well (Associated Press, 2011).

PennEast expects 60% of their 2,400 person workforce to consist of non-local, temporary hires (Federal Energy Regulatory Commission, 2016b). While pipeline construction jobs will come and go more quickly than gas field jobs, it is reasonable to assume, prepare for, and expect higher costs for additional law enforcement needs.

## Effects on Economic Development

Impacts to public health, scenery, and community services could affect the economic development of the counties crossed by the pipeline's route. Across the study region, county-level economic development plans recognize the importance of a high quality of life, a clean environment, and scenic and recreational amenities to the economic future of people and communities. According to the Comprehensive Economic Development Strategy Five-Year Plan for Northeastern Pennsylvania, which encompasses Carbon and Luzerne Counties, "the Northeastern Pennsylvania region will continue to be an attractive place to live because of its excellent quality of life, which is supported by a strong and diversified economic base that brings prosperity to its residents...the



Pasture in Hunterdon County that would be impacted by the PennEast Pipeline.

(Photo Credit: Carla Kelly-Mackev)

region will maintain a balance between the preservation of its rural environment with open space and an expanded economic base with industrial, commercial and retail centers for its residents” (Northeastern Pennsylvania Alliance, 2013, p. 23).

In New Jersey, Hunterdon County’s Comprehensive Economic Development Strategy notes the County’s melding of old and new economy businesses (farming and nationally recognized healthcare, for example) and recognizes that the “beautiful rural landscape comprised of rolling hills, working farms, and attractive historical hamlets...provides an attractive location for a young, highly-skilled workforce that is heavily vested in an active outdoor lifestyle” (Hunterdon County Board of Chosen

Freeholders, CEDS Governing Committee, Hunterdon County Planning Board Staff, & North Jersey Transportation Planning Authority, 2014, p. 102).

These intentions mirror common trends in other amenity-rich locales around the country. For example, Niemi and Whitelaw state “as in the rest of the Nation, natural-resource amenities exert an influence on the location, structure, and rate of economic growth.... This influence occurs through the so-called people-first-then-jobs mechanism, in which households move to (or stay in) an area because they want to live there, thereby triggering the development of businesses seeking to take advantage of the households’ labor supply and consumptive demand” (1999, p. 54). They note that decisions affecting the supply of amenities “have ripple effects throughout local and regional economies” (p. 54). Similarly, Johnson and Rasker (1995) found that quality of life is important to business owners deciding where to locate a new facility or enterprise and whether to stay in a location already chosen. This is not surprising. Business owners value safety, scenery, recreational opportunities, and quality of life factors as much as residents, vacationers, and retirees.

Part of what makes tourism an important part of the region’s economy is the high aesthetic quality and environmental amenities available in the study region. In 2012, a visitor report about the Pocono Mountains (partially located in Carbon County) reported \$1.3 billion in total spending resulting from overnight visits, with an estimated 25 million total person-trips consisting of 9.1 million in overnight trips and 15.9 million day trips during 2012 (Northeastern Pennsylvania Alliance, 2013).

Wildlife-related recreational activities related to tourism are also important. In 2011, hunters, anglers, and wildlife watchers spent \$2.7 billion in Pennsylvania and another \$2.2 billion in New Jersey (U.S. Fish & Wildlife Service, 2011b, 2011a).

The PE could dampen these economic activities and undermine the progress toward economic development goals. A loss of scenic and recreational amenities, the perception and the reality of physical danger, and environmental and property damage resulting from the PE could discourage people from visiting, relocating to, or staying in the region. Workers, businesses, and retirees who might otherwise choose to locate along the PE’s proposed route will instead pick locations that have retained their character, their productive and healthy landscapes, and their promise for a higher quality of life.

This is already occurring in the region. With the possibility of the PE looming, business plans are stalling and the real estate market is slowing. For example, Movant, Kay Trio, LLC, a land development company, had plans to

develop 105 total acres for single family homes in Nazareth, Pennsylvania. The proposed pipeline, however, would cross the “Trio Fields” development and “aside from destroying numerous lots and any profits associated therewith, will likely affect sales, interest, operation and the overall success of the development as a whole” (Avrigian, Jr. & Martosella, III, 2015). Natasha Jiovino, an owner of property in Holland Township, New Jersey, has been pursuing a development project since 1999 that has incurred development costs of over \$2.8 million to date.

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***“Our customers will not tolerate less than pristine environmental conditions for their prized champion mares and their foals. Construction of the pipeline will result in the immediate loss of our customers and the closure of our business, resulting in the loss of the primary source of income for my wife and me.”***

*-Richard Kohler, Owner of Cedar Lane Farm Inc.  
Hunterdon, NJ*

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Among other impacts, the PE would jeopardize the construction of 132 townhouses and other units that would help the township reach its affordable housing requirements (Jiovino, 2015).

Many of the region’s residents believe the PE will harm the travel and tourism industry. For example, officials from the City of Lambertville in Hunterdon County, New Jersey believe the pipeline and associated construction will disrupt local tourism and recreation businesses (City of Lambertville & PennEast Pipeline Committee of the City of Lambertville, 2016).

It is difficult to predict just how large an effect the PE would have on decisions about visiting, locating to, or staying in the study region. Even so, based on information provided by business owners to FERC and as part of this research, we can consider scenarios for how the PE might affect key portions of the region’s overall economy, such as tourism and recreation, retirement, and entrepreneurship.

If, for example, the PE were to cause a 10% drop in recreation and tourism spending from 2015 baselines, the PE could mean \$448.0 million less in travel expenditures each year (Tourism Economics, 2015, 2016).<sup>34</sup> Those missing revenues would otherwise support roughly \$38.8 million in state and local tax revenue and 4,090 jobs in the six-county region.<sup>35</sup> In the short run, these changes multiply through the broader economy as recreation and tourism businesses buy less from local suppliers and fewer employees spend their paychecks in the local economy. As with the reduction in local property taxes, lost tax revenue from a reduction in visitation and visitor spending would squeeze local governments trying to meet existing public service needs as well as additional demands created by the PE.

Along similar lines, retirement income is an important economic engine that could be adversely affected by the PE. In county-level statistics from the U.S. Department of Commerce, retirement income shows up in investment income and as age-related transfer payments, including Social Security and Medicare payments. In the study region, investment income grew by 0.6% per year from 2000 through 2014, and age-related transfer payments grew by 4.1% per year. During roughly the same time period (through 2013), the number of residents age 65 and older grew by 15.8% (1.2% per year), and this age cohort now represents 15.8% of the total population (U.S. Department of Commerce, 2015a; U.S. Department of Commerce, 2015b).

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<sup>34</sup> Baseline tourism data for Pennsylvania was given for 2014 and adjusted for inflation to 2015\$.

<sup>35</sup> This reduction in economic activity would be in addition to the lost recreation benefits (the value to the visitors themselves over and above their expenditures on recreational activity) that are included under the heading of lost ecosystem services.

It is difficult to precisely quantify the effect of the PE on retirement income, but given the expression of concern from residents about changes in quality of life, safety, and other factors influencing retirees' location decisions, it is important to consider that some change is likely. Here, we consider what a *10% reduction of the growth rate* might entail. A 10% growth reduction scenario would mean an annual decrease in investment income and age-related transfer payments of approximately \$55.6 million. That loss would ripple through the economy as the missing income is not spent on groceries, health care, and other services such as restaurant meals, home and auto repairs, etc.

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***“As a business owner, I provide employment for ten heads of households in a rural area where few job opportunities exist. I also provide critical youth employment on a part time basis for many of our local teenagers. Part of the draw of my restaurant, Milford Oyster House, is the pristine natural environment in which it exists. Travelers come from all over to visit our beautiful area.”***

*-Amy Coss, Owner of Milford Oyster House  
Milford, NJ*

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The same phenomenon also applies to people starting new businesses or moving existing businesses to communities in the study region. This may be particularly true of sole proprietorships and other small businesses who are most able to choose where to locate. As noted, sole proprietors account for a large and growing share of jobs in the region. If proprietors' enthusiasm for starting businesses in the study region were dampened to the same degree as retirees' enthusiasm for moving there, the 10% reduction in the rate of growth would mean 791 fewer jobs and \$16.3 million less in personal income.

For “bottom line” reasons (e.g., cost of insurance) or due to owners' own personal concerns, businesses in addition to sole proprietorships might choose locations where the pipeline is not an issue. If so, further opportunities for local job and income growth will be missed.

These are simple scenarios and the actual magnitude of these impacts of the PE will not be known unless the pipeline is built. Even so, and especially because the pipeline is promoted by its supporters for its jobs and potential other economic benefits to the region, it is important to consider the potential for loss.

## CONCLUSIONS

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The full costs of the proposed PennEast Pipeline to people and communities in the six-county study region and beyond are wide-ranging. The costs include one-time costs like reductions in property value and lost ecosystem services during pipeline construction. These one-time costs, according to our conservative estimates, would be between \$166.0 and \$199.4 million. There are also ongoing costs like diminished ecosystem service value, lost property tax revenue, and the cost of increased carbon emissions that recur year after year for the life of the pipeline (assumed to be 30 years). Lost ecosystem service value and diminished property tax revenues would total between \$5.3 and \$12.8 million per year. The majority of these costs would be borne by the residents, businesses, and institutions in Bucks, Carbon, Luzerne, Northampton, Hunterdon, and Mercer counties.

Beyond the immediate region, the PennEast Pipeline would also impose a cost on people worldwide, due to the addition to the combustion of natural gas transported through the pipeline. The social cost of carbon is an annual cost that varies by year and with the rate at which future costs are discounted. It would total between \$291.9 million and \$2.3 billion, raising the total annual external costs to between \$297.2 million and \$2.3 billion.

Adding up all one-time recurring costs, and discounting those future costs to 2017, we estimate the total external costs of PennEast Pipeline to be between \$13.3 and \$56.6 billion.

By contrast, the pipeline would in the words of FERC's DEIS provide only "minor" benefits in the form of economic impact during construction and operation of the pipeline. Using PennEast LLC's own estimates (Econsult Solutions & Drexel University School of Economics, 2015) and applying the same methods to calculate the present value of all future benefits, the pipeline promises a total of \$2.3 billion in economic impact over 30 years of operation. This means for every dollar of benefit promised, the PennEast Pipeline would impose between \$5.85 and \$24.97 in costs.

While the decision to approve or not approve the PE does not hinge on a simple comparison of estimated benefits versus estimated costs, the huge difference between the external economic costs presented in this report and the potential payments to local and state governments as well as citizens suggests that, from an economic perspective, the proposed PE is grossly inefficient. The scope and magnitude of the costs outlined here reflect an important component of the full extent of the PE's likely environmental effects that must be considered when making the certification decision. Impacts on human well-being, including but not limited to those that can be expressed in dollars-and-cents, must be taken into account by the Federal Energy Regulatory Commission and others weighing the societal value of the PennEast Pipeline.

If these considerations and FERC's overall review result in selection of the "no-action" alternative and the PennEast Pipeline is never built, most of the costs outlined in this report will be avoided. It is *most*, not *all*, costs because the cost of delayed business plans, houses languishing on the market, and the cost to individuals of the stress, time, and energy diverted to concern about the pipeline rather than what would normally (and more productively) fill their lives has already occurred.

Another possible scenario is that FERC, considering the impacts of the PE *as currently proposed* on ecosystem services, property values, and economic development, conducts a thorough analysis of all possible alternatives. Those alternatives may include using alternative energy technologies for meeting the energy needs of the region, using existing gas transmission infrastructure (with or without capacity upgrades), routing new gas transmission lines along existing utility and transportation rights-of-way, and/or scaling down permitted new pipeline capacity to match regional gas transmission needs. In this case, estimates of these impacts should inform the choice of a preferred alternative that minimizes environmental damage and, thereby, minimizes the economic costs to individuals, businesses, and the public at large.

Note that consideration regional energy and natural gas transmission needs would most appropriately be made in the course of preparing a Programmatic Environmental Impact Statement, or PEIS, that considers the multiple pipeline proposals now on FERC's docket as well as others that FERC could reasonably foresee as likely to be proposed to transport gas from the Marcellus Shale to regional, national and international markets. FERC has unfortunately, and possibly in direct violation of NEPA, so far refused to do PEISs (Adams, 2015b). FERC's reason is in part that it has not done PEIS's before. FERC also maintains that it can adequately address such concerns as part of its analysis of the cumulative effects of any individual pipeline.

