# Highland County

## and the Atlantic Coast Pipeline:

## Summary of Economic Effects

Key-Log Economics for Highlanders for Responsible Development

Revised May 2016

*"Highland is now an eclectic mix of native farm families and new residents drawn to the high quality of life"*

–Economic Development Authority of Highland County

## Highland County's Economy: What's at Risk

In Highland County, known as "Virginia's Switzerland" for its high mountain valleys, scenic beauty, and rural charm, residents depend on a clean and healthy environment to sustain a high quality of life. The Atlantic Coast Pipeline, which would run 25.5 miles in Highland, has triggered widespread concern over what the pipeline would do to the local community, land, and economy. This report describes the assets and conditions that may be at risk if the Atlantic Coast Pipeline were built and summarizes research on the potential economic impacts on land value, natural benefits, and key economic sectors in Highland County.

*Left to Right: Artists' Weekend; Dividing Waters Farm; Maple Festival*

## At a Glance:
## The Atlantic Coast Pipeline in Highland County

- Miles of Pipeline: 25.5
- Acres in the construction corridor and permanent right-of-way (ROW): 386 and 232
- Most impacted land cover type (ROW only): Forest (176 acres lost)
- Parcels touched by ROW: 59
- Parcels in the 1.4-mile-wide evacuation zone: 368
- Residents and housing units in the evacuation zone: 708 people and 519 homes
- Parcels from which the pipeline is visible: 1,945, or 38% of all parcels in Highland County
- Baseline property value at risk (and expected one-time cost due to the ACP):
  - In the ROW: $8.6 million ($361,000 to $1.1 million)
  - In the evacuation zone: $55.1 million ($2.1 million)
  - In the viewshed: $317.8 million (to avoid double counting with lost aesthetic value under ecosystem services, this effect is not separately estimated)
- Total property value effect lost: $2.5 to $3.2 million
- Resulting loss in property tax revenue (annual): $11,295 to $14,774
- Lost ecosystem service value, such as for water and air purification, recreational benefits, and others:
  - Over the two-year construction period: between $3.7 and $13.5 million (a one-time cost)
  - Annually for the life of the ACP: between $1.1 and $3.9 million
- Lost economic development opportunity due to the erosion of Highland County's comparative advantages as an attractive place to visit, reside, and do business. Under the scenarios described below, these could include:
  - An annual loss of recreation tourism expenditures of $1.5 million that would support 17 jobs, $311,700 in payroll, and generate $77,500 in state and $45,600 in local taxes
  - Annual loss of personal income of $137,000 due to slower growth in the number of retirees
  - An annual loss of personal income of $23,000 due to slower growth in sole proprietorships
- One-time costs (property value and ecosystem services during construction) would total between $6.2 and $16.7 million
- Annual costs (all other costs above) would range from $2.8 to $5.6 million

Note: For a number of reasons, these estimates are conservative and the actual economic cost of the ACP, if built, would likely be much higher. For further explanation of the concepts, methods, data, and assumptions behind these numbers, please see the technical report, "Economic Costs of the Atlantic Coast Pipeline to Property Value, Ecosystem Services, and Economic Development in Western and Central Virginia," available for download at keylogeconomics.com.

Home to the headwaters of both the James and Potomac River, Highland is a growing county with much to offer in western Virginia. Nestled in the Allegheny Mountains, Highland is bordered on the east by the Shenandoah Valley. The George Washington National Forest, Highland Wildlife Management Area, and several privately conserved parcels help maintain the county's natural beauty and historic areas, including the McDowell Battlefield. The Jackson, Bullpasture, and Cowpasture rivers are also among the county's outstanding water resources (Billingsley et al. 2015). This natural beauty offers a multitude of opportunities for outdoor recreation and a pastoral landscape perfect for the festivals Highland is known for, including the Maple Festival, which brings 50,000 visitors over the week-long celebration (Billingsley et al. 2015). These features contribute to and benefit from the county's beautiful, clean environment. They are also an important part of the county's economy, with faster employment and per capita income growth compared to Virginia's other rural counties.

