United States Department of the Interior

NATIONAL PARK SERVICE
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IN REPLY REFER TO

A.1.2. (NER-RSS)

January 12, 2017

Colonel Jason E. Kelly, Commander
US Army Corps of Engineers, Norfolk District
803 Front Street
Norfolk, VA 23510-1096

Subject: Dominion Surry-Skiffes Creek-Whealton Transmission Line; Comments on Revised Draft Memorandum of Agreement and Related Documents

Dear Colonel Kelly:

Please find the National Park Service's (NPS) comments on the revised draft MOA (Dec. 9, 2016) and Dominion's Response to Comments Made by the Consulting Parties (Dec. 9, 2016) for the Surry-Skiffes Creek-Whealton Transmission Line project. The NPS again unequivocally asserts that the impacts to the nationally significant and iconic historic resources affected by this project cannot be mitigated and urges the United States Army Corps of Engineers (USACE) to deny the permit request.

The NPS must raise issues regarding the fundamental flaws with the USACE's 106 process that we, and other consulting parties, have repeatedly identified but yet remain unresolved. The consultation process has been flawed from the beginning because of the absence of USACE's ownership of the Section 106 process, as required by the regulations at 36 CFR 800. Throughout the consultation process, documents containing research, analysis and statements of Section 106 findings have been prepared by the project proponent (in this case Dominion), or its contractors, and have been passed on to the consulting parties without any clarity whether the USACE sanctions any of the information, much less the Section 106 findings. As noted previously, this leaves the consulting parties uncertain whether they represent official determinations made by the federal agency. This constant state of uncertainty is not representative of a reasonable and good faith consultation effort.

Project proponents understandably have a particular agenda for which they advocate but which may not necessarily coincide with the determinations that the USACE must provide under Section 106. The NPS has done its best to respond to this barrage of potentially inapplicable and inappropriate information. The quality of the consultation has been sadly diminished by the lack of USACE leadership of the process.

Another fundamental flaw in the Section 106 process that the NPS has pointed out to the USACE has been lack of the coordination noted in CEQ's 2013 Handbook for Integrating NEPA and Section 106. The handbook notes:

> The CEQ Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, (40 C.F.R. Parts 1500-1508) (CEQ regulations) encourage integration of the NEPA process (NEPA review) with other planning and environmental reviews, such as Section 106 of NHPA (Section 106). The regulations that implement Section 106, Protection of Historic Properties (36 C.F.R. Part 800),encourage agencies to plan Section 106 consultations coordinated with other requirements of other statutes, as applicable, such as NEPA. The concepts of "coordination" and "integration" are found in both the CEQ regulations and Section 106 regulations, because they provide efficiencies, improve public understanding, and lead to more informed decisions. Coordinating the Section 106 and NEPA reviews is most effective when the responsible parties begin them simultaneously so that each process will fully inform the other. The general principles in 36 C.F.R. § 800.8(a) provide a framework for this coordination.

We have seen no evidence of the initiation, much less completion, of any amount of analysis as required by NEPA. A number of issues related to the Section 106 process *became points of disagreement largely attributable to the lack of coordination of both processes.* Repeated comments from the ACHP, VDHR, NPS, and other consulting parties have noted significant concerns regarding: (1) completion of an adequate visual analysis; (2) evaluation of socioeconomic impacts; and (3) sufficient cumulative effects analysis; each of these would in turn inform proper assessment of effects for each historic property including understanding the effect and its severity. The ability to determine appropriate mitigation measures (Section 106 resolution of adverse effects step) depends on a satisfactory completion of the preceding assessment of effects step, particularly in a scenario such as this with many nationally significant resources affected.

Repeatedly, the NPS and others have clarified the deficiencies that need to be addressed before the consultation can reasonably move into the resolution of adverse effects step. Repeatedly, the USACE has deferred to Dominion rather than completing the additional impact analysis the subject matter experts have requested. All of this additional analysis could have effectively been accomplished through a concurrent NEPA analysis of impact. A good faith and effective consultation process would have been for the USACE to meet with consulting parties to outline a strategy to resolve the deficiencies as they were identified. We would not be at the stage of yet again noting fundamental flaws in the process.

As just one example of how completing these analyses would inform the required decision making process, please see the attached report from IEc that highlights the deficiencies in the socioeconomic impact analysis completed to date. The report points to readily available, peer-reviewed methodologies to assess the socioeconomic impacts of this project that are not, as Dominion suggests, subjective. An additional example can be seen in the attached comments related to the visual analysis impacts.