In the case of the Mountain Valley Pipeline, for example, FERC stated in a 2015 letter that its DEIS "will analyze both the project-specific impacts of the Mountain Valley Pipeline and the cumulative impacts of other actions affecting the environment in the region, including other proposed natural gas pipelines (FERC Chairman Norman Bay, quoted in Adams, 2015b)." That DEIS was released in the fall of 2016 and, as it turns out, FERC failed to adequately assess cumulative impacts of the proposed project. The U.S. Environmental Protection Agency (which has responsibility to review the quality of other agencies' compliance with NEPA) critiqued FERC's DEIS,

saying FERC "uses a narrow geographic and temporal scope," EPA said the Commission defined the scope of analysis of cumulative effects is too narrow. EPA recommended "that FERC describe the inter-related network of existing and proposed pipelines and associated impacts...to provide a more comprehensive consideration of impacts from natural gas production, transmission and use" (U.S. EPA Office of Environmental Programs, 2016, p.4).<sup>36</sup>

Unfortunately, and as demonstrated in the case of the Mountain Valley Pipeline and several other pipeline proposals in the Marcellus Shale region, the outlook for an adequate environmental review by FERC and, subsequently, an economically efficient outcome is not good. FERC routinely discounts or ignores important economic costs and turns a blind eye to energy supply and transmission options that could reduce the waste of land, natural resources, and financial wealth.

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<sup>36</sup> EPA identified many deficiencies in FERC's DEIS for the Mountain Valley Pipeline, including inadequate consideration of climate change impacts, and an analysis impacts on forests that is not meaningful.

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## APPENDIX A: CANDIDATE PER-ACRE VALUES FOR LAND-USE AND ECOSYSTEM SERVICE COMBINATIONS

As explained under “Effects on Ecosystem Service Value,” the benefit transfer method applies estimates of ecosystem service value from existing studies of “source areas” to the “study area,” which in this case is the proposed PE corridor. This application is done on a land-use-by-land-use basis. So, for example, values of various ecosystem services associated with forests in the source area are applied to forests in the study area. The table below lists all of the values from source area studies considered for our calculations.

Land Use	Ecosystem Service	Minimum \$/acre/year	Maximum \$/acre/year	Source Study
Cropland	Aesthetic	35.01	89.23	(Bergstrom, Dillman, & Stoll, 1985)
	Biological Control	15.21	15.21	(Brenner Guillermo, 2007) *
	Biological Control	14.38	204.95	(Cleveland et al., 2006)
	Erosion	27.31	72.55	(Pimentel et al., 2003) *
	Food	33.25	33.25	(Lex & Groover, 2015)
	Pollination	10.14	10.14	(Brenner Guillermo, 2007) *
	Pollination	13.89	13.89	(Robinson, Nowogrodzki, & Morse, 1989)
	Pollination	47.43	1,987.97	(Winfree, Gross, & Kremen, 2011)
	Recreation	18.77	18.77	(Brenner Guillermo, 2007) *
	Recreation	2.16	5.02	(Knoche & Lupi, 2007)
	Soil Fertility	7.28	7.28	(Pimentel, 1998) *
	Soil Fertility	115.23	115.23	(Pimentel et al., 2003)
Waste	132.26	132.26	(Perrot-Maître & Davis, 2001) *	
Grasslands	Aesthetic	102.38	116.61	(Ready, Berger, & Blomquist, 1997)
	Biological Control	15.21	15.21	(Brenner Guillermo, 2007) *
	Climate	3.55	3.55	(Brenner Guillermo, 2007) *
	Erosion	17.48	17.48	(Barrow, 1991) *
	Erosion	68.28	68.28	(Sala & Paruelo, 1997) *
	Food	15.50	15.50	(Lex & Groover, 2015) *
	Pollination	16.23	16.23	(Brenner Guillermo, 2007) *
	Soil Fertility	3.55	3.55	(Brenner Guillermo, 2007) *
	Waste	55.28	55.28	(Brenner Guillermo, 2007) *
	Waste	5.88	64.40	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Water Flows	2.54	2.54	(Brenner Guillermo, 2007) *
Pasture	Aesthetic	102.38	116.61	(Ready et al., 1997)
	Biological Control	15.21	15.21	(Brenner Guillermo, 2007) *
	Climate	3.55	3.55	(Brenner Guillermo, 2007) *
	Erosion	17.48	17.48	(Barrow, 1991) *
	Erosion	68.28	68.28	(Sala & Paruelo, 1997) *
	Food	15.50	15.50	(Lex & Groover, 2015)
	Pollination	16.23	16.23	(Brenner Guillermo, 2007) *
	Soil Fertility	3.55	3.55	(Brenner Guillermo, 2007) *
	Waste	55.28	55.28	(Brenner Guillermo, 2007) *

Land Use	Ecosystem Service	Minimum \$/acre/year	Maximum \$/acre/year	Source Study
	Waste	5.88	64.40	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Water Flows	2.54	2.54	(Brenner Guillermo, 2007) *
Shrub/Scrub	Air Quality	37.26	37.26	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Climate	7.27	7.27	(Croitoru, 2007) *
	Erosion	22.75	22.75	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Pollination	1.41	7.10	(Robert Costanza, Wilson, et al., 2006)
	Recreation	3.95	3.95	(Haener & Adamowicz, 2000)
	Waste	46.35	46.35	(Croitoru, 2007) *
	Waste	0.10	324.35	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
	Forest	Aesthetic	4,439.71	18,141.99
Air Quality		372.57	372.57	(Ministerie van Landbouw & Natuur en Voedselkwaliteit, 2006) *
Biological Control		8.91	8.91	(Wilson, 2005) *
Biological Control		2.54	2.54	(Brenner Guillermo, 2007) *
Climate		67.45	67.45	(Brenner Guillermo, 2007) *
Climate		56.89	56.89	(Robert Costanza, d'Arge, et al., 2006)
Erosion		61.87	61.87	(Brenner Guillermo, 2007) *
Erosion		3.09	36.09	(Zhou, Al-Kaisi, & Helmers, 2009)
Extreme Events		797.66	797.66	(Weber, 2007)
Food		0.13	0.13	(Wilson, 2005) *
Pollination		202.87	202.87	(Brenner Guillermo, 2007) *
Raw Materials		24.53	24.53	(Wilson, 2005) *
Raw Materials		166.82	166.82	(Weber, 2007)
Recreation		152.66	152.66	(Brenner Guillermo, 2007) *
Recreation		1.29	4.55	(Cruz & Benedicto, 2009) *
Recreation		1.56	1.56	(Kniivila, Ovaskainen, & Saastamoinen, 2002) *
Recreation		37.13	45.50	(Prince & Ahmed, 1989)
Recreation		2.79	503.97	(Shafer, Carline, Guldin, & Cordell, 1993)
Soil Fertility		6.09	6.09	(Brenner Guillermo, 2007) *
Soil Fertility		19.97	19.97	(Weber, 2007)
Waste		55.28	55.28	(Brenner Guillermo, 2007) *
Waste		8.66	8.66	(Cruz & Benedicto, 2009) *
Waste		265.79	266.89	(Lui, 2006)
Water		204.39	204.39	(Brenner Guillermo, 2007) *
Water		47.39	47.39	(Cruz & Benedicto, 2009) *
Water		1,292.23	1,292.23	(Weber, 2007)
Water Flows		230.01	230.01	(Mates, 2007)
Water Flows		797.66	797.66	(Weber, 2007)
Water	Recreation	446.31	446.31	(Brenner Guillermo, 2007) *

Land Use	Ecosystem Service	Minimum \$/acre/year	Maximum \$/acre/year	Source Study
	Recreation	155.36	914.10	(Cordell & Bergstrom, 1993)
	Recreation	304.18	437.19	(Mullen & Menz, 1985)
	Recreation	148.68	148.68	(Postel & Carpenter, 1977)
	Waste	10.72	10.72	(Gibbons, 1986) *
	Water	512.74	512.74	(Brenner Guillermo, 2007) *
	Water	22.98	22.98	(Gibbons, 1986) *
Wetland	Aesthetic	38.46	38.46	(Amacher & Brazee, 1989) *
	Air Quality	75.50	98.02	(Jenkins, Murray, Kramer, & Faulkner, 2010)
	Climate	1.84	1.84	(Wilson, 2005) *
	Climate	157.73	157.73	(Brenner Guillermo, 2007) *
	Extreme Events	228.06	369.85	(Wilson, 2005) *
	Extreme Events	110.06	4,583.26	(Brenner Guillermo, 2007) *
	Extreme Events	304.18	304.18	(Robert Costanza, Farber, & Maxwell, 1989)
	Extreme Events	278.77	278.77	(Robert Costanza & Farley, 2007)
	Extreme Events	1,645.59	7,513.98	(Leschine, Wellman, & Green, 1997)
	Raw Materials	50.16	50.16	(Everard, Great Britain, & Environment Agency, 2009)
	Recreation	80.71	80.71	(Bergstrom, Stoll, Titre, & Wright, 1990)
	Recreation	1,716.76	1,761.89	(Brenner Guillermo, 2007) *
	Recreation	109.30	429.97	(Robert Costanza et al., 1989)
	Recreation	1,041.04	1,041.04	(Creel & Loomis, 1992)
	Recreation	88.06	994.50	(Gren & Söderqvist, 1994) *
	Recreation	71.11	71.11	(Gren, Groth, & Sylven, 1995) *
	Recreation	208.01	208.01	(Kreutzwiser, 1981)
	Recreation	209.51	209.51	(Lant & Roberts, 1990) *
	Recreation	648.57	4,203.82	(Whitehead, 1990)
	Waste	141.56	141.56	(Wilson, 2005) *
	Waste	67.02	67.02	(Breaux, Farber, & Day, 1995)
	Waste	1,050.34	1,050.34	(Brenner Guillermo, 2007) *
	Waste	170.05	170.05	(Gren & Söderqvist, 1994) *
	Waste	35.20	35.20	(Gren et al., 1995) *
	Waste	551.02	551.02	(Jenkins et al., 2010)
	Waste	209.51	209.51	(Lant & Roberts, 1990) *
	Waste	5,027.28	5,027.28	(Meyerhoff & Dehnhardt, 2004) *
	Waste	10,881.15	10,881.15	(Lui, 2006)
	Water	1,934.84	2,407.52	(Brenner Guillermo, 2007) *
	Water	622.77	622.77	(Creel & Loomis, 1992)
	Water	18.19	18.19	(Folke & Kaberger, 1991) *
	Water Flows	3,741.87	3,741.87	(Brenner Guillermo, 2007) *
Water Flows	3,920.69	3,920.69	(Leschine et al., 1997)	
Water Flows	4,329.70	4,329.70	(UK Environment Agency, 1999)	
Urban Open Space	Aesthetic	1,006.06	1,322.31	(Qiu, Prato, & Boehrn, 2006)
	Air Quality	32.46	32.46	(G. McPherson, Scott, & Simpson, 1998)
	Air Quality	192.35	192.35	(G. E. McPherson, 1992)

Land Use	Ecosystem Service	Minimum \$/acre/year	Maximum \$/acre/year	Source Study
	Climate	1,134.38	1,134.38	(G. E. McPherson, 1992)
	Extreme Events	315.52	597.01	(Streiner & Loomis, 1995)
	Water Flows	8.32	8.32	(G. E. McPherson, 1992)
	Water Flows	138.22	187.58	(The Trust for Public Land, 2010)
Urban Other	Climate	420.95	420.95	(Brenner Guillermo, 2007) *
	Recreation	2,670.74	2,670.74	(Brenner Guillermo, 2007) *
	Water Flows	7.61	7.61	(Brenner Guillermo, 2007)

All values are adjusted for inflation to 2015 dollars.

\* Indicates source is from the TEEB database.

**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 19,**  
Email from Dr. Steven Norris to FERC Director of Safety  
and Security Mark Radlinski detailing shoulder injury  
from FERC security, Sept. 21, 2016.

**From:** <beyond-extreme-energy@googlegroups.com> on behalf of Steven Norris  
<earthsun2@gmail.com>

**Date:** Wednesday, September 21, 2016 at 8:04 AM

**To:** <mark.radlinski@ferc.gov>

**Subject:** Injury at FERC

Dear Mr Radlinski

This is to notify you that during the Aliso Canyon hearing at FERC last Friday, September 16, my right shoulder was badly injured when I was forcibly removed from the hearing room by security. The security person grabbed my elbow and upper arm and lifted me as he pushed me toward the door. I did not resist.

I lost about 90% of the strength and range of motion in my right shoulder, and saw a doctor afterward. Fortunately my shoulder does seem to be healing (slowly) and probably will not require surgery.

You might want to instruct security to be aware of these problems, especially with older folks like me (I am 73).

You could also talk to the Commissioners, and suggest they give more attention to the needs of communities like Porter Ranch in California and elsewhere who are being severely impacted by FERC permitted projects. FERC has become a rubber stamp for the gas industry, which gravely injures many communities all over the country, and has policies which contribute hugely to the emission of green house gases, especially methane. Because of this FERC has lost all credibility.

It has been captured by industry and has turned our democracy on its head, regulating the public instead of industry. As a result of this, and my insistence on my democratic rights to speak, I was severely injured.

Sincerely, Steven Norris, Ph.D.

Beyond Extreme Energy

--

Steven Norris, 828-777-7816, Fairview, North Carolina

**People's Dossier: FERC's Abuses of Power and Law  
→ Public Participation Undermined**

**Public Participation Undermined Attachment 20,**  
Email from Susan Meacham regarding PennEast route  
changes, June 3, 2016.