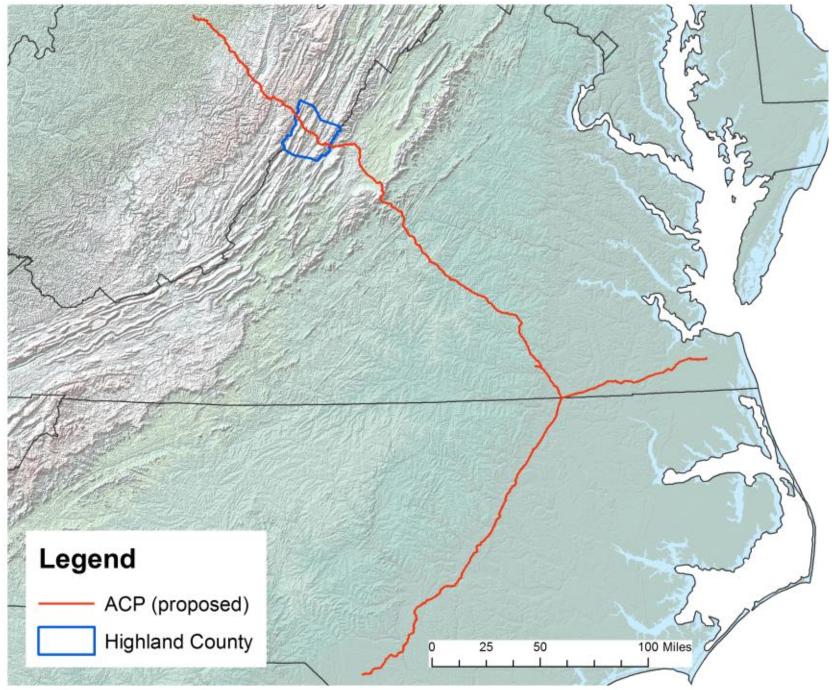


Figure 1: The route of the proposed Atlantic Coast Pipeline, which would bisect Highland County

While Highland is not growing in terms of overall population, recent trends indicate economic strengths consistent with a so-called "rural growth trifecta" – a combination of outdoor amenities, creative workers, and entrepreneurship (McGranahan, Wojan, and Lambert 2010). Together, these factors attract people who create economic opportunity that fits with the landscape and culture of the area.

**Recent Trends.** With 2,248 residents in 2014, Highland is Virginia's least populated county. That total is about 11% lower than in 2000, with the change due to both natural change (more deaths than births) and out-migration.[1] From 2000 to 2013, the population over the age of 65—often retirees or semi-retired persons who can choose where to live—grew from 20.4% to 32.3%.[2] That segment now comprises almost a third of the population, up from one fifth in 2000. Retirees bring their incomes and when they spend it they create opportunities for economic development.

[1] Unless otherwise noted, all employment, income, and population figures are from Headwaters Economics 2015; US Census Bureau 2013; US Bureau of Economic Analysis 2015.
[2] Age distribution data is the most recent available from the US Census Bureau.

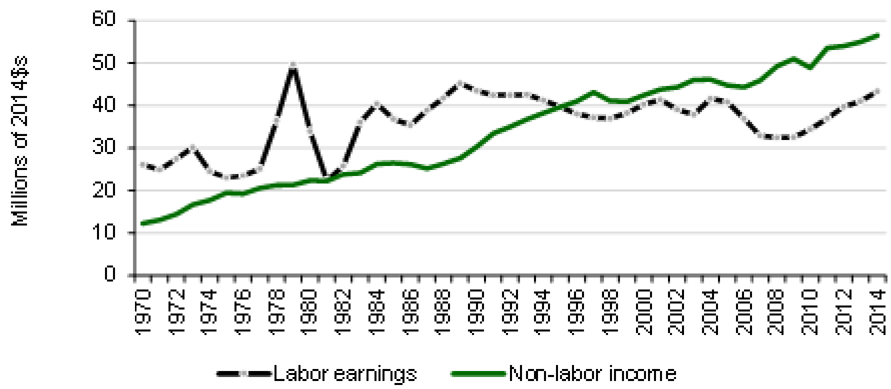


**Figure 2: Components of Personal Income, Highland County (Source: Headwaters Economics 2015, US Bureau of Economic Analysis 2015)**

Besides labor income (one's earnings from a wage-and-salary job), Highland residents also receive "non-labor income" in the form of earnings on investments (dividends, interest, and rent) and transfer payments, such as Social Security and Medicare. As a share of the total non-labor income now accounts for 57 out of every 100 dollars earned or received by Highland residents. This is nearly double the percentage from 1970. Since 2000, non-labor income rose 33.0% while labor earnings rose by only 7.6% (Figure 2).