As noted in our June 7, 2016, letter to the USACE, NPS also has a number of questions and concerns about the proposed Dominion Surry-Skiffes Creek-Whealton Permit Application and the accuracy of the analysis based on current conditions. The overall process was flawed by the alternatives being narrowly constrained before any Section 106 analysis could provide comparisons of effects to historic resources

and before any NEPA analysis took place. From the beginning of the process, without adequate analysis, viable alternatives were dropped, which constrained the range of alternatives the USACE considered and therefore the ability of USACE to modify or condition its permit. The necessity of this project as proposed and the appropriate range of alternatives is germane to NPS because different routing or project design could reduce adverse impacts to units of the National Park System and other important historic resources.

As has been the case from the beginning, the project proponent simply brushes off this fundamental flaw, stating again in the "Response to Comments Made by Consulting Parties" document that the State Corporation Commission's consideration and evaluation of the project proposal ensures alternatives have been considered and the mitigation hierarchy has been followed sequentially. As there has been no good faith consultation in response to our concerns expressed previously, we must thus simply repeat our comments from page 23 of our July 27 letter:

> As we have noted multiple times previously, there has been a failure to fully and adequately consider a reasonable range of alternatives and their impacts. **Only the proposed project--a single alternative--has been subject to Section 106 review. No alternatives have been subject to open public review under NEPA. The State Corporation Commission review process--that led to federal consideration of only a single alternative--did not even consider the impacts to historic properties that have been identified through the Section 106 review; some resources now known to be NRHP eligible were not even considered and impacts on other resources--now acknowledged--were considered non-existent. This includes the Captain John Smith Chesapeake National Historic Trail and the 84,000 acre historic district through which the project passes.**
>
> The lack of consideration of alternatives fundamentally affects the process to date. It has failed to apply the mitigation hierarchy sequentially and assess which alternatives best balance public need and the avoidance of impacts to nationally significant resources. [emphasis added]

The Section 106 regulations (36 CFR 800) require that the Section 106 process begins at a time when alternatives are available for consideration. The NPS has never received an official USACE response to this or other comments the NPS has provided.

In light of the foregoing, if the permit is not denied, at a minimum the NPS again requests:

1) A thorough review of the numerous issues/questions included in multiple NPS letters (including this letter) over the previous 18 months. Provide NPS with formal, official USACE responses to these concerns with adequate notification and review time. Effective consultation does not mean the USACE defers to the project proponent to respond to the many significant concerns raised by the NPS and other consulting parties without any indication regarding whether or not the USACE sanctions such responses.

2) USACE-led consulting party meetings that seek to identify and collaboratively resolve outstanding issues regarding assessment of effects that in turn would inform a robust discussion of mitigation actions. Consultation should outline steps to accomplish the level of analysis that

would be needed to adequately assess the significance of the adverse impacts to historic resources.

3) Completion of required National Environmental Policy Act Compliance. In repeated letters for well over a year (June 29, 2015, July 24, 2015, October 22, 2015, November 12, 2015, December 11, 2015, January 29, 2016, March 15, 2016, June 7, 2016, July 27, 2016, October 13, 2016, December 9, 2016), we have made clear that the National Park Service finds that this project would significantly affect the quality of the human environment.

   The high degree of **scientific/expert controversy and major impacts to nationally significant resources** raised by this project must trigger preparation of an EIS. One example of the scientific controversy is represented by the 12/09/16 draft MOA itself noting the disagreement among consulting parties and Dominion regarding methods for and conclusions of the impact analysis for the nationally significant resources. It has never been clear what the USACE position is.

   Moreover, we also expressed deep concern over having no opportunity to review any draft documents USACE may be preparing under NEPA. Once again, we request information about how the USACE is addressing the clear and certain need for an EIS. When can the NPS review draft NEPA documents?

Below, the NPS once again outlines concerns regarding multiple aspects of the USACE's evaluation of the impacts of the Surry-Skiffes-Whealton project proposal.

Visual Analysis

The revised draft MOA continues to be based on inadequate evaluation of the severity of the adverse effects on historic properties. The NPS has noted problems with the visual analysis in the CREA on numerous occasions.

Section 3.a. of the Basis for the Proposed draft MOA refers to visual effects mitigation based on a completely different circumstance noted in the Mitigation Methodology Section below.