**From:** [Corinne Bell](mailto:Corinne Bell)  
**To:** [corinne@delawariverkeeper.org](mailto:corinne@delawariverkeeper.org)  
**Subject:** FW: GAO review - an issue to mention  
**Date:** Friday, March 24, 2017 3:48:40 PM

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**From:** Susan Meacham [mailto:themeachams@ptd.net]  
**Sent:** Friday, June 03, 2016 11:55 AM  
**To:** 'Maya K. van Rossum, Delaware Riverkeeper'  
**Subject:** RE: GAO review - an issue to mention

Hi there – please forgive if this is a duplication of something you’ve already got on a list to include about FERC abuses, but I’m concerned with the notice of newly impacted landowners and the route change after PE filed their formal FERC application.

We have people who never knew they were impacted until they got easement packages in the mail from PE with monetary offers. I know in one case, an elderly neighbor of mine is in a nursing home and her sons live far off. PE could well have surveyed that property with no one home, and the first the sons knew about PennEast moving the route onto their childhood home was when the easement agreement and related docs came from PE.

I’ve put a comment on the FERC docket about this, but it seems to me FERC allowed a route change after the formal filing, and also they don’t seem to be requiring applicants to ensure timely notification of newly impacted landowners.

Best

/susan

---

**From:** Maya K. van Rossum, Delaware Riverkeeper [<mailto:keepermaya@delawariverkeeper.org>]  
**Sent:** Friday, June 3, 2016 9:05 AM  
**To:** Maya K. van Rossum <[keepermaya@delawariverkeeper.org](mailto:keepermaya@delawariverkeeper.org)>  
**Subject:** GAO review update

HI All

Quick update on our effort to secure a GAO review

We continue to reach out to legislators to try to find our champion for a GAO review.

At this point we seem to be getting the most interest from Congressman Pallone and Congressman Cartwright.

Pallone sits in the appropriate seat of power where a request from him should get the request immediately on the GAO review list for doing.

Congressman Cartwright does not have a position that results in automatic granting of the request if made, so for him we are pressing that he be our champion perhaps with a dear colleague letter or press statement expressing support for our efforts.

Given recent positioning of Gillibrand, Schumer, Kuster, and a few others we are trying to invigorate some interest from them but so far they seem to be on their own path.

I am planning a fresh letter that mentions some of the recent abuses of FERC we have all experienced and identifying all of your organizations as being sign ons for the request — hopefully that brings it back to the top of consideration from congressional staffers that had expressed some level of interest.

Other actions and thoughts are very welcome.

I am also very interested in the concept of pressing a parallel request for AG investigation but just haven't had a chance to think that through.

Also, our lawsuit claiming that FERC's process violates the federal constitution is getting the attention of FERC and now INGAA. It's going to be a fun ride — smiling.

**We are getting closer to the first date of our Webinar Series — please consider signing up today.**

**Webinar Series —  
Understanding & Protecting NEPA to Help Battle Pipelines,  
Compressors, LNG Exports and Other Environmental Harms.  
With 4 Opportunities to Participate.**

***The Delaware Riverkeeper Network, EarthJustice and Save Our Earth are presenting a webinar (offered at 4 different times for maximum accessibility) about the value and threats to NEPA, and what you can do to protect it from the recent set of house and senate energy bills.***

The National Environmental Policy Act (NEPA) is one of the first environmental

protection laws passed at the federal level. While it does not mandate a particular substantive outcome, it does require our federal agencies to thoroughly investigate and review the environmental and community impacts of their decisions and whether there are other alternatives that could do a better job with a lesser environmental footprint. In the context of pipelines, compressors and LNG export facilities, NEPA is one of the primary mechanisms communities can use to fully understand and vet the impacts of an infrastructure proposal and to make the case that a project should not be approved by the powerful agency that is FERC. It also provides a pathway for engaging the community and informing politicians about a project proposal so they know how best to get engaged. In recent years NEPA is constantly under threat. In the context of FERC regulated projects both the Senate and the House have advanced proposals that would seriously undermine NEPA review and as a result would further grease the wheels for quick approval by FERC of the many inFRACKstructure projects damaging so many communities.

Sign up for 1 of 4 dates:

June 7 @ 1 pm

<https://delawariverkeepernetwork.clickwebinar.com/nepa-benefits-threats-including>

June 7 @ 7 pm <https://delawariverkeepernetwork.clickwebinar.com/nepa-benefits-threats-including-for-pipe>

June 13 @ 11 am <https://delawariverkeepernetwork.clickwebinar.com/nepa-benefits-threats-including-for-pip>

June 22 @ 7 pm <https://delawariverkeepernetwork.clickwebinar.com/nepa-benefits-threats-inc>

Maya K. van Rossum  
the Delaware Riverkeeper

Delaware Riverkeeper Network  
925 Canal Street, Suite 3701, Bristol, PA 19007  
215 369 1188 ext 102

Website: [www.delawariverkeeper.org](http://www.delawariverkeeper.org)

Twitter: @DelRiverkeeper

Blogging at [www.delawarivervoiced.blogspot.com](http://www.delawarivervoiced.blogspot.com)

**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 21,**  
Email from Lakshmi Fjord to Maya K. van Rossum  
regarding Atlantic Coast Pipeline, January 28, 2017.

**From:** Lakshmi Fjord <[lakshmi.fjord@gmail.com](mailto:lakshmi.fjord@gmail.com)>

**Date:** Saturday, January 28, 2017 at 8:02 AM

**To:** Molly Atz <[Molly@delawariverkeeper.org](mailto:Molly@delawariverkeeper.org)>, "Maya K. van Rossum, Delaware Riverkeeper" <[keepermaya@delawariverkeeper.org](mailto:keepermaya@delawariverkeeper.org)>, Chad Oba <[chado108@icloud.com](mailto:chado108@icloud.com)>, Heidi Dhivya Berthoud <[heidi1008@gmail.com](mailto:heidi1008@gmail.com)>

**Subject:** Re: dossier re FERC abuses

Dear Molly and Maya,

Buckingham County, Virginia has prior to certificate been the direct recipient already of many varied FERC abuses.

All are related to expunging the entire county and the proposed only Virginia ACP compressor station ACP impacts from the FERC record.

And, thus, from FERC-led requirements to Dominion Resources/ACP LLC to further study and specify how they will address specific human, animal, forest, air, water, soil, erosion, sediment, seismic environmental impacts cited in comments. For, Buckingham is also where ACP intends to cross under the designated Scenic Historic James River and several tributaries.

### **NO FERC public meetings**

1. Buckingham is the only Virginia ACP impacted county where FERC would not hold an open public scoping meeting (no FERC response to the many comments in the initial comment period calling their attention to that fact). This despite Buckingham is the only Virginia county with a proposed very large compressor station intended for the entire length of the state -- not industry standard practice.

2. It is now post -DEIS the only Virginia ACP impact county where FERC has not scheduled a "listening session." They suggest we go to a neighboring county.

Both FERC omissions of our county lead the majority residents to conclude that Dominion Power has so influenced FERC to make this compressor station and its location at the intersection of the existing 4-pipeline Transco corridor and the proposed ACP **invisible in the FERC record** and ensure residents feel intimidated and powerless.

### **FERC response to Dominion Resources/ACP LLC amended Atlantic Coast Pipeline application, March 10, 2016**

In FERC's response document to Dominion Resources/ACP LLC's amended application in March 2016, Buckingham's compressor station is not cited as needing any of a list of required studies asked for other compressor stations. And. It's as if it doesn't exist.

I can take time to go to this document attached, from FERC to ACP LLC, for pages, if necessary. My notes are written on a hard copy. Here is a partial list of problems with FERC's response to ACP LLC, all based on no attention to Buckingham's version of this issue cited as of concern for other places:

- a. Wetlands -- there is a known wetlands area right next to the proposed compressor station facility, as in right next even on the site map
  - b. The crossing of the James River, a historic register water-body
  - c. The crossing of Sycamore Creek, a James tributary
  - d. Geohazard study and report for Compressor station 2, Buckingham, vs. other compressor stations; this with a known 125 written record of earthquakes, most recently, the epicenter in November 2015.
  - e. No refuting of claim by ACP LLC that there are "no impacted cultural resources" when we have received "Most Endangered Historic Place" in Virginia listing from Preservation Virginia; and now, have applied for eligibility for nomination for historic register status for the Union Hill/Woods Corner Rural Historic District based on its slave plantation and Freedmen history.
  - f. No recognition of the NEPA requirement that new toxic emitting infrastructure not more heavily burden a minority community. When during the initial and later comment period, I made multiple comments representing different groups to the effect that it is perhaps 92% African American;
- And, then, during the second comment period, many made that known as well.

And these are just some examples.

Thanks for putting this out for our input. You already have my "peer review" of the "FERC Health Impact Assessment" used by Dominion to claim that this mega compressor station will have no health impacts at all. If you need me to resend I am glad to do so.

warmest thanks,  
Lakshmi

**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 22,**  
Michael Martz, *Battle escalates over extending comment*  
*period for proposed pipeline*, Richmond Times Dispatch,  
April 22, 2015.

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## Battle escalates over extending comment period on proposed pipeline

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Story **Comments**

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Posted: Wednesday, April 22, 2015 10:30 pm

By MICHAEL MARTZ Richmond Times-Dispatch



2011, EVA RUSSO

U.S. Rep. Robert Hurt, R-5th, asked the Federal Energy Regulatory Commission to schedule an additional hearing in Nelson on the proposed Atlantic Coast Pipeline because of concern that 125 county residents who had signed up to speak at a hearing last month were not able to do so.

Virginia's two U.S. senators and a member of the state's congressional delegation want federal regulators to allow more time and public hearings for opponents of the proposed Atlantic Coast Pipeline to have their say.

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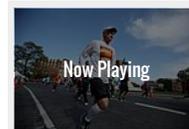
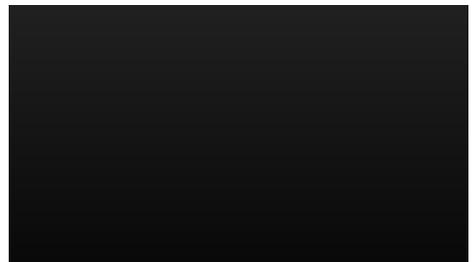
But a Hampton Roads natural gas company says further delay in the federal regulatory process would harm its customers, and the Virginia Chamber of Commerce called for speedy approval of the pipeline proposed from West Virginia to the southeastern Virginia and North Carolina coasts.

The public comment period for an environmental review of the project at the Federal Energy Regulatory Commission has become an early battleground over the proposed \$5 billion, 550-mile pipeline, with opponents seeking more time and hearings to make their case and supporters warning against any delay in the regulatory process.

The 60-day public comment period, already extended from 30 days, is scheduled to end on Tuesday as part of the commission's environmental impact

### VIDEOS

**2016 Monument Avenue 10k**  
Richmond Times-Dispatch



**2016 Monument Avenue 10k**  
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### LATEST NEWS

review. FERC, as it is known, has made no decision on whether to extend the deadline for public comment or schedule new hearings in addition to the 10 it already has held in the three states through which the pipeline would pass.

FERC spokeswoman Tamara Young-Allen said the commission would consider written comments even if they are submitted after next week's deadline. "The commission staff will look at all the comments," she said.



## Pipeline opponents bring advertising battle to Richmond

People in the Richmond area are about to meet people in the path of the proposed Atlantic Coast Pipeline in western Virginia.



## Nelson couple's "dream business" sits near alternate pipeline route

LYNCHBURG — A small slice of Bavaria can be found within Roseland right across from Wintergreen Mountain.

But Sens. Mark R. Warner and Timothy M. Kaine, both Virginia Democrats, asked FERC this week to extend the comment period and hold additional public hearings in Nelson and Augusta counties, where opposition to the project has been fiercest and concern about the fairness of the regulatory process has been deepest.

"Public meetings are only beneficial if they allow for maximum participation and airing of different viewpoints, and we believe Nelson and Augusta County residents deserve the full opportunity for comment that was not provided at the previous meeting," wrote Warner and Kaine, who previously had raised concerns with FERC about how the hearings were handled.

Last week, Rep. Robert Hurt, R-5th, asked the commission to schedule an additional hearing in Nelson and consider extending the scoping period because of concern that 125 county residents who had signed up to speak at a hearing last month were not able to do so.

Hurt, whose congressional district includes Nelson, acknowledged that the public could file written comments to FERC, but said, "I believe that the citizens who requested, but were not granted, time to comment verbally should be afforded an opportunity to share their perspectives in a public forum if they so choose."

Phil Anderson, executive director of the "All Pain, No Gain" campaign against the project, called the requests for more time by Warner, Kaine, and Hurt "a step in the right direction toward a fair and open public comment period."

But the possibility of a delay in the regulatory process alarms Virginia Natural Gas, a Virginia Beach-based distribution company that is owned by AGL Resources, one of the partners in the limited liability company led by a subsidiary of Dominion Resources that is proposing the pipeline.