This does not mean labor earnings are unimportant. Wages, salaries, benefits, and self-employment income still make up 43.4% of Highland residents' income.

Like retirees, entrepreneurs and small business owners in a variety of industries choose where they locate, basing their decisions on amenities and quality of life, rather than on access to input or output markets, or other traditional business concerns (Ray and Glick 1994). One indicator of this phenomenon in Highland is the growth in sole proprietorships. By 2014, Highland's 954 sole proprietors accounted for two thirds of the county's jobs, and their ranks had grown by 34.4% since 2000. Through 2013, however, the county lost population in all age brackets younger than 45, and gained the majority of population growth in the 65 and older age bracket. Taken together, these trends may indicate that some of the county's entrepreneurs may also be semi-retirees. The facts remain that Highland is attracting some new residents (and their incomes) and that the creative activity of residents is important to the county's economic vitality.

Travel and tourism are also an important and growing part of Highland's economy. Jobs in the industry—composed primarily of passenger transportation, arts, entertainment, recreation services, accommodation, food services, and portions of the retail sector—make up 18% of all private sector jobs in the county.

## Local Economy: Landscape Based Events

Highland County utilizes its environment as the backdrop for numerous events. For example, Artists' Weekend, held the last full weekend in June each year, offers artists from all over a place to gather to paint beautiful landscapes and historic barns and buildings. Artists have the opportunity to take in the subjects of their art during the days and then to gather as a community to showcase their work on Saturday evening.

Highland also hosts music events such as the Old Time Fiddler's Convention, which is in its fourth year, and the Blue Grass Valley Music Fest, which features local food and regional talent.

-Highland County Chamber of Commerce

Between 2010 and 2014, Highland saw a $960,000 dollar increase in traveler expenditures and a $90,000 dollar increase in travel related payroll (Virginia Tourism Corporation 2015).[3]

In addition to tourism, timber and agriculture are important natural resource-using industries in Highland. Timber accounts for a much larger share of private employment in the county than the average for non-metro Virginia, 6.4% vs 3.9%.[4] Similarly, agriculture accounts for 17.6% of all employment in Highland.[5] The average for non-metro Virginia, by contrast, is 4.2%. Both timber and agriculture rely on and contribute to Highland's healthy natural landscapes.

> ***"Highland is working hard to redefine itself as a tourism/leisure destination. This pipeline will set that objective back if not destroy it altogether."***
>
> *- Nancy Baillie,*
> *Owner of Dividing Waters Farm, Established in the 1700s*

A relatively low unemployment rate, rapid personal income growth, and a high per-capita personal income (PCPI) further indicate the county's overall economic health. The unemployment rate was 3.8% in 2014 compared to 6.9% for all of non-metro Virginia. Personal income increased by 35.7% between 2000 and 2014, nearly three times the average increase of 13.1% for all of non-metro Virginia. Highland's PCPI stood at $44,403 in 2014 compared to $33,923 for non-metro Virginia. Lastly, and consistent with the growth in population of retirement age people, Highland has a higher-than-average portion of personal income from non-labor sources and, compared to the Commonwealth as a whole, a very high level of investment income per person. This is a good sign for the county because this measure demonstrates the stock of household wealth and is positively correlated with economic development (Low 2005).

In the context of the proposed Atlantic Coast Pipeline, it is worth emphasizing that Highland County's healthy economic performance has occurred without energy infrastructure of the ACP's type or scale. While the pipeline promises some benefits (Atlantic Coast Pipeline, LLC, n.d.) and Governor McAuliffe has called such infrastructure "a game changer,"[6] local, state, and federal officials must consider *how* the ACP would change the county's current conditions and whether such change would really be for the better. Our research, summarized in this report, shows some of the ways in which the ACP could make things much worse.