The NPS requests the USACE ensure that the CREA visual impact analysis be done properly so it accurately assesses the impacts to the historic properties. The NPS also requests that the USACE complete a separate visual impact analysis that properly analyzes scenic and visitor experience impacts. As we have stated previously, visual impacts to historic properties, scenic resources impacts, and impacts to visitor experience are not the same thing. Each must be assessed separately and would be best accomplished by concurrent completion of an EIS.

The NPS worked with visual impact analysis experts from the Argonne National Laboratory to review the visual analysis completed for the CREA. Their comments are attached. As previously noted, the NPS would be pleased to provide assistance to the USACE from these experts to ensure completion of an accurate visual impact analysis.

Heritage Tourism

While heritage tourism is not a distinct topic of consideration within the scope of the Section 106 compliance process, the potential short and long-term impacts to the economic value of heritage tourism would most certainly be fully considered within the scope of an EIS.

Jamestown Island, the Colonial Parkway, Carter's Grove and the Captain John Smith Chesapeake NHT are historic resources within the local "historic triangle" and within southeast Virginia and the APE. Within an EIS, the USACE must ensure preparation of a full economic analysis on the impacts that potential loss of income would have on the totality of the local economy, not just on the historic structures and locations themselves. The existence and continued preservation of the heritage values associated with these properties, and others within the region, further enhances the overall quality of the visitor understanding and experience, quality of life for the residents in the area as noted in public comments received by the ACOE and contributes to the economic abundance both locally and regionally. This issue must be more fully assessed within the context of an EIS before being addressed or dismissed within the MOA. As we noted in our July 27 letter, and as reiterated in attachments to this letter, assessment of impacts to tourism, visitor experience and associated economic values is routine practice in EISs and there is a large body of literature on appropriate methodology. We are aware of no such primary research being conducted for this project.

Cumulative Effects

Identification and analysis of the cumulative effects resulting from the project continues to be a source of disagreement between the consulting parties and Dominion, while the USACE's position on the matter remains unclear. The NPS, VDHR and ACHP have all repeatedly expressed concerns on this matter, concerns that Dominion downplays in their Sep. 16, 2016, letter to the USACE, cherry-picking statements from the ACHP and VDHR, and ignoring the most important points they made on this topic. Refer to the NPS letter to the USACE (July 5, 2016) for a clear detailing of these concerns.

Indeed the USACE and NPS agreed that further work was needed to understand the potential cumulative effects of the project (Feb. 18, 2016, meeting). With considerable time and effort the NPS provided the USACE, as agreed, with additional analysis of the project's cumulative effects including specific analysis of the cumulative effects to NPS resources (July 5, 2016) and once again, five months later, we see that our input was dismissed by Dominion without discussion or feedback but simple statements that the findings of the CREA are correct. It is the responsibility of the USACE to direct and approve any Section 106 analysis Dominion completes on behalf of the USACE.

For Dominion to continually state, without explanation, that the findings of the CREA are correct and the expert opinions of multiple professional agencies, including the NPS, VDHR and ACHP, are incorrect or simply an acceptable disagreement contradicts the spirit of Section 106 consultation. The NPS stands ready to work to meet with the USACE and other consulting parties to identify deficiencies in the CREA point by point and identify necessary actions to remedy the deficiencies.

While the "Dominion Response to Comments Made by the Consulting Parties" (Dec. 9, 2016) recognizes the substantial disagreement regarding cumulative effects, revisions to the MOA don't reflect this and were limited to deleting a "Whereas" clause that referred to cumulative effects. Deletion of language that

is not agreed on docs not resolve the underlying issue. The same "Dominion Response to Comments..." document does speak to Dominion's cumulative effects analysis (in the Impact Disagreement category). Unfortunately that section simply repeats at length how the 2015 CREA's conclusions are correct and discounts the pages of valuable comments provided once again by the consulting parties. We refer the USACE back to the NPS July 5, 2016, letter containing cumulative effects analysis the USACE requested but, apparently, has yet to make any use of.

All of this speaks, once again, to the NPS's and other consulting parties' repeated comments regarding the flaws in the USACE Section 106 process for this project. Multiple times the NPS and the ACHP have clearly stated that various steps of the Section 106 process must be sufficiently completed before moving to the next. Completion of the assessment of effects, arguably the heart of the process, must be completed, including a reasonable level of agreement between the parties, before appropriate mitigation concepts can be developed. Without that, once again, we are presented with a draft MOA and mitigation proposals for adverse effects that have not been sufficiently analyzed to understand any sort of mitigation that might be appropriate.