The gas company urged FERC last week not to extend the comment period because "delay will dampen economic growth in Eastern Virginia and adversely affect the development of new energy infrastructure required to support economic development projects."

VNG President Robert S. Duvall said the company struggled to meet peak gas

\$25,000 reward offered after second break-in at Mechanicsville gun store

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demand on Feb. 15 because of strained pipeline capacity “and was required to curtail service to all of the interruptible industrial customers on our system.”

“There is not currently enough interstate pipeline capacity to serve any substantial economic development east of Richmond, and often throughout the heating season, large transportation customers are adversely impacted by having their natural gas use restricted by operational flow orders issued from the existing interstate pipelines,” Duvall wrote the commission April 15.

Sen. Shelley Moore Capito, R-W.Va., sent a letter to FERC on Wednesday asking it to not extend the comment period. “It is now time to proceed without further delay,” Capito said.

Business allies of the energy industry also have rallied behind the Atlantic Coast Pipeline project, proposed by an alliance of Dominion Transmission Inc., Duke Energy, AGL Resources, and Piedmont Natural Gas, based in North Carolina. The pipeline company has asked FERC not to extend the public comment period.

Virginia Chamber President Barry E. DuVal urged FERC on Tuesday to “promptly approve” the proposed pipeline, which the business organization said would lower electricity rates, while replacing coal with a cleaner fuel for power generation and promoting “additional manufacturing opportunities in regions that badly need them.”

The Consumer Energy Alliance, a pro-pipeline organization aligned with the energy industry, delivered almost 21,000 comments in support of the project to FERC, including 7,600 from Virginia members who signed the Houston-based organization’s online petition.

Executive Vice President Michael Whatley, who runs the alliance’s Washington office, said the Atlantic Coast Pipeline would supply the East Coast with low-priced natural gas from the Marcellus Basin shale fields in West Virginia and Pennsylvania. “Regionally, it’s very important,” he said.

Whatley dismissed the calls for extending the comment period as “delay for delay’s sake.”



### Dominion to withdraw lawsuits against landowners over pipeline surveys - and start over

Dominion Transmission Inc. is withdrawing lawsuits against 116 landowners who had refused access to their properties to survey the route of a proposed pipeline from West Virginia to the southe...



### Pipeline opponents go to "another level" with ad campaign

Opponents say they are expanding fundraising to the Richmond and Northern Virginia areas to pay for the next round of television advertising that has begun in the Charlottesville and Harrisonb...

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17	18	19	20	21	22	23
24	25	26	27	28	29	30

An Evening With Kevin Smith   
[Tue, Apr 19, 7:30 pm EDT](#)  
 The National, Richmond

"Out of the Darkness: Moths of Virginia"   
[Wed, Apr 20, 9:00 am EDT](#)  
 Lewis Ginter Botanical Garden, Richmond

Jim Breuer   
[Wed, Apr 20, 8:00 pm EDT](#)  
 The National, Richmond

Rick Gutierrez - April 21-24   
[Thu, Apr 21, 7:30 pm EDT](#)  
 Funny Bone Comedy Club, Henrico

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Posted in [Virginia News](#) on *Wednesday, April 22, 2015 10:30 pm.*

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**People's Dossier: FERC's Abuses of Power and Law**  
→ **Public Participation Undermined**

**Public Participation Undermined Attachment 23,**  
Andrew Cain, *US regulators reject request for more*  
*hearings on Atlantic Coast Pipeline*, Richmond Times  
Dispatch, May 14, 2015.



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## U.S. regulators reject request for more hearings on Atlantic Coast pipeline

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Posted: Thursday, May 14, 2015 11:00 pm

By ANDREW CAIN Richmond Times-Dispatch



BOB BROWN/TIMES-DISPATCH

A "No Pipeline" sign at the end of a driveway on Route 639 in Nelson County, VA Friday, March 13, 2015. Land in the area is in the path of a new alternative route for the Atlantic Coast Pipeline.

Federal regulators have rejected a request by Virginia's U.S. senators and a congressman for additional public hearings on the proposed Atlantic Coast pipeline.

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In April, Sens. Timothy M. Kaine and Mark R. Warner, both Democrats, and Rep. Robert Hurt, R-5th, said they wanted the Federal Energy Regulatory Commission to allow more time and public hearings in order for opponents of the project to have their say, particularly in Nelson and Augusta counties.

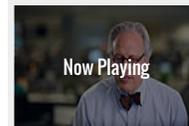
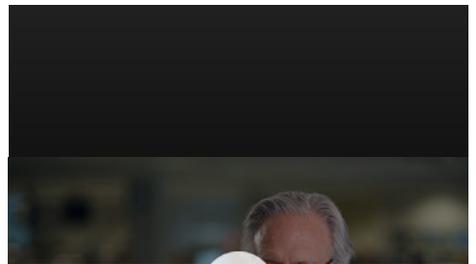
In a letter Monday FERC Chairman Norman C. Bay assured Kaine that its staff "will accept and fully review" any comments the commission received after the April 28 deadline to submit comments.

In a separate letter to Warner, Bay said that while he regrets that not all who wished to get to speak at previous meetings, the commission will not hold additional hearings.

"FERC staff has concluded that, based on the 10 scoping meetings that have been held in locations along the pipeline and

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the over 2,000 written comments received, it has been able to fully identify the issues surrounding the Atlantic Coast Pipeline Project and that additional meetings would not be likely to bring new matters to light," Bay wrote.

"Therefore, FERC staff does not plan to hold additional scoping meetings regarding the project."

The senators' offices said in a joint statement Thursday evening: "While FERC

has assured them that verbal and written comments will receive equal consideration, Senators Kaine and Warner are disappointed that FERC will not be holding additional public scoping meetings on the Atlantic Coast Pipeline.

"With that said, both senators plan to follow up with FERC in the coming weeks to give voice to a number of the key issues raised with them and their staffs by Virginians with concerns about this project."

Dominion Resources and three energy partners are proposing the \$5 billion, 550-mile pipeline to carry natural gas from West Virginia to southeastern Virginia and North Carolina.

[acain@timesdispatch.com](mailto:acain@timesdispatch.com)

(804) 649-6645

Twitter: @AndrewCainRTD

Posted in [Virginia Politics](#) on Thursday, May 14, 2015 11:00 pm.

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**People's Dossier: FERC's Abuses of Power and Law  
→ Public Participation Undermined**

**Public Participation Undermined Attachment 24,  
Letter from Senator Kaine to FERC Asking to Revise  
Policies, April 7, 2015.**

TIM KAINE  
VIRGINIA

WASHINGTON OFFICE:

WASHINGTON, DC 20510-4607  
(202) 224-4024

COMMITTEE ON  
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# United States Senate

WASHINGTON, DC 20510-4607

COMMITTEE ON  
FOREIGN RELATIONS

April 7, 2015

COMMITTEE ON  
THE BUDGET

The Honorable Cheryl LaFleur  
Chair, Federal Energy Regulatory Commission  
888 First Street NE, Room 11H  
Washington, D.C. 20426

Dear Chairwoman LaFleur:

I would like to share with you a sampling of constituent correspondence and press accounts concerning recent FERC scoping meetings in two Virginia counties – Nelson and Augusta – on the proposed Atlantic Coast Pipeline.

Given the differing, strongly-held views in Virginia communities on this project, I believe it is crucial for everyone to have the opportunity to make their concerns known. A number of Virginians who attended these meetings felt that this opportunity was not sufficiently given, due to a lack of clarity over precisely when citizens were able to sign up to offer verbal comment. According to several accounts, many constituents showed up at the announced start times of these meetings only to discover that all speaking slots had been claimed hours earlier.

I request that you review this correspondence and make appropriate changes to the scoping meeting process, to ensure that future meetings provide equitable opportunity for all views to be aired. Thank you for your attention to this matter.

Sincerely,

A handwritten signature in blue ink, appearing to read "Tim Kaine". The signature is stylized and written in a cursive-like font.

# **Frustrations continue after Atlantic Coast Pipeline project meeting**

Posted: Thursday, March 19, 2015 6:38 pm

**Rachael Smith**

Though emotions ran high at the Federal Energy Regulatory Commission's scoping meeting Wednesday night, those feelings were not alleviated overnight.

In fact, many who are opposed to the proposed Atlantic Coast Pipeline feel even more frustrated and disappointed with the lack of communication from FERC.

Before the hearing at Nelson County High School began at 7 p.m., residents could sign up on a first-come, first-served basis.

Joanna Salidis, president of anti-pipeline group Friends of Nelson, called ahead to ask an external affairs officer at FERC when people could arrive to sign up to speak.

"She told me signups would start shortly before 7 [p.m.] and that even if people arrived after 7 they would still be able to sign up. I was here by 6:30 [p.m.]," she said. "I got number 52."

Though the meeting was set to end at 10 p.m., FERC representatives allowed speakers to file through until 10:45 p.m. Speakers were allowed only three minutes and then were stopped mid-sentence to keep the meeting running as planned.

Of the 203 people who signed up, 78 spoke within the allowed time frame. Seventeen of the first 20 speakers were pro-pipeline. After the first 17, the rest were pipeline opponents.

"Those people were obviously organized to sign up super early and were obviously told to sign up very early," Salidis said. "FERC should not have allowed that."

Dominion spokesman Jim Norvelle said the sign up process is a first-come, first-served process and it was not set up to specifically allow all of the supporters to speak first.

“A number of ACP supporters asked us when should they come to the school to sign up to speak,” he said. “The FERC puts the sign-up sheet on the table about one hour before the scheduled start time, based on our observation at the earlier scoping meetings in North Carolina and Virginia. We told them that and they showed up. There is support for the ACP in Nelson County, for the reasons that several of the speakers gave last night, despite some interrupting disrespect for their position from those opposed.”

While supporters spoke of their endorsement during the meeting, comments and interruptions disclaiming those statements could be heard from the crowd.

Salidis said though some people were rude, they were upset about the process.

“It’s upsetting to read about how anti-pipeline people were arguing with pro-pipeline people, and people were rude and interrupting, however without understanding the context — so many people were told they couldn’t speak, and there they are listening to speaker after speaker talk about Dominion talking points and that’s really frustrating,” she said.

Norvelle said FERC representatives and Dominion did not work together to get supportive speakers to sign up first.

Salidis believes the FERC should have made it clear to the public what time sign ups would open and close.

“I think there was no communication between the different parties,” she said. “There should have been more coordination from a governmental agency. This thing matters. This was the public’s chance to speak. People were very frustrated.”

Salidis felt this gave a “gross distortion” of the sentiment of the county, adding FERC had a responsibility to the public and then let it down.

“They should set up another meeting because this is an issue that people are so passionate about and people want to speak and be heard in a public forum,” she said. “It’s not the same to receive written comments, they should have a time for sign ups and it should be publicly available for everyone, that way it would be fair.”

Norvelle said the scoping meeting in Nelson County was the largest so far. Previous meetings brought in about 20 to 25 speakers.

“The fact that last night’s meeting was the largest should not be a surprise to anyone,” he said Thursday.

**Contact Rachael Smith at (434) 385-5482 or [rsmith@newsadvance.com](mailto:rsmith@newsadvance.com).**

**From:** Connie Brennan [<mailto:connie@cstone.net>]

The press is just getting wind of the outrageous happenings at the FERC Scoping Meeting here in Nelson County on Wednesday.

<http://www.nbc29.com/story/28565480/anti-pipeline-group-readies-to-post-1k-signs-in-nelson-augusta>

FERC applied for and received permission to use the Nelson County Middle School auditorium for its Scoping Meeting on the 18<sup>th</sup>, from 4:00-10:00pm. There was public notice that the meeting was to occur from 7:00-9:00pm. There was no indication that persons who wished to speak should come and sign up to do so.

People arrived around 6:00, and some of them were met at the door and asked if they were there for "the dinner". When they said no, they were escorted into a different area.

The sign-up table was set up, even though no one knew they had to sign up to speak, and there were already 15 or so people signed up. It was discovered that these folks were allowed to sign up early, and were allowed to sign in for people who were not yet there (this was strictly forbidden during the regular sign-ups).

These early sign-ups were all pro-pipeline and obviously spoke first, using up about an hour of the allowed time. Almost all of them left promptly after speaking. All speakers thereafter were there to speak against the pipeline. 203 people signed up to speak, but only 75 actually had a chance to do so. Therefore, 128 people were denied the chance to speak.

It was later discovered that Dominion had brought in a lot of folks early and fed them, and then had them sign up first, and again, allowing them to sign in for people not even there.

This very thing happened again at the August FERC meeting last night, I am told.

People are furious. The press will be reporting more about this soon, if they have not yet already done so. There are no secrets in small communities.