# Impacts of the ACP

## Property Values

The proposed ACP would affect property values in three ways: from loss of use and enjoyment of the property, from safety risks, and from diminished

[3] All dollar values have been adjusted for inflation.
[4] Timber is comprised of forestry/logging, lumber and wood products manufacturing, and paper and allied products manufacturing. The "private employment" base for this percentage does not include government, agricultural, or self-employment. Those categories are not included in the primary data source that also provides details on timber employment (Headwaters Economics 2015; US Census Bureau 2015a).
[5] For agriculture, a different data source that includes all employment is used (Headwaters Economics 2015; US Bureau of Economic Analysis 2015).
[6] Quoted in Stewart (2015).

views from one's property. With some overlap, these effects would be most prominent in three zones: in the right-of-way (ROW), in the evacuation zone (including a narrower "high consequence area"), and within sight, or in the viewshed, of the pipeline.

Loss of use and enjoyment of properties would be felt most acutely by owners of parcels the proposed 75-foot-wide ROW crosses or touches. Forestland in the ROW will be stripped and converted to shrub or grassland, eliminating the prospect of future timber income (Williams 2015). Construction will harm crop and forage productivity due to soil compaction, soil temperature changes, and alteration of drainage patterns (Fitzgerald 2015). Cropland in the ROW also cannot be managed in the same way due to restrictions on the landowner's ability to cross the pipeline with heavier farm equipment (Monroe and Monroe 2015; Leech 2015). For the same reason, farm and forestland adjacent to the ROW would become less valuable if it becomes more expensive to reach woodlots or fields on the far side of the ROW.

Current and future residential housing is another productive use of land potentially suffering an economic loss from the ACP. People now living on parcels in the ROW will feel less safe, may be at risk of losing wells during or after construction, and will be deprived of the peace, quiet, and scenic views paid for when properties were initially purchased. There would also be a loss for potential subdivision and development depending on how and where the pipeline crosses umimproved properties.

These economic losses translate into financial losses when current owners attempt to sell their properties and find, as Highland landowners already have, that buyers are far less interested in properties near the proposed right-of-way. "Most of my clients have told me they don't want to look at any properties on or adjacent to the proposed pipeline," says Daniel Hotz, a realtor from McDowell. "Buyers are concerned about safety, views, and resale values. The permanent easement that it will create will devalue every property in its path (2015)."

***"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*

Based on the current value of Highland County property, as well as surveys of buyers, realtors, and appraisers (Kielisch 2015),[7] the total loss of property value for the parcels touched by the proposed pipeline ROW in Highland ranges from $361,000 to $1.1 million.

Properties outside the ROW, but still near the pipeline, would also suffer a

[7] Some of our estimates based on the survey of prospective home buyers reported in Kielisch (2015) are conservative. Some 62.2% of the survey respondents said they would not purchase a property with a pipeline (smaller than the ACP would be) at any price. The remaining survey respondents were split between those who would offer 21% less and those who would offer the same amount. In our estimates we use the average price reduction for just those buyers who stay in the market – that is, an average reduction in offer price of 10.5%. If one considers that 62% of buyers are effectively reducing their offer prices by 100%, the average reduction in offer price would be 66.2%.

loss in value. First there is a "high consequence area," within which one's survival of an explosion would be unlikely. The high consequence area would be 0.4 miles wide (1,092 feet on either side) for a pipeline of this size. There is also a 1.4-mile-wide evacuation zone (3,582 feet on either side), defined as the area an unprotected human would need to move beyond in order to avoid burn injury in the event of an explosion or a fire following a leak. Living with the 24/7/365 possibility of having to evacuate one's home or business at a moment's notice, if notice is even possible, diminishes the value of the property to its owner.

As with the effects within the ROW, the loss of value to owners within the high consequence area and the larger evacuation zone translates into lower prices if and when current owners choose to sell. The effect in the high consequence area arguably would be greater than in the evacuation zone, but due to lack of studies estimating such a difference, we are conservatively assuming that the effects within the entire evacuation zone, including within the high consequence area, are the same.