Mitigation Methodology

Throughout the consultation process, Dominion has sought to compare and equate the process and outcomes of the Surry-Skiffes project with the Susquehanna-Roseland line (S-R Line) in Pennsylvania and New Jersey. The company seems to believe that, since "Both projects are 500 kV transmission line projects with visual impacts on historic properties," it is unmannerly for the NPS to have issued a permit for the S-R Line and object to Surry-Skiffes. What Dominion--and presumably, for lack of communication to the contrary, the USACE--seem to fail to grasp is the difference in scale and significance of the properties affected, elements of context that are vital to both the Section 106 and NEPA analysis. Although the NPS has explained the differences between the projects before, we will summarize the highlights once again.

The predecessor to the S-R Line pre-dated the creation of the three NPS units which it now crosses. The existing line was already visible to, and having an adverse effect upon, multiple historic properties. The upgrade to a 500kV line, and associated widening of the cleared vegetation area, magnified the existing adverse effect to some of those historic properties. It also became visible to additional historic properties, creating a new adverse effect. For many of these properties, however, the view towards the power line was not a significant historic characteristic; it was conceivable that efforts at landscape management would, in fact, mitigate these effects. For those where screening would not be sufficient, and with consideration for the reasons for which the properties were significant, namely their importance to the agricultural and recreational history of the local region, physical repair or interpretation projects were considered adequate.

Dominion "acknowledges that the portion of the Project crossing the James River up to the switching station is new" but provides as justification "residential, commercial, and industrial development in that area is not." This conveniently ignores the difference in scale between gargantuan steel towers planted in the river and low-lying development screened from the river by vegetation. It also deliberately refuses to acknowledge that there is a difference between magnifying the existing adverse effects *in an existing footprint* and inserting a new, enormous intrusion in a place where none existed. In addition, the

properties affected by the Surry-Skiffes line have significant historic characteristics directly tied to the river or to views of the river, which makes screening either impossible or an adverse effect unto itself. The national significance and singularity of the affected properties along the James also decreases the possibility of adequate mitigation – how can one possibly define mitigation for Jamestown? How can the installation of huge steel towers in the middle of the river be made less harsh or hostile to the views that John Smith saw on his explorations? It cannot be done.

Dominion alleges that "neither Section 106 nor its implementing regulations make a subjective belief regarding the relative importance or significance of a historic property a consideration in determining or resolving adverse effects thereto." There are no subjective beliefs involved here. The S-R Line did not adversely affect any National Historic Landmarks; the Surry-Skiffes line does. National Historic Landmarks are recognized as the most important or significant historic properties in the nation. 36 CFR 800.10(a) clearly emphasizes that additional effort must be made to minimize harm to any National Historic Landmark. Ergo, additional considerations are required for the properties affected by Surry-Skiffes than for those which were affected by the S-R Line.

Additionally, National Register Bulletin 15, *How to Apply the National Register Criteria for Evaluation*, defines a property with national significance as "the prehistoric and historic units of the National Park System and those properties that have been designated National Historic Landmarks," which describes Colonial National Historical Park – including Jamestown – and Carter's Grove; the Bulletin further describes these properties as "of exceptional value in representing or illustrating an important theme in the history of the nation." It is reasonable, then, for properties of national significance (i.e., historic units of the National Park System) to merit the same additional consideration as National Historic Landmarks in the Section 106 process.

Attempting to assign monetary values to the ineffable qualities of historic resources is difficult, if not impossible. The NPS attempted it for the S-R Line, where the affected historic properties, while important, did not rise to the significance of the properties affected by the Surry-Skiffes line. The national significance of the region and properties affected by the proposed project requires additional consideration during the mitigation process, just as the regulations require for all parts of the Section 106 process for properties of this magnitude; a straight application of the formulas used for the S-R Line do not suffice for Surry-Skiffes. Different situations require different solutions.