Best regards,  
Connie

Connie Brennan  
Board of Supervisors  
Nelson County, Virginia  
Elected from the Central District  
Serving all Citizens of the County of  
Nelson  
524 Buck Creek Lane  
Faber, VA 22938  
home 434 263-4690  
cell 434 996-5246  
county office 434 263-7003



For Immediate Release

March 26, 2015

Contact: Joanna Salidis  
434-242-5859  
[josalidis@gmail.com](mailto:josalidis@gmail.com)

Ernie Reed  
434-971-1647  
[lec@wildvirginia.org](mailto:lec@wildvirginia.org)

### Regulators Fail to Protect Public Interest in Pipeline Process

The Federal Energy Regulatory Commission (FERC) held a scoping meeting in Nelson County on Mar. 18 for affected landowners and the wider community to help define the “scope,” or range, of pipeline impacts that need to be considered in the regulatory process. FERC held a similar meeting the next night in Stuart’s Draft. Since the meetings, attendees have filed numerous comments on FERC’s online comment forum and with legislators alleging that the meetings were biased to amplify the voices of those in favor of the Atlantic Coast Pipeline.

“FERC’s scoping meeting in Nelson illustrates exactly what so many affected communities around the country have been saying: FERC is an independent governmental agency, funded by the industry it regulates, with no accountability - nor, in their eyes, responsibility to the public,” says Joanna Salidis, President of Friends of Nelson, a group working to oppose Dominion’s pipeline.

Public comments filed with FERC under the Atlantic Coast Pipeline docket from those who attended the meeting in Stuart’s Draft or Nelson indicate that both evenings a pro-pipeline dinner was catered for supporters at the meeting venue starting at 5 p.m., thus encouraging supporters to sign up earlier than those not invited to the dinner.

“Sarah McKinley, the FERC external affairs officer, told me that sign ups to speak would start ‘shortly before 7,’ but they actually were opened hours earlier than that,” says Salidis, speaking specifically of the Nelson meeting. “People who showed up shortly before 7 were too far back in the line up to speak. Pro-pipeline supporters signed up more than an hour before the meeting began, allowing them to dominate the first hour of the meeting, when the media was present, and skewing the numbers heard in favor that evening because supporters were not randomly distributed. Not a single person after the first 20 spoke in favor of the pipeline.”

At the Nelson meeting, 203 people signed up to speak, but time allowed for only 78 to provide comments. Two hundred and three is an underestimation of the number of people who would have liked to speak, because workers at the sign in table told potential speakers that they would be unlikely to be heard due to time constraints.

Public comments filed with FERC also make it clear that some people were allowed to sign up others to speak while other people were not allowed to sign up anyone but themselves. For example, Susan McSwain, a Nelson County resident, commented that she spoke to a pipeline supporter she knew the day following the meeting to ask why his name had been called to speak, but he did not step forward. He responded that he had not gone to the meeting at all. However, when she tried to sign up someone who was coming to the meeting later, she was told that no one was allowed to sign anyone else up to speak.

“If this sham of a meeting is any indication of what FERC thinks of the public, then (FERC) should be disbanded, ” she says in her comment to FERC. McSwain further states “Public meetings engage a broader segment of the public than input limited to written comments. They are particularly important for those, like many in Nelson, without internet access. Public meetings like the scoping meeting are also essential for community members to hear and learn from each other. They are vital to a transparent process. Written comments are no substitute. FERC should schedule an all-day Meeting in Nelson to allow anyone who was denied the opportunity to speak on March 18<sup>th</sup> their right to speak.”

Many property owners on the proposed path of the pipeline were very angry that so many were unable to speak, particularly in light of the apparent bias towards pipeline supporters. “I told a FERC representative that night, David Hanobic, that FERC needed to provide a second public meeting for those who wished to speak,” Salidis continued. “He said that we were lucky to get a

public meeting at all since the National Environmental Policy Act that governs the scoping process does not mandate public meetings and some government agencies don't offer them. When I responded that those agencies don't have the extraordinary power of eminent domain, he claimed that FERC didn't either – rather they just gave that authority to transmission companies like Dominion. As a property owner on the path of the proposed pipeline threatened with the forcible taking of my property, I really resent this attempt to dodge taking responsibility for the power they yield over property owners.”

Friends of Nelson continues to call on FERC and legislators to support a fair, thorough, transparent public process by extending the scoping period, offering another scoping meeting, and rigorously analyzing both the proposed pipeline's need and alternatives. Friends of Nelson had filed comments with FERC in early March asking for an extension of the period and a postponement of the meeting due to the fact that over 100 property owners in Nelson had been put on the route a few days before the period and meeting were announced. They have also sent letters to legislators asking that they weigh in with FERC to support these requests. “We hear a lot from FERC about their role in ‘mitigating’ impacts – but what we want is a process that honestly weighs public benefit against harm. Nelson and Augusta's scoping meetings are a perfect example of why we cannot assume this will happen,” says Ernie Reed, of Friends of Nelson. “Legislators have the responsibility to hold FERC accountable.”

In response, Virginia Senator Mark Warner has sent a letter to FERC Chairman LaFleur questioning its policies and procedures (see attached). And in Augusta County, the Board of Supervisors has passed a resolution petitioning FERC to hold a second public meeting at which all citizens' voices can be heard.

“The FERC's shameful display of contempt for public participation at the scoping meeting last week shows that we need help to be heard,” says Sharon Ponton, Blue Virginia blogger and an organizer with Free Nelson, a second group fighting for justice in Nelson. “We've asked our legislators for specific help, and we don't want back platitudes and form letters. The meeting really highlighted that the process is stacked against landowners and communities. ”

###

**From:** Joanna Salidis [mailto:[josalidis@gmail.com](mailto:josalidis@gmail.com)]  
**Sent:** Tuesday, March 24, 2015 11:53 AM  
**To:** Barbash, Nick (Kaine)  
**Subject:** Sen. Kaine's response re Atlantic Coast Pipeline

FERC's scoping meeting in Nelson was more of a sham than I ever could have imagined. Surely, the Senator has heard about it by now? That 203 people signed up to speak but only 78 were heard? That I was told by Sarah McKinley a FERC representative who you get when you call for public information that sign ups would start "a little" before 7, when they actually started at the latest at 5? That Dominion catered a dinner for supporters only, starting at 5? That 17 of the first 20 speakers were pro-pipeline, the only pro-pipeline speakers of the evening? That the media, of course; left after those first 20 speakers and thus, of course, reported completely inaccurate public sentiment? That pro-pipeline supporters were allowed to sign others up to speak who were not present but those on our side were told that you had to sign yourself up?

I know all these things are true. I have names and details. This is not hearsay. Any actual investigation would uncover these facts and no doubt more and worse. I would not be even slightly surprised if FERC reps were at Dominion's dinner. Maybe these things are not illegal, but do they sound like a company being open and forthcoming to you? Does it sound like they are being responsive to landowners and other residents? Forget about Dominion, does it sound like FERC is interested in the public's feedback?

Here are write ups of FERC's fiasco, oh, I mean scoping meetings in Nelson and Augusta:  
<http://www.gettingmoreontheground.com/2015/03/23/chuck-bubbas-corruption-and-the-atlantic-coast-pipeline/>  
[http://www.newsadvance.com/nelson\\_county\\_times/news/frustrations-continue-after-meeting-on-atlantic-coast-pipeline-project/article\\_ac9407a2-ce88-11e4-ab80-23fe38d5ee3e.html](http://www.newsadvance.com/nelson_county_times/news/frustrations-continue-after-meeting-on-atlantic-coast-pipeline-project/article_ac9407a2-ce88-11e4-ab80-23fe38d5ee3e.html)  
<https://www.popularresistance.org/rubber-stamper-ferc-dominion-shills-in-nelson-county/>

Finally, I wrote the following on Friends of Nelson's Facebook page about an interaction I had the evening of the scoping meeting with FERC representative David Hanobic:

"How does FERC's failure to provide a fair, transparent public venue for public comments and enough time in the scoping period jeopardize our rights? FERC wields the extraordinary power of eminent domain. They declare that our property is forfeit due a greater public interest. Without adequate process to weigh harm vs. benefit, eminent domain is pure theft. THEY ARE NOT TAKING THEIR RESPONSIBILITY SERIOUSLY. At Nelson's meeting, I told a FERC rep. that I was angry that so few of those who signed up would be heard. He replied that we were lucky to have a public meeting at all because it is not required under NEPA and plenty of agencies have the scoping period without the meeting. This alone is a shocking response- to tell me as a person whose property is forfeit that I am LUCKY to be heard in public?! I challenged him with the fact that those other agencies do not have the power of eminent domain. Then he said - FERC doesn't yield the power of eminent domain. When I cited the Natural Gas Act, he backed down a bit and said - well, yes, we issue the certificate of public convenience and necessity that gives DOMINION the power of eminent domain - but THEY have the power, not us. CAN YOU IMAGINE A LAMER DODGE OF RESPONSIBILITY THAN THIS?"

I would add that, up to this point, I have also seen no evidence that Sen. Kaine is taking his responsibility to protect our rights seriously.

I want to hear whether or not Senator Kaine intends to file a request with FERC to extend the scoping period, as I originally requested and which is still critical. I also urge the Senator to show that he is serious about standing up for his constituents by requesting that FERC provide a second scoping meeting, given the

**public's justified feeling of being treated like second class citizens at a public meeting meant to hear our concerns.** I am perfectly aware, by the way, of the purpose of the scoping period, precisely, so please do not respond with FERC or Dominion provided pablum that 1) FERC will accept comments after the scoping period is over or that 2) written comments are just as good as verbal comments or that 3) we can always intervene later - because - 1) we prefer not to rely on their good intentions but rather the law and considering comments does not mean that the comments will be used to help define the scope of the EIS 2) public forums are provided for a reason and are important for numerous reasons which I really hope I don't have to explain and 3) intervening is a completely different step with a different function than scoping.

The time to "monitor" is over. We now have joined the growing chorus with our own evidence that FERC doesn't work. Is the Senator interested in facilitating communication and ensuring a fair, thorough, process that actually protects the public, or not? If he is, I expect SOME action that indicates his interest in his constituents. In addition to the extension of the scoping period, and another meeting, there is also the issue of getting to the bottom of whether the pipeline is actually necessary (see <http://breakingenergy.com/2015/03/20/reducing-carbon-pollution-from-the-power-sector-without-building-hundreds-of-miles-of-new-pipelines/>), what it will actually be used for, and pushing Dominion to use existing rights of way. They will never use existing rights of way unless someone forces them to because it may cost more and limits their expansion plans. Jim Norvelle said today "“But oftentimes, [using existing ROW] is not feasible,” said Norvelle, citing potential problems with soil conditions and prohibitions by the owners of the existing rights of way to sharing their use." in [http://www.dailyprogress.com/news/local/pipeline-opponents-take-ad-campaign-to-another-level/article\\_2da8962c-d0f1-11e4-bb69-ff88a277a657.html](http://www.dailyprogress.com/news/local/pipeline-opponents-take-ad-campaign-to-another-level/article_2da8962c-d0f1-11e4-bb69-ff88a277a657.html)

Now, you tell me, does it make any sense that they can take my property without my permission but they can't take the property of those who already have easements?

Please help. Again, I would like to know the Senator's response. What real thing will he do to help?

PS.

Given the Senator's interest in "monitoring" the situation, he may want to read some of the comments his constituents prepared for the scoping meeting, here:

<http://friendsofnelson.com/ferc/ferc-scoping-meeting-comments/>

And here's a detailed comment to FERC about our scoping meeting: [http://elibrary.ferc.gov/idmws/file\\_list.asp?accession\\_num=20150324-5002](http://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20150324-5002)

Thanks,  
Joanna

**People's Dossier: FERC's Abuses of Power and Law**  
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**Public Participation Undermined Attachment 25,**  
“Draft for Maya” describing the difficulty in navigating  
the FERC website.

## **Some Examples Where FERC has Failed the Public in the NED Project**

FERC uses policy statements developed 17 years ago to guide its decisions on whether the public benefit of a pipeline justifies environmental risks, health risks, and eminent domain takings. These policy statements presumed a domestic gas shortage, when in fact there is now a glut. This practice suits the interests of entrenched energy interests who want unlimited approvals of capacity requests, but not the public interest.

The pre-filing process which FERC created 10 years ago is being used improperly by Kinder Morgan in its NED proposal in an attempt to simultaneously plan its project in parallel with the approval process. FERC seems unfazed by KM's obvious abuse of the pre-filing process.

KM launched its NED process in secrecy, making unannounced home visits to individual owners without notifying any public officials of its plans. These visits were often threatening. When project managers began public outreach, they presented misleading information. For example, they showed pictures of 6,000 HP compressor stations when their proposals were for up to 120,000 HP. Nine months after the NED project surfaced locally, KM officially requested to use the pre-filing process. On November 5, 2014, KM loaded reams of required information onto FERC's antiquated website. They submitted their desired routes on topographic maps from the 1980's. They merely estimated where compressor stations might be located and did not notify landowners within the ½ mile of those locations as required. Yet, FERC defended the lack of transparency because the pre-filing process was "voluntary."

Less than one month after publishing its preferred route, KM substantially revised it, moving a large swath of the pipeline's "market path" north from Massachusetts into New Hampshire, with a completely new set of stakeholders. This was a surprise to New Hampshire, and presumably to FERC, but not to Kinder Morgan investors. Richard Kinder had talked about such a move to investors during October, before the first reports were even released. FERC did not require KM to refile.