The evacuation zone through the county would touch 368 parcels, not counting those already affected by the ROW. Based on the current value of these properties and research on the decrease in property value due to a risk of evacuation (Boxall, Chan, and McMillan 2005), the ACP would induce an additional loss of $2.1 million in property value.

Depending on topography, the pipeline will also be visible for many miles in all directions. In Highland, 1,945 parcels will have their views affected by the pipeline. Homebuyers, realtors, and commercial property owners know the importance of the proverbial "million-dollar view". While the pipeline might not erase quite that much value from a given property, it is likely a property with a view that suddenly includes a pipeline right-of-way where there was once an unbroken view of woodlands or farm fields will experience a real loss in value. This lost value would be reflected in the loss of aesthetic value included with other effects on ecosystem services described in the next section.

Leaving aside the value lost in the viewshed and counting only the impacts in the right-of-way and the evacuation zone, the ACP could cause between $2.5 and $3.2 million in lost property value. Applying the median tax rate for the county, this one-time loss in property value translates into an annual loss of property tax revenue of between $11,300 and $14,800.

These estimates of lost property value and tax revenue are conservative for five reasons. First and as explained in the footnote seven,[7] estimated impacts on sale prices for properties in the ROW do not take into account the fact that more than 3 out of 5 prospective buyers would not buy such properties at any price. Second, our estimates treat properties in the (higher risk) high consequence areas as if they are affected only to the same degree that properties in the evacuation zone would be affected. Third, we have not quantified the effect of additional surface infrastructure, such as access roads, that would take up land outside the right-of-way. Fourth and finally, the estimated impacts on tax revenue do not reflect lost value for properties with pipeline-damaged views. If the ACP is permitted, a property-by-property reappraisal of all parcels affected in any of these ways and in all areas–along the ROW, in the evacuation zone, and throughout the viewshed–should be undertaken to determine the full impact on landowners and local tax revenues.

## Ecosystem Services

The construction and presence of the ACP will alter the flow of natural benefits people receive from well-functioning, healthy ecosystems. Known as "ecosystem services" and defined as benefits people obtain from ecosystems, these natural benefits include services such as clean water for drinking and for industrial processes, food grown on cropland, raw materials in the form of timber, and the aesthetic value of beautiful views from residential and commercial properties as well as from areas used for recreation.

Ecosystems also protect people and property from extreme events like floods and wildfire, regulate local and global climate, clean the air, support food production through natural pest control and pollination, provide wildlife to hunt, fish to catch, and spaces for other forms of recreation.

Because these ecosystem benefits are benefits to people, they convey economic value. To the extent the ACP would reduce the flow of these benefits, the reduction must be counted among the ACP's economic costs. Beyond this economic rationale, there is a growing legal and regulatory imperative to consider ecosystem services effects, particularly where federal land, such as the George Washington National Forest, and federal actions are involved (USDA Forest Service 2012; Donovan, Goldfuss, and Holdren 2015).

***"The Henever Farm is over 200 years old and contains the headwaters for both the Potomac and James Rivers. The farm is also home to one of the most valuable stands of sugar maple trees in the Allegheny Highlands. The ACP is slated to cross this iconic Virginia landmark. If that happens, it will hurt both the farm's prosperity and its contribution to Highland's culture."***

*– Lewis Freeman*
*President, Highlanders for Responsible Development*

To estimate these costs, we use the well-established "benefit transfer method," in which different land uses are associated with different rates of delivery of various ecosystem services. For example, each acre of forest produces a certain number of dollars' worth of aesthetic value, recreational opportunity, water and water flow regulation, among others each year. Similarly, cropland produces food and other natural benefits at its particular rate. Urban open space makes its own contribution to aesthetics and other values. These rates of delivery are transferred to the study region from previous research on areas that are reasonably similar to the study region.