Excess Capacity

In the Response to Comments Made by Consulting Parties document, Dominion provides a general response and then specific comments that are all supposedly addressed by the general response. But the general response does not address all of the comments listed. One such specific comment states, "Dominion's predictions about the levels of growth in demand and conclusions about rolling blackouts have been challenged by PERI, NPS and NPCA." The general response simply states that peak electrical demand continues to grow and cited the time period 2013-2015 for six federal facilities. This is not a sufficient response to address the "challenges" raised. And as we point out below and have brought to USACE attention in the past, the repowering alternatives rejected initially were not considered in light of the actual capabilities and actual performance of the units at the Yorktown Power Station according to the

data Dominion has been submitting to the Energy Information Administration (EIA). This has unnecessarily constrained the alternatives considered from the very beginning of the process.

Alternatives/Oil or Natural Gas

The NPS asserts that the MOA is based on a faulty premise. The NPS and other consulting parties have provided the USACE with multiple alternatives to the proposed project which would truly avoid or minimize the impacts to historic resources.

Dominion's response claims that an exhaustive list of alternatives has been examined, citing the alternatives documents they or their contractor have written and provided to the USACE, and the one summation document the USACE wrote. These alternatives have not been subject to formal public review and comment in the context of Section 106 or NEPA review. In addition, the alternatives offered were built on a foundation of insufficient information as to the true capabilities and conditions of operations at the Yorktown Power Station. Dominion claims that "repowering Yorktown Power Station with natural gas has been thoroughly evaluated and found to be impracticable and not to meet the project purpose and need."[1] But Dominion has failed to explain data they have been submitting to the Energy Information Administration (EIA) that shows Yorktown Units 1 and 3 are capable of and have been burning natural gas as a generating fuel source since 2008.

Dominion also claims that repowering Yorktown with oil is not practicable. But according to data Dominion has been submitting to the EIA, all three units are capable of and at least Units 2 and 3 have been burning oil as a fuel source since 2008. Analysis of EIA data was supplied by NPS in our October 13, 2016, letter to the USACE. Fuel sources in use since 2008 have been used through the latest available data from the EIA prior to our October 2016 letter. We have not received any response to our letter, but it seems particularly applicable to the arguments raised in this document.

Dominion claims that repowering Yorktown to natural gas is also not practicable due to the timing and estimated cost of firm natural gas transportation (FT) arrangements that would be necessary to deliver fuel to the plant. But data Dominion submitted to the EIA shows that in 2015, Yorktown switched their natural gas transportation service to "firm", from the previous "interruptible" service, as listed on Form EIA-923. Data for 2016 shows service as firm as well. Dominion should explain how their current firm service is operating; whether natural gas supplies are constrained during certain times of the year and if so why; and how current firm transportation service affects the practicality of "repowering" alternatives for units already capable of and powered by the range of fuel types.

Finally, Dominion in this document provides a general response and then specific comments that are all supposedly addressed by the general response according to the issue charts. But the general response does not address all of the comments listed. One such comment is "The Atlantic Coast Pipeline would likely qualify as a "reasonably foreseeable future action" under NEPA. Specifically, wants to know why the Corps will not consider the pipeline on the supply side, but simultaneously is considering the pipeline as driving demand and load growth. This opens a wide range of alternative for the Corps to consider." The general response does not address this comment. The USACE should explain why it considers the

[1] 2016.12.9 Skiffes – Sorted and Consolidated Responses to Consulting Party, Issue 12, page 48.

Atlantic Coast Pipeline as a driver of demand and load growth, but not a source on the supply side. As NPS has pointed out in the past in communication with the USACE, this point has not yet been addressed.

EIS

The comments in this letter should not come as a surprise to the USACE. The NPS and other consulting parties have commented countless times on the fundamental need for preparing an Environmental Impact Statement (EIS) for this project. The NPS refers the USACE to the NPS's March 5, 2016, letter that focused entirely on the need for the USACE to complete an EIS as just one of numerous communications regarding the need for an EIS. The Director of the NPS sent two letters to the USACE requesting completion of an EIS for the project. We are not aware of any official USACE responses to NPS requests.

We are confident there is already sufficient information to demonstrate the proposed project would have a significant adverse impact on multiple resources and values and that the permit should be denied. As the NPS has stated numerous times in the past, the impacts of the proposed project are clearly significant and continuing to pursue the current Dominion proposal unquestionably requires an EIS.

We again remind the USACE that a project of such substantial scientific controversy about the nature of adverse impacts to nationally significant resources clearly merits the completion of an EIS. A Finding of No Significant Impact via an EA is simply not reasonable. See 40 CFR 1508.27.