Kinder Morgan touts that their new route uses primarily existing rights of way. In truth, this route will require a completely new ROW corridor to be obtained beside the 77+ miles of powerline easement across southern NH. Along this corridor NED will double the width of intrusion into private property and public conservation lands with associated destruction of forests, wildlife habitat, wetlands and water resources, and privacy. FERC continues to allow Kinder Morgan to misrepresent the truth.

FERC made formal requests to Kinder Morgan for more information beginning in February 2015 in anticipation of Resource Reports to be released in March 2015. Many of these requests were still unanswered when FERC made even more requests in May. In July, Kinder Morgan's reports were still filled with "TBD" (to be determined) in places where critical information is required. Yet FERC continued with the next step of the pre-filing process by scheduling scoping sessions, even in the absence of this information.

Pre-filing regulations specify that the applicant must respond to all issues raised at scoping sessions within 14 days of the end of the scoping comment period. This period ended on October 16, 2015. Kinder Morgan provided NO responses in the required time. The first responses Kinder Morgan offered

were with its formal application on November 20, where it indicated it would be late December before they responded to comments made after October 1. Even in its December 21 responses, KM appears to have been selective about which comments to address. FERC has not held KM to any deadline, and has not pushed them to respond to the comments as its regulations require.

Kinder Morgan's incomplete November application once again changed routes and changed compressor station locations, introducing yet another round of stakeholders into the process at this late date. On December 21, KM requested a waiver of landowner notification because it had failed to notify some stakeholders. As of this writing, FERC has not acted on their request.

The November 20 application continued with missing information. Kinder Morgan says this information will be provided in "supplemental filings." It has become apparent in public statements and in a December 30 filing that the application will not be complete until late April. Yet, despite protests from many, including the six affected Regional Planning Agencies in Massachusetts and New Hampshire, FERC accepted the application as "complete" and formally noticed it on December 7. It appears that FERC is not running the process, but rather that Kinder Morgan is running FERC.

FERC itself has failed to respond to comments and requests. Chairman Bay responds to requests from elected officials with boilerplate language. FERC has received repeated requests from elected officials, private citizens, municipal groups and conservations agencies, for a comprehensive review of all Northeast pipelines under consideration, but this request has been apparently ignored.

FERC's website is not designed for public access. It is bulky, cumbersome, and prone to crashes. It does not use plain language to ease navigation. It makes no attempt to make it simple for the average person to find what is needed, or to browse and select items for closer examination. Incredibly, the "automated" website was down without public notice for both long weekends over the holidays while the public was anxious to meet a January 6 intervention deadline. In the realm of technology, FERC gives no consideration to the important role of the public.

Remarkably, although NEPA requires that FERC conduct this "open" process for review of environmental impacts, FERC has no such public process to address the counterbalancing question of need. Public discussion of "public necessity" appears limited to considering the "no action alternative" as part of the environmental review process. Kinder Morgan provides self-serving, broad discussions of need in the application materials. They quickly dismissed the MA Attorney General's comments which included results of an independent study which refuted KM's estimate for gas needs of the electric generating market.

The lack of transparency regarding need is indefensible given the tremendous issues at stake for the country. The U.S. Energy Information Agency predicts the US will become a net LNG exporter within the next 24 months. Public interests demand attention to issues unaddressed in FERC's 1999 policy statements. These include climate change, shale gas extraction, the potential impact of natural gas exports on American energy prices, the emergence of conservation and renewable technologies to address the nation's energy needs, and the critical question of whether private land can be taken by eminent domain in the absence of clear public benefit.

**A few more of our favorite things to mention, but not *directly* NED.....**

When the FERC Need policy was approved Google had 8 employees. There were no thumb drives, no wifi, no smartphones. Deregulation was all the rage. Enron, poster child for deregulation, participated actively in the development of the Policy Statements. Richard Kinder was once President and COO of Enron. He started Kinder Morgan with the purchase of Enron Liquid Pipelines.

A recent DOE study concludes “While selling natural gas at higher prices on the world market would increase profits for U.S. gas producers, the narrowing of the price gap between the United States and the rest of the world would erode some of the benefits that have accrued to U.S. consumers and manufacturers.”

FERC has more power than the President in its assigned realm. Although most Americans aren’t even aware of its existence, the decisions it makes today, with essentially no oversight, have significant implications for the American people for years to come. FERC actions to enable unbridled markets for natural gas will have far-reaching effects on climate change, national security, and the country’s fossil fuel reserves. FERC’s decisions will arguably increase the price of energy in America in the wake of natural gas exports, thwart emerging conservation and renewable energy technologies, and institutionalize the practice of taking private land by eminent domain even absent clear public benefit.



**People's Dossier: FERC's Abuses of Power and Law  
→ Public Participation Undermined**

**Public Participation Undermined Attachment 26,  
FERC Notice of Public Comment Meeting Location  
Change, PennEast Pipeline, LLC., August 5, 2016.**

UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

PennEast Pipeline Company, LLC

Docket No. CP15-558-000

NOTICE OF PUBLIC COMMENT MEETING LOCATION CHANGE FOR THE  
PROPOSED PENNEAST PIPELINE PROJECT

(August 5, 2016)

The staff of the Federal Energy Regulatory Commission is providing this notice of a change in the location of public comment meetings for the PennEast Pipeline Project. Since issuance of the *Notice of Availability of the Draft Environmental Impact Statement for the Proposed PennEast Pipeline Project* on July 22, 2016, the Commission staff was notified that The Grand Colonial in Hampton, New Jersey and the Clifford B. Martin Memorial Hall in Ewing, New Jersey are no longer available for the public comment meetings previously scheduled for August 16 and 17, 2016, respectively. Please take note that the public comment meetings are now scheduled at the following alternative locations at the same date and time as previously scheduled.

<b>Date and Time</b>	<b>Location</b>
Tuesday, August 16, 2016 6-10pm	Holiday Inn Clinton-Bridgewater Hunterdon Ballroom 111 W Main Street Clinton, NJ 08809 Phone: (908) 735-5111
Wednesday, August 17, 2016 6-10pm	Patriots Theater at War Memorial George Washington Ballroom 1 Memorial Drive Trenton, NJ 08608 Phone: (609) 984-8484

All other public comment meetings will be held as listed in the Notice of Availability issued on July 22, 2016.

Nathaniel J. Davis, Sr.,  
Deputy Secretary.

**People's Dossier: FERC's Abuses of Power and Law  
→ Public Participation Undermined**

**Public Participation Undermined Attachment 27,**  
Letter from Kingwood Township to FERC, September 11,  
2016.

# TOWNSHIP OF KINGWOOD

Environmental Commission Meeting:  
Fourth Tuesday of Each Month – 7:30pm  
Municipal Building:  
Corner of Rt. 519 & Oak Grove Rd.  
Fax: (908) 996-7753



Address Reply To:  
Cynthia Keller, EC Secretary  
P.O. Box 199  
Baptistown, NJ 08803-0199  
Phone: (908) 996-4276

Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street Northeast, Room 1A  
Washington, DC 20426

Re: Docket CP15-558-000 – Proposed PennEast Pipeline Project  
Request withdrawal of DEIS and/or extension of comment period

September 11, 2016

Dear Ms. Bose,

The Kingwood Township Environmental Commission is submitting these comments in opposition to the proposed PennEast Pipeline Docket CP15-558-000. Kingwood Township Environmental Commission is an intervenor in this matter and Kingwood Township is an impacted landowner on the proposed route. Both the construction and the long term functioning and maintenance of this pipeline would put our environmental and cultural resources and human health and safety at risk.

**The draft Environmental Impact Statement (DEIS) released by FERC on July 22, 2016 does not accurately describe Kingwood’s natural and cultural resources or evaluate the potential impacts and risks to the environmental and human and safety. It does not fully evaluate alternatives, including route changes that would avoid our sensitive resources or renewable energy and energy conservation. Therefore, it does not fulfill FERC’s NEPA obligation.**

A preliminary review of the DEIS reveals the FREQUENT admission that PennEast has not completed multiple (at least 80) required studies and analyses. We have previously submitted many comments to PennEast and FERC through the pre-filing and filing processes and it is apparent that this information has been ignored and our concerns have not been addressed in any substantive way. We have submitted our Environmental Resource Inventory to the Docket. \* We suggest this as a *starting point* for researching the environmental resources and evaluating the potential environmental impacts of the proposed PennEast pipeline project.

In each section, FERC’s DEIS then goes on to conclude in every instance, that, even though they have no information on which to make ANY conclusion, they determine that there will be insignificant impacts. Accurate conclusions CANNOT be drawn on incomplete, or rather non-existent information. The safety of our residents and our water supply; our economic, environmental and cultural resources; the value and use of our open space and farmland; and our residents’ constitutional rights to their property are at risk from this unneeded pipeline. Therefore, we insist that FERC withdraw the PennEast DEIS until

PennEast has completed and submitted the required studies. Stakeholders must then be allowed a reasonable time to evaluate them.

We want to express further dissatisfaction with FERC's disregard for its responsibility to provide access to its documents and the ability of the public to comment on such documents. A few hours after announcing the release of the Draft Environmental Impact Statement on July 22, 2016, the entire FERC website became non-operational. The FERC website remained inert until sometime Monday morning. This prevented the public from downloading these critically important documents for three days out of an already too-short 45 day comment period. For the majority of people who work weekdays, the loss of an entire weekend during which they may have dedicated time to the review of this obese document, is especially significant. From the beginning of this proposed project, citizens have often been frustrated by FERC's website's frequent malfunctions, which we find unacceptable and contrary to public interest. Even after that first weekend of the comment period, residents have continued to complain about being unable to access FERC website. One of the important requirements of NEPA is for a public input into the project.

In fact, we have found your entire process for public discourse to be lacking. The public hearings on the DEIS were scheduled only three weeks after most people could even obtain a copy of the document. Public participation was further thwarted by the strange "public meetings" which were not operated in public, but instead took people one by one to speak to support staff holding a recording device, instead of in a public forum in front of our peers and FERC staff who we actually wanted to communicate with. We did not feel as if our concerns were being heard.

Furthermore, PennEast filed an additional 300+ page filing, August 8, 2016, which is 18 days after the submission of the DEIS and more about a week ago. The 45-day public comment period was already insufficient for a thorough review of the 1200+ page DEIS. We request that FERC extend the public comment period by at least 60 days to permit a more reasonable time period for stakeholders and their experts to review and comment on this high volume of material.

In conclusion, FERC must withdraw the DEIS immediately, wait for PennEast to submit all the necessary documentation and studies, and re-release the DEIS after making an unbiased evaluation of all the information. FERC must ensure that the public has access to the online functions of downloading and submitting documents to the docket; and finally, at a later date after release of a completed DEIS, the comment period must be adequate and fair to the people whose land PennEast proposes to condemn. If a situation again occurs where substantive changes or information are made available after the start of the comment period, the clock must re-start to allow evaluation of this new information on top of the prior submittal.

Thank you for your full consideration of Kingwood Township's comments.

Sincerely,

**The Kingwood Township Environmental Commission**

CC: Kingwood Township Committee  
Congressman Leonard Lance  
Senator Robert Menendez  
Senator Cory Booker

Assemblyman John DiMaio  
Assemblyman Erik Peterson  
Senator Michael J. Doherty  
Hunterdon County Freeholders

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\* Kingwood Township Environmental Commission. 09/25/2015. *Comment of Kingwood Township Environmental Commission on Resource Reports 1, 4, 5, and 10 under PF15-1*. Submittal 20150925-5008 to FERC DOCKET PF15-1. <http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13995592>

**People's Dossier: FERC's Abuses of Power and Law  
→ Public Participation Undermined**

**Public Participation Undermined Attachment 28**, Jim Levulis, Rosenberg: Gas Pipeline at Odds with State's Energy Goals, WAMC Northeast Public Radio, January 5, 2016.

# Rosenberg: Gas Pipeline At Odds With State's Energy Goals

By [Jim Levulis](#) • WAMC Northeast Public Radio, Jan 5, 2016

Massachusetts Senate President Stan Rosenberg is asking federal energy regulators to take into consideration the state's efforts to reduce greenhouse gases as they review a proposed natural gas pipeline.

In a letter to the Federal Energy Regulatory Commission, Rosenberg says he's concerned that Kinder Morgan's Northeast Energy Direct pipeline through southern New Hampshire and western Massachusetts could set back those efforts.

Rosenberg pointed to the state's 2008 Global Warming Solutions Act, which calls for reducing greenhouse gas emissions between 10 percent and 25 percent below 1990 levels by 2020.

The Amherst Democrat says Massachusetts is instead trying to increase the availability of solar power, off-shore wind turbines, hydropower and other technologies to meet future energy demand.

FERC is currently accepting public comment on the \$5 billion project until Jan. 15th after being extended following a FERC website malfunction. The previous deadline was Jan. 6.