Acreage converted from a more productive to a less productive land use results in lower ecosystem service values. During construction, the ACP would convert all acreage in the 125-foot-wide construction zone to barren land, which has no ecosystem service value. After construction, we assume acreage in the construction zone but outside the 75-foot-wide ROW would return to its previous land use/land cover. Within the ROW, we assume previous forestland would return to shrub/scrub and that cropland would return as pasture/forage.[8] All other acreage, including those beginning as shrub/scrub

[8] We recognize that some land in the ROW could technically be used for crop production again after construction. However, restrictions on the weight of machinery that can cross the pipeline itself may make such production uneconomic. Moreover, the presence of the pipeline and restrictions on activities that can occur within the ROW can have spillover effects on the crop fields through which the ROW passes. As Augusta County farmer Harry Crosby has testified, the ROW would take an entire field of 30-40

or pasture/forage, is assumed to return to its pre-pipeline use or cover type.

The other driver of change in ecosystem service value is the difference in per-acre productivity for land that returns to its previous use after construction. For example, post-construction differences in soil structure, compaction, and other factors may render pasture/forage less valuable for food production, for water purification, and for producing other benefits once a pipeline runs through it. As 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]." Similarly, urban open space might become less suitable as a place for children to play or people to relax once it becomes open space occupied by a high-pressure gas transmission line. While we are aware of one proposed study focused on agricultural productivity,[9] there are not yet data indicating how severe the changes would be. Our estimates assume, therefore, that acreage in the ROW is as productive after construction as any other acreage in the same land use/land cover.

In Highland, ecosystem service value lost in the temporary conversion from forest, cropland, urban open space, and other areas to a 125-foot-wide construction zone would range from $1.9 to $6.7 million in each of the two years of construction.[10] Ecosystem service value lost in the ROW each and every year thereafter is estimated to be between $1.1 and $3.9 million.

Lost aesthetic value represents the largest share of this total. Disruptions to water supply and water flows, the related category of protection from extreme events, and recreation make up much of the remainder.

We regard these as conservative estimates because we only count the loss of value that would otherwise emanate from the ROW and construction corridors themselves. Additional losses would occur due to the conversion of forest and other areas to barren or urban land (both of which have relatively low ecosystem service productivity) that would serve as access roads and other pipeline-related infrastructure.

In addition, the ROW 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 an even larger area. During construction, the construction corridor itself could be a source of air and water pollution that may over-burden the ability of surrounding areas to absorb sediment, particulates, and other pollutants. If that is the case, the ecosystem service value of the construction corridor during construction would not be zero, it would be negative.

Finally, these estimates reflect only changes in natural benefits that occur due to changes on the surface of the land. Particularly because the proposed pipeline would traverse areas of karst topography common in Highland and neighboring Augusta County, there is concern subsurface hydrology could be

acres out of crop production (Crosby 2015a; Crosby 2015b). Our assumption that ONLY the acreage in the ROW itself would be lost to crop production is therefore a conservative one.

[9] Once funded, this Ohio State study would use field-level data to examine the anecdotal evidence gathered over the course of decades that fields with pipelines have lower crop and forage yields than those without (Culman 2015).

[10] While construction at any given point along the pipeline would not take two years, we assume that it would be two years before the construction zone is fully revegetated and functioning as the land use or ecosystem type in which it will stay during operation of the pipeline.

affected during construction and throughout the lifetime of the pipeline (Pyles 2015). Blasting and other activities during construction could alter existing underground waterways and disrupt water supply. There is also a risk sediment and other contaminants could reach groundwater supplies if sinkholes form near the pipeline during construction or afterwards.

In an assessment for the Town of Monterey, hydrologist William K. Jones warns of "activities and land disturbances that affect recharge to the [Town's] wells or introduce sediments or other pollutants within the capture zones of the wells" (2015, 3). While the magnitude of the effects of trenching, blasting, and other activities on karst aquifers is difficult to predict, Jones states that construction of the ACP "will certainly cause alteration of the epikarst and affect ground-water recharge along the route" (2015, 3).

These scenarios would entail further loss of ecosystem service value and, for the homeowners or municipalities affected, major expenditures. Officials in nearby Augusta County estimate it would cost at least $2.1 million to establish a new municipal well, for example (Hoover 2015).