While the Section 106 process should result in a thorough evaluation of the effects to historic properties, an EIS will allow the USACE to demonstrate impacts under many other topics such as tourism, visitor experience, scenic resources, natural resources etc. Furthermore, as noted previously, undertaking an EIS would allow for the impacts to historic properties to be evaluated in context with other impact topics, providing the USACE with a complete picture of the broader range of impacts that will result. Moreover, if those analyses were in the context of an EIS which is considering a full range of alternatives we expect more viable and less impactful alternatives would be discerned.

We find it ironic that Dominion places such an emphasis on the Susquehanna-Roseland project as precedent for the Surry Skiffes project and the draft MOA. As we note above, the S-R line was an entirely different situation, largely due to it being an NPS permitting action for enlargement of an **existing** transmission line in an **existing** right of way. Regardless, because of the potential for significant adverse impacts to the human environment, the NPS completed an EIS for that project and coordinated and integrated the NEPA and Section 106 processes; this coordination and integration ensured that not only were the adverse effects under 106 disclosed in the EIS, but the severity of the impacts under NEPA was correlated with them, providing a complete picture of the repercussions of the project. The Surry-Skiffes-Whealton transmission line proposal merits the same level of NEPA analysis.

Equivalence and Impact Disagreements

Dominion's Response to Comments Made by the Consulting Parties (Dec. 9, 2016) regarding Equivalence leads the NPS to believe that Dominion does not understand the topic, or once again cherry picked what comments to respond to. Dominion seems to focus on effects to individual historic properties

in a vacuum, rather than address those effects within the context of the broader historic district within which they reside and contribute, which is the point the NPS is making. Dominion claims that these issues have already been addressed with the Correlation White Paper and Severity White Paper, although, oddly, both appear to have been produced and added "to the record" after the first draft of the MOA and seem to have had little effect on the revised MOA.

The NPS comments on equivalence were much broader than the one issue (understanding individual impacts) addressed by Dominion in their Response to Comments (Dec. 9. 2016). Equivalence speaks to offsets or mitigation actions providing conservation results that are equivalent in value, function and significance as the resources being impacted. For this to be achieved, a clear understanding of the scope of resource impacts is required. In addition, a clear articulation of how offsets provide the same value, function and significance is necessary. Dominion focused on the continuing disagreement regarding assessment of effects to individual resources and their stance that a basic understanding of the effect including the nature and severity is unnecessary.

As mentioned previously, Dominion's Response to Comments Made by the Consulting Parties (Dec. 9, 2016) once again states that the USACE and VDHR have concurred that the assessment of effects step is complete. Dominion's continual repetition that adverse effects have been fully assessed and that the impact intensity will be "negligible to moderate" does not make these statements true. While, on the surface, it may be true that the parties have agreed which properties will experience an adverse effect, Dominion does not recognize, but simply continues to discount, the multiple comments from consulting parties that an understanding of the nature and severity of each individual adverse effect (basic description of the effect) is necessary in order to strategize potential mitigation.

Despite continued detailed comments on this topic, Dominion continues to repeat that this information exists and is included in the CREA. Despite the massive amount of comments on the CREA's analysis, Dominion never revised any of the findings within the CREA, but continues to repeat statements such as effects "were appropriately analyzed in the CREA" and the "CREA provides a thorough, detailed analysis of the visual impacts..." among too many other similar instances to list. Dominion did eventually produce an analysis that resulted in severity of effect evaluations, similar to what might be found in NEPA (Dominion Response to Comments Dec. 8, 2015). However, stating that an impact will be minor, for example, does not begin to describe how the individual resource and its character-defining features would be affected. The NPS and other consulting parties have repeatedly stated, for over a year, that further analysis regarding the nature and severity of the adverse effects is needed before resolution of effects, and mitigation, can be considered. This additional analysis could have been completed over this past year, allowing the process to move into the resolution of effects stage. The consulting parties are not asking for a monumental task, but a simple process to clearly identify not only how much of each historic property will be affected but what character-defining features of the property will be affected and the effect on the property's integrity. Results of this analysis would allow an understanding of the effects and therefore the ability to consider potential mitigation proposals to balance the adverse effects. However, through a repeated dismissal of the many comments on this topic (and the NPS providing some of this needed analysis), we find ourselves in the same position now as we were a year ago: commenting a draft MOA that is based on a lack of understanding of the adverse effects.