Click [here](#) for WAMC's continuing coverage of the Northeast Energy Direct Project.

*Information from The Associated Press was used in this report.*

<http://wamc.org/post/rosenberg-gas-pipeline-odds-states-energy-goals>

**People's Dossier: FERC's Abuses of Power and Law  
→ Public Participation Undermined**

**Public Participation Undermined Attachment 29,**  
Delaware Riverkeeper Network letter to FERC  
concerning Millennium, May 15, 2016.



May 15, 2016

Ms. Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E.  
Washington, D.C. 20426

Michelle Hook, Director of Public Relations  
Millennium Pipeline Company, LLC  
One Blue Hill Plaza, 7th floor  
PO Box 1565  
Pearl River, NY 10965  
**VIA EMAIL:** hook@millenniumpipeline.com

RE: Millennium Eastern System Upgrade Project, PF16-3

Dear Ms. Bose and Ms. Hook,

The Delaware Riverkeeper Network is troubled that the Millennium Pipeline Company (Millennium) has not fulfilled its community outreach obligations as mandated by the Federal Energy Regulatory Committee (FERC) process regarding the proposed Eastern System Upgrade project, and that Millennium is failing to honor the written and verbal commitment to address these issues through a more appropriately accessible and informative public meeting.

**Millennium has failed to fulfill its Pre-Filing obligation regarding public outreach; this is a failing that must be remedied.**

As outlined by FERC under the *Pre-filing procedures and review process for LNG terminal facilities and other natural gas facilities prior to filing of applications*, 18 C.F.R. § 157.21, applicants are required to conduct open houses and meetings with all affected stakeholders during the pre-filing process. The intent and purpose of the this process, as further explained in FERC's Suggested Best Practices for Industry Outreach Programs to Stakeholders, is to "engage ... stakeholders to identify and resolve issues at the earliest stages of project development," and to do so through "constructive discussions about potential issues and environmental concerns."<sup>1</sup>

In an attempt to fulfill its open house obligation, Millennium Pipeline Company held three consecutive open houses during the week of March 28<sup>th</sup>, 2016 in the three counties facing the brunt of the proposed upgrade project's impacts. But Millennium's absolute failure to make available full and accurate information during the open houses, its failure to have staff available that were able to provide full and accurate answers to questions, and the fact that many Millennium representatives provided false, misleading and inaccurate information over the course of each and every open house were a clear, obvious and intentional failure to fulfill the letter and spirit of the open house obligation.

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<sup>1</sup> Federal Energy Regulatory Commission (FERC). July 2015. Office of Energy Projects, Division of Gas Environment and Engineering, *Suggested Best Practices for Industry Outreach Programs to Stakeholders*.  
<https://www.ferc.gov/industries/gas/enviro/guidelines/stakeholder-brochure.pdf>.

When the Delaware Riverkeeper Network and others in attendance objected to the inaccurate, false, misleading, and lack of information during the course of the open houses and requested that a public meeting at which knowledgeable Millennium staff and materials would be available to provide full and accurate information regarding the proposal and its impacts, and that Millennium representatives present would be able to fully and accurately answer all questions asked, Ms. Hook assured us that such a meeting would be organized and forthcoming in order to remedy the obvious and video recorded deficiencies of the original open houses.

Specifically, we had requested and Millennium's representative Ms. Hook had preliminarily agreed that the company would organize and hold a new public meeting that would: 1) include appropriate experts who could clearly and accurately answer the public's questions in regard to the project and its environmental and health impacts; 2) be held at a location that was accessible to those living nearby the proposed compressor station site in Highland, NY and at a venue that can accommodate the large number of stakeholders affected and concerned by the many aspects of the Eastern System Upgrade Project including its environmental and health impacts; and 3) be conducted so as to provide clear and cohesive information to a large public audience through powerpoint presentations and Question & Answer sessions.

This commitment illustrated a seemingly good faith effort on behalf of Millennium to fulfil FERC's pre-filing obligations and Suggested Best Practices for Industry Outreach to Stakeholders and to respond to the concerns of affected stakeholders. We have now learned that this commitment to remedy the failure to fulfill the open house obligation has been rescinded.

Millennium has now stated that it would rather meet with smaller groups in smaller venues than have a larger public event.<sup>2</sup> This strategy does not properly fulfill the public outreach obligation. Meetings with smaller groups in smaller venues would create the same deficiencies and problems that affected stakeholders have identified in the failed open house meetings—if not more so:

- There will more likely be a lack of appropriate experts. Appropriate experts were not available to answer questions at the open houses. It is highly unlikely that appropriate Millennium experts will repeatedly travel to the project area for multiple small meetings.
- They result in a lack of accountability to stakeholders. When experts are not held accountable by large public groups, as well as fellow peer experts, answers can more easily be false—as is demonstrated by the misinformation and contradictory information given at the open houses. As a result, public understanding is not increased and concerns are not addressed, but instead stakeholders are left more confused or frustrated, or falsely placated by inaccurate information. There is no “narrative consistency,”<sup>3</sup> as one commenter put it.
- Information is diffused. Even if a valuable answer is given, it is only given to one person or a small group of people at a time. The public cannot benefit from the questions and answers of their fellow affected stakeholders. In a large, inclusive public process, different stakeholders will bring different levels of understanding and different concerns to the table, allowing all to benefit from the cohesive process. This allows for more accurate and efficient exchanges and dissemination of information, for both the stakeholders and the company experts.
- Such events are less accessible in that they require individuals to have the knowledge and capacity to request and organize such a meeting; and/or for individuals to become aware that the small, closed meetings are happening and find the appropriate contact to secure the right to attend.

<sup>2</sup> Email correspondence from Michelle Hook to Maya van Rossum on April 22, 2016.

<sup>3</sup> Comment provided to DRN by local resident who attended the March 31<sup>st</sup>, 2016 open house.

The request, for one large public meeting, held in a question and answer format and moderated by a local party—to which you have previously committed—is not at all unusual or above and beyond industry best practices. FERC’s *Suggested Best Practices for Industry Outreach Programs to Stakeholders* states that:

Stakeholders routinely request that the companies themselves hold a formal question and answer meeting to address their questions during the early stages of a project. Commission staff believes this is beneficial. Often a local elected official or a local agency will conduct these meetings; the company and FERC staff may attend to answer stakeholder questions, as appropriate. These types of meetings are generally productive when hosted and moderated by a local entity acting as/serving as a neutral party.<sup>4</sup>

In a recent letter sent on behalf of Millennium to FERC, the company claims that “Millennium’s Open Houses, and the notices it provided thereof, were fully consistent with—and exceeded—the Commission’s pre-filing regulations and its Suggested Best Practices for Industry Outreach Programs to Stakeholders.”<sup>5</sup> However, the recent retreat on your commitment to hold such a meeting is evidence that Millennium is not, in fact, acting in a way consistent with or at all in exceedance of FERC’s suggested best practices, as they claim.

The federally regulated pre-filing procedures to engage all stakeholders in a timely manner, early on and throughout the pre-filing process, exist for a reason. The proposed project has serious implications for the economic, psychological, and general wellbeing and health of stakeholders who own property in proximity to the proposed project sites; who regularly breath the air or rely on the water in the Delaware River Watershed that will be polluted by the construction, constant emissions, and inevitable leaks that the project would bring; or those who are concerned for the extremely delicate endangered species and habitats that the project would disturb. Because the stakes faced by affected parties are so great, it is both a moral responsibility and a federally regulated obligation to properly engage stakeholders and accurately inform them on the project.

We send this letter to FERC to demand that you enforce the open house obligation with regards to the Eastern System Upgrade Project and to urge Millennium to honor its commitment to provide this remedy in the format discussed verbally and via email as described above.

In the absence of such a remedy the regulatory obligation for open houses remains unfulfilled.

**Comments submitted to the Delaware Riverkeeper Network document the many deficiencies of the Millennium Open Houses and its failure to fulfill its public outreach obligation.**

The Delaware Riverkeeper Network (DRN) represents, through our members, a significant portion of stakeholders who stand to be affected by the proposed project. As such, we have received comments from members and concerned citizens expressing their frustration, concern, and confusion resulting from the open houses. In addition to the comments submitted to DRN that are referenced in this letter, several comments in the same vein have also been submitted to the docket by individuals following the open houses, as well

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<sup>4</sup> Federal Energy Regulatory Commission (FERC). July 2015. Office of Energy Projects, Division of Gas Environment and Engineering, *Suggested Best Practices for Industry Outreach Programs to Stakeholders*. <https://www.ferc.gov/industries/gas/enviro/guidelines/stakeholder-brochure.pdf>.

<sup>5</sup> Millennium Pipeline Company, LLC. April 13, 2016. Letter to FERC Re: Millennium Pipeline Company, L.L.C., Docket No. PF16-3-000; Response to Comment on Inadequate Notice for Open Houses.

those who submitted directly to FERC at the open houses.<sup>6</sup> For the record, the following comments characterize the experiences of many who attended to the Open Houses held to date.

**The “station” format of open house meetings diffuses information and confuses stakeholders.**

One of the primary complaints heard from affected stakeholders who attended the open houses is of the “information station” format of the meetings, as Millennium refers to it in their Public Participation Plan<sup>7</sup>—where Millennium employees, contractors, and FERC representatives are spread throughout a room, talking one-on-one or with small groups to stakeholders. The issues identified with the format range from noise issues to being continuously redirected to other staff, which ultimately leads to a confusing, inefficient process in which there is no accountability for Millennium staff to provide accurate, consistent answers—if any. This experience was not the exception, but the rule, as can be seen in stakeholders’ comments on the meeting format:

The noise level in the room was so loud that I could not hear unless uncomfortably up against the speakers; who all seem to be speaking in soft voices.

– Stakeholder who attended the Sullivan County open house

The "open house" forum does not facilitate having questions answered—if that is FERC's intent. Millennium personnel often said that another staff person was the appropriate party for the question. [It was] too noisy at times for a meaningful conversation. Despite two hours, [there was] inadequate opportunity to have anywhere near all questions responded to. Far better for the community would be to have a panel of Millennium personnel and the opportunity for all attendees to ask and also hear each other's' questions and the responses thereto.

–Karen London; Smallwood, NY

The forum should have been a Q&A with experts in the field answering questions from a concerned public. The convention-style format diffused the information.

– Stakeholder who attended the Sullivan County open house

The outreach meeting has to be completely redone. The forum was a trade show format; it was passive. It was not a full, open presentation of the project by the pipeline company. There was not narrative consistency; and answers were repeatedly argued away 'we'll get back to you on that'; 'go ask so and so, they might know the answer.'

– Stakeholder who attended the Sullivan County open house

**The absence of qualified experts at open house meetings led to a lack of information, misinformation, and contradictory information.**

In conjunction with the format of the open houses, the lack of qualified experts with awareness and understanding of the specific project and local realities led to Millennium’s inability to answer stakeholders’ questions at all in some cases, and to provide false information in others. Often, stakeholders received extremely different answers regarding basic information on the project from different staffers within the event. It was not uncommon for Millennium representatives to provide patently false information—like the assertion that the Highland compressor station would provide no emissions—and then when challenged by individuals with specific knowledge said it would provide very low emissions that were fully regulated (as was stated to a group of individuals, including the Delaware Riverkeeper Maya van Rossum, and recorded on video).

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<sup>6</sup>See Comments of Shawn Cahill, Docket No. PF16-3-000. Mar. 30, 2016; Comments of Teresia Parker, Written comments from the public at Open Houses for the Eastern System Upgrade Project (CP14-96) on March 30-31, 2016; Comments of Brandi Merolla, Docket No. PF16-3-000. April 21, 2016; among others

<sup>7</sup> Millennium Pipeline Company, LLC. January 2016. Draft Resource Report 1, Appendix 1E: *Public Participation Plan*.

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Many comments from stakeholders point to the inability of Millennium staff to answer questions at all or provide any information of value:

I was frequently told, "I don't have that information, but you can look on our website, or give me your email address"

—George Billard; Eldred, NY

I was either referred to others or my more difficult questions were answered evasively. I engaged the head of operations (he told me) very pleasantly in conversation...saying, truthfully, I had just moved to the area and had heard rumors about health problems at Minisink...did he know about this? He said he had heard about that but didn't know for sure. I said it sounded serious, with children experiencing nosebleeds, asthma et al, and I had heard people even abandoned their expensive homes because of the health problems associated with the compressor. He indicated he didn't know if that was accurate, but he had many times personally opened the valves for the blow-offs and he was fine. I asked him if he also stayed for any period of time in the near area as the residents do...of course not. His evasiveness led me to say to him that if I were head of operations, I would make it my business to find out the facts.

—Valerie Lucznikowska; Warwick, NY

Pipeline spokesperson to spokesperson gave vague answers to very specific questions. Not one Millennium representative had a business card on them for distribution making follow-ups impossible. I'd ask the same questions over and over and got varying answers each time.

— Stakeholder who attended the Sullivan County open house

Most of the people I talked to told me to talk to the FERC desk, which was stationed by what looked like three college interns. They handed out brochures and told us to leave comments. No one was able to provide accurate information on contaminants in the air.