## Economic Development Opportunity

Highland County's economic future is tied to the beauty of the landscape and the quality of life for the people living there. As stated in the strategic plan of the Economic Development Authority of Highland County (EDA), the county aims to realize a healthy economic future by "encouraging entrepreneurs to open their businesses in Highland and growing [its] own entrepreneurs from Highland's youth" (2015, 8). The plan recognizes that the quality of life is important to those new business makers. As the EDA states, "Highland is now an eclectic mix of native farm families and new residents drawn to the high quality of life" (2015, 4).

The ACP would significantly undermine progress toward its economic goals 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 county. 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 the 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 (Smith 2015b; Smith 2015a; Hotz 2015; Davenport 2015). Highland residents are also concerned that the ACP could have broad, negative effects on the economy. During the scoping phase of the Federal Energy Regulatory Commission's environmental review all Highland County residents who mentioned the economy expressed a belief that the ACP would have a negative effect. Of those who mentioned agriculture or tourism, all but one believe the ACP would harm those sectors.

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 (1999, 54) 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". They note that decisions affecting the supply of amenities "have ripple effects throughout local and regional economies".

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, locating to, or staying in Highland. 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 county's overall economy.

Highland residents believe the ACP will harm the travel and tourism industry. Farther east, Wintergreen Resort 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 income for [the life of the pipeline]" and that insurance and other costs will further impact its bottom line (Fenton and 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 their 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.

Although Highland has fewer people and less development of the sort more common to its neighbors to the east, the county does have its own strengths and much to offer visitors, as attendance at events like the Maple Festival demonstrates. The county also has much to lose if the ACP were to degrade what the EDA calls the "pristine scenic beauty and rustic rural charm," for which Highland is known.

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 ACP were to cause a 10% drop in recreation and tourism spending from the 2014 baseline, the ACP could mean $1.5 million less in travel expenditures each year in Highland. Those missing revenues would otherwise support roughly $312,000 in payroll, $77,500 in state tax revenue, $45,600 in local tax revenue, and 17 jobs in the county's recreation and tourism industry each year.[11] 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.

[11] 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 (the value to the visitors themselves over and above their expenditures on recreational activity) that are included with ecosystem service costs.

Along similar lines, another important economic engine affected by the ACP is retirement income. 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 Highland, investment income grew by 1.5% per year from 2000 through 2014, and age-related transfer payments grew by 5% per year. During roughly the same time period (through 2013), the number of residents age 65 and older grew by 42% (3.3% per year) and this age cohort now represents 32.3% of the total population.[2]

Although it is difficult to precisely quantify the effect of the ACP on retirement income, 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. For Highland, such a scenario entails an annual decrease in investment and age-related transfer payments of approximately $137,000. 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, etc.

> ***"[the EDA's mission is to] promote sustainable economic development in order to achieve a desirable quality of life for the citizens of Highland County, preserving our rural heritage and natural beauty, supporting existing businesses, promoting new investment and igniting entrepreneurship enhances the county's economic vitality."***
>
> *– Economic Development Authority of Highland County*

The same phenomenon also applies to people starting new businesses or moving existing businesses to Highland. 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 accounted for a large and growing share of jobs in the county. If proprietors' enthusiasm for starting businesses in Highland were dampened to the same degree as retirees' enthusiasm for moving there, the effect would be 2 fewer new jobs and $23,000 less in new personal income each year.[12]

For "bottom line" reasons (e.g., cost of insurance) or due to the owners' own personal concerns, other businesses besides 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 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.

# Conclusion

The full costs of the proposed Atlantic Coast Pipeline in Highland County are wide-ranging. They include one-time costs like reductions in property

[12] It is possible that many of Highland County's proprietorships are part-time endeavors undertaken by residents who are semi-retired or supplementing income from traditional wage-and-salary jobs.

value and lost ecosystem services during pipeline construction, which we estimate to be between $6.2 and $16.7 million. Also, there are ongoing costs like lost property tax revenue, diminished ecosystem service value, and dampened economic growth that recur year after year for the life of the pipeline. These annual costs would range from $2.8 to $5.6 million per year. Most of these costs would be borne by Highland County residents, businesses, and institutions. By contrast, the ACP's one local benefit would be much smaller. It is an estimated average tax payment of $416,221 per year through 2025 (Natural Resource Group 2015, 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.).[13]

The decision to approve or to 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 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.

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[13] 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 (2015) for a review.

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