Mitigation must be based on a full understanding of the adverse effects and how they affect the historic character and integrity of a resource. This can be no more important than in a situation such as this where such iconic nationally significant resources are at stake. Understanding the historical significance and character of the Colonial Parkway is one example for which we have repeatedly explained how a clear understanding of the adverse effect is needed before attempts to mitigate the effect. The MOA context document and the draft MOA continue to demonstrate a lack of understanding of the adverse effects and how to appropriately mitigate them. The Dominion response document also demonstrates the misunderstanding with statements such as the project's structures will not "obstruct, sever, or surround historical viewsheds" for the Parkway. One of the main character-defining elements of the section of the Colonial Parkway that would be affected by the project is its views and connection to the James River. Placing the power line and its structures in the viewshed of the Parkway is a major adverse effect (and certainly not a "negligible or moderate" effect). As presented in the draft MOA, attempting to block river views of the infrastructure through "screening" is in itself an adverse effect to the Parkway. As with the analysis of adverse effects to the other historic properties, this demonstrates the underlying flaws in the USACE process and the continued and repeated dismissal of guidance and advice provided by the NPS and others.

Dominion's understanding of Hog Island represents another example of insufficient assessment of effects. Dominion continually relies on the "correct conclusions" contained in the CREA, but yet has forgotten the original finding in the CREA that Hog Island is significant under Criterion A as well as D, ignores the Criterion A significance during the assessment of effects, and discounts it completely while considering mitigation – a point we have also made in the past. The visual effects to Hog Island will be tremendous and not result in a scenario where the "setting and feeling within the boundary of the property itself remains."

The lack of solid adverse effects analysis and understanding is evident even in the recent White Paper Regarding Severity of Impacts. This product also repeatedly contains the same language stating the analysis in the CREA is sound and complete. Yet it confirms the lack of understanding of the historic character of the resources at stake and how to evaluate effects to them. As just one example, the Severity White Paper correctly states that the Historic District was found eligible for the National Register under Criteria A, B, C, and D. While the core of the District is the James River, Dominion states that the project will have minimal effect on the District as it will not affect the areas of significance for which it is eligible for listing. First, a project does not affect the significance of a resource, but the historical integrity. Furthermore, Dominion suggests that that the physical character of the River has no effect on the integrity of the District. The physical character of the James River within the District is at the heart of the District's historical integrity. Altering that setting and feeling of the river is a major impact to the District as a whole.

The massive collection of comments from the NPS, VDHR, ACHP and other consulting parties makes it clear that the USACE has not completed a sufficient assessment of effects and has not begun to understand the true nature and severity of effects to the individual properties, making it impossible to understand what type of mitigation might be possible or appropriate. Moreover, this makes it impossible for the draft MOA to meet the standard of equivalence.

Landscape-Scale Context

The revised draft MOA makes a modest attempt to couch some mitigation stipulations in the language of a landscape scale context, specifically stipulations III.f and III.g both of which scale to the James River watershed. However, neither in the context document nor in the response to comments document is there any articulation of a response to the questions below posed by NPS in pages 22-23 of our July 27 comment letter:

> The NPS requests the USACE to show: How have the effects of the project proposal been assessed in terms of each of these landscape contexts? How would each context be altered or changed as a result of the project? What is the extent of this change? How does application of the mitigation hierarchy avoid, minimize or offset landscape level impacts?

The proposed MOA documents still fail to articulate clear answers to these fundamental questions. This represents the same fundamental flaw regarding inadequate assessment of effects described above. As a result there is no basis or rationale for establishing whether or not the proposal adequately addresses the impacts/repercussions to landscape level resources like a nationally significant multi-state trail.

Durability

Despite our comments above on the fundamental inadequacies of impact analysis--and therefore on any proposed mitigation--we must once again comment on the issue of the durability of mitigation. There is no substantive change in the draft MOA on this point. Further, Dominion's Response to Comments Made by Consulting Parties document simply brushes off our prior comments without addressing our substantive concerns at all. Therefore, we restate the issue from our July 27 letter:

> There is no real concept of durability or provisions for it within the proposed MOA. While a certain individual offset/mitigation action might provide a degree of durability--most specifically land acquisition--even on this the MOA has shortcomings. None of the specific offsets have life-cycle costs built into them. There is no provision for operations and maintenance costs associated with long-term stewardship