—Jess Irish; Smallwood, NY

They were not [in reference to whether their questions were answered fully or accurately]. On numerous occasions throughout the presentation/event, pipeline representatives were engaged and pushed to answer questions directly. They consistently danced around specific queries. For instance, 'what exactly is in the emissions from a compressor?' General answer- its 'natural gas'. That is evasive and not an answer.

— Stakeholder who attended the Sullivan County open house

One commenter detailed his experience of receiving no meaningful information when asking straightforward, important questions about the basic operations of the proposed compressor station in Highland, and the ways in which the project would impact his health and safety:

I asked the "Community Outreach" staff person why Highland was selected as a "host" community when the town's zoning had clearly prohibited compressor stations. Even if local law is pre-empted, if Millennium is concerned about community acceptance, did it even review the town's zoning? He did not seem aware of this and responded that the engineers determined where the compressor station needed to be sited.

I noted that the towns have all-volunteer emergency personnel and unlikely to have the man-power, equipment and training to address fires or explosions at the proposed compressor station. The response was a generic "we will work with the local emergency services" to get adequate response. I was also told that Millennium has 32 emergency personnel for NYS but, when I noted that 32 for a state the size of NY did not seem adequate, Millennium personnel was unable to tell me how many of those 32

employees were within even an hour of Highland or how long it would take to get such personnel to our proposed site.

I also inquired whether Millennium has or will undertake modelling specific to this proposed site to determine emissions impacts taking into account topography, the nearby reservoirs and weather patterns (especially wind). I was told that was a good question and one that should be submitted to the FERC docket.

I inquired whether there will be infrared cameras installed that would provide the public with real-time web-based monitoring of emissions. I was told doing so might present a security risk (as if no one would otherwise know that a compressor station was sited there!) but that maybe local officials might be provided access and that, again, that should be submitted as a FERC comment.

We should know whether Millennium evaluated and adequately considered any alternative sites that would have enabled an electric compressor station. Millennium personnel only responded that an "electric compressor station would be worse" and would entail cutting down a lot of trees but without noting any particular alternative site evaluated.

We should secure all documentation on frequency and duration of blow-downs, scheduled and accidental, on Millennium compressor stations in particular and on compressor stations, in general, if that information is even compiled. John Arron (operations) told me that there is only one scheduled blow-down a year for maintenance and that only lasts a few minutes but then I heard of a partial blow-down scheduled in Hancock today and another full (annual) blow-down at Hancock scheduled for April 12th.

–Karen London; Smallwood, NY

This demonstrates a clear lack of awareness and understanding of the local, but vital, particularities of the project on the part of the “experts” on hand. Such knowledge of the project is necessary to engage in “constructive discussions about potential issues and environmental concerns”<sup>8</sup> It also demonstrates a lack of accountability of the company to its project stakeholders, when important questions are not answered but instead continually referred to the FERC docket. Most concerning, it reveals the contradictory and outright false information that was given to stakeholders—in this case in reference to the frequency and intensity of compressor blowdowns, information that is vital for the community in understanding the direct impacts of the project on their health and air quality.

### **Misinformation and contradictory information.**

Many other attendees point to instances of false or contradictory information given at the open house:

Many of the Millennium representatives were not actual employees, but outside contractors who did not have the information requested. In addition, there were several printed presentations that were deliberately misleading, that only through rigorous questioning were shown to be false.

–George Billard; Eldred, NY

Most spokespeople talked about the project like it was still in the conceptual stage, which is a outright falsehood. They have existing plans are far along in the process, planning to file in a matter of weeks. The most egregious lie was from the "Wetlands expert" who promised all of the water run off would be professionally treated. When I asked the planner about the ponds on the site plans, he explained those were standing pools with "vegetation" to do the treatment. I was shocked. For a parcel so close to both the Delaware River and several protected habitats, this is an outrage.

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<sup>8</sup> Federal Energy Regulatory Commission (FERC). July 2015. Office of Energy Projects, Division of Gas Environment and Engineering, *Suggested Best Practices for Industry Outreach Programs to Stakeholders*. <https://www.ferc.gov/industries/gas/enviro/guidelines/stakeholder-brochure.pdf>.

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–Jess Irish; Smallwood, NY

I asked how often Eldred should expect to experience blow-downs. Michelle Hook said once every 4-5 years while an operation manager said one time yearly was required, but when unforeseen problems arise, blow-downs can be done several times a year.

– Stakeholder who attended the Sullivan County open house

Here are some quotes I recall that I very much doubt are true: "emissions are almost 100% clean natural gas, like what comes out of your stove". That is an absurd statement, as gas is toxic and again the ratios are vague. "Millennium will be paying \$900,000" in local taxes." I find this hard to believe, especially as the company was just purchased by a Canadian company and will likely export its goods overseas. "All of the run-off water will be treated according to DEC standards." By a planting of vegetation around standing pools as diagrammed in their site plan? Please.

–Jess Irish; Smallwood, NY

The position/location map of the compressor had no roads indicated on it giving the impression it was in the middle of nowhere. Also Dr. Richard Malenky found the position dot to be incorrect. In either case I found this information useless and very deceptive... In the Air quality we were told that the facility would have zero (0) emissions. That is impossible, as even a single 100 hp automobile or lawn mower has emissions and a 22,400 hp machine has plenty... From another Millennium spokesperson, we were told that an emergency employee was within an hour away from any facility; And yet Millennium has no record of creating any local employees. According to the IDA, they have created no employees of the 17 they had promised. "

– Stakeholder who attended the Sullivan County open house

Another local resident felt misled when she was told by Millennium representatives that the proposed holding ponds naturally treated waste water and had no possibility of contamination—"This is very serious as this project is in a MAJOR watershed area. Spills/leaks from holding ponds could cause significant water quality impacts."

Many stakeholders who were able to attend the open houses took audio and video recording of the responses to document falsehoods and contradictory responses.

In Millennium's recent letter to FERC regarding the open houses, they stated that "at each Open House, Millennium staff was on hand to educate the public about the planned Project and answer all questions one-on-one from members of the interested public." It is clear, however, from the public's feedback, that the public did not feel educated or that all of their questions were answered.

### **The open house meetings were not accessible to affected stakeholders.**

It is impossible for Millennium to fulfill this obligation of informing stakeholders if the affected stakeholders are not able to access the meetings. The open house forum on March 31<sup>st</sup>, that was intended to focus on the proposed Highland compressor station, was held 30 miles north of the proposed site, at a time that many indicated was inconvenient for the daily realities of those affected. Millennium's poor choice of location and timing for the open house meetings further adds to the failure of the company in meeting its obligation. Those who were able to attend noted:

"The forum was far from town and very inconvenient. For people with families it was impossible as it was a school night during the dinner hour."

–George Billard; Eldred, NY

"The location of the open house put the local community at a huge disadvantage. It was very far away from the proposed compressor site itself. When asked about why this was the case, the PR woman said it was because she knew the community was already in opposition. Not a very "open" way to communicate with the affected community. While this may have made her job easier, it is a very disingenuous way to offer "information."

–Jess Irish; Smallwood, NY

The location was 30 miles from the proposed compressor station site and that dramatically limits attendance.

–Stakeholder who attended the Sullivan County open house

This presentation was simply too far from proposed site. If a project is going to happen in a township, the outreach should happen in that township—not approx. 30 miles away. Many people could not make it to the presentation due to distance/time.

– Stakeholder who attended the Sullivan County open house

In regard to the company's announcement and advertisement of the events—which were addressed in their April 13, 2016 letter to FERC<sup>9</sup>—we do not believe that they provided sufficient notice or adequate visibility of the event, or truly made a good faith effort to get the word out to all affected stakeholders, as demonstrated by comments made on the record already and additional comments submitted to DRN.

One attendee noted:

The "forum" was so poorly attended, I wonder what actual outreach they did beside one mention in the newspaper. Most of the people who attended were—although I moved here only a few months ago - people I recognised and knew to be opposed to the projects because of documented health risks.

–Valerie Lucznikowska; Warwick, NY

In addition, the Delaware Riverkeeper Network received a phone call the week after the open houses from a concerned landowner who believes that the proposed compressor station in Highland would be within sight of her family home. She had received no notice or information regarding the project or the open house meeting—and only found out about the project through the press regarding the opposition at the open houses. This is a clear violation of 18 C.F.R. § 157.21 (f)(3), which requires that all applicants using the pre-filing process, "Within 14 days [of pre-filing approval], contact all stakeholders not already informed about the project, including all affected landowners." Affected landowners are defined in paragraph § 157.6(d)(2) of the same section as including landowners whose property "Is within one-half mile of proposed compressors." FERC officially approved the Eastern System Upgrade project for pre-filing on February 5, 2016.

### **Adverse impacts of proposed projects are too serious to ignore.**

In regards to how the proposed project would impact them, commenters repeatedly mentioned concerns over air emissions and associated health problems for their families, real estate values in the township, impacts on local economy and tourism, and impacts on wildlife:

[I'm] concerned about pollution in the vicinity of my home and adverse impacts upon wildlife, property values and Sullivan County as tourism destination.

–Karen London; Smallwood, NY

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<sup>9</sup> Millennium Pipeline Company, LLC. April 13, 2016. Letter to FERC Re: Millennium Pipeline Company, L.L.C., Docket No. PF16-3-000; Response to Comment on Inadequate Notice for Open Houses.

As a resident of Tusten, I live 5 miles from the proposed site and I am very concerned with air quality and emissions in the local area for residents, wildlife and the planet.

– Stakeholder who attended the Sullivan County open house

Possibly my health and certainly the value of our property and quality of the community will all be downgraded. As they say Location, Location

– Stakeholder who attended the Sullivan County open house

One commenter expressed concern of the troubling impacts that nearby Minisink and Hancock compressor stations, also owned by Millennium, have had on the local community:

“The Millennium compressor in Minisink is causing health problems for that community. This has been documented, as have problems with air quality directly related to the Millennium compressor. In Hancock, residents living near the compressor have seen their property values plummet, and banks unwilling to finance sales. Our community is deeply dependent on 2nd homes and tourism, and we can ill afford to have this kind of negative impact on our health, real estate and public image as a nature destination. Despite the emphasis of 1/2 mile perimeter, the last time I checked air does not stay contained. Millennium refers to us as a "host community", but that implies that they were invited. They were not, and they are not wanted here.”

–George Billard; Eldred, NY

Two other stakeholders, who live within close proximity of the proposed Highland compressor station, pointed to concerns over the potentially intensified health impacts of compressor emissions on themselves and their family members—as children and people with asthma and other preexisting health conditions have been identified as being more vulnerable to emissions.

Myself, my wife and my daughter are in close proximity to the project. Further, my daughters school is in close proximity to this project. I have asthma by which I take medication daily. This project will NOT help that condition.

– Stakeholder who attended the Sullivan County open house

We live within five miles of the planned compressor, and already struggle with health issues such as asthma, headaches and skin cancers. We are very opposed to any industrial operation that would further compromise both our health and the beauty of the local landscape. This is why we live here!

–Jess Irish; Smallwood, NY

### **Millennium must fulfil its legal obligation and hold a large public meeting as promised.**

Millennium was approved for the pre-filing process for the expressed purpose, in the company’s own words, of facilitating “the early identification of affected parties and environmental issues and the timely resolution of concerns in consultation with Commission Staff and Project stakeholders.”<sup>10</sup> The purpose of the pre-filing process is not to avoid any differing of opinions and shield company employees from challenging questions—but rather to identify and address all concerns and issues before the application process begins. We do not believe the open houses held by Millennium have done this, nor were they opportunities for “constructive discussions about potential issues and environmental concerns.”<sup>11</sup> Holding several small meetings at small venues would not address these issues, and would not fulfill Millennium’s obligation or commitment to its stakeholders.

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<sup>10</sup> Millennium Pipeline Company, LLC. January 19, 2016. *Request for Pre-Filing Review*.

<sup>11</sup> Federal Energy Regulatory Commission (FERC). July 2015. Office of Energy Projects, Division of Gas Environment and Engineering, *Suggested Best Practices for Industry Outreach Programs to Stakeholders*. <https://www.ferc.gov/industries/gas/enviro/guidelines/stakeholder-brochure.pdf>.

These impacts that will result from approval of the Eastern System Upgrade Project are serious and significant. Irreversible impacts to the environment, harm to individual and family financial security, serious risk of illness, major threats to community safety and emergency response, and the resulting psychological harm from such threats cannot be ignored by Millennium and must be addressed in an open, informative public meeting. This is not only a moral responsibility, by an obligation federally mandated by FERC that Millennium has failed to fulfil—as demonstrated in this letter. As such, we expect that you will ensure that Millennium uphold the promise that was made to us and hold a large public meeting that resolves each of the issues we've explained here with the remedies we've described.

Sincerely,

A handwritten signature in blue ink that reads "Maya K. van Rossum" followed by a horizontal line.

Maya K. van Rossum  
the Delaware Riverkeeper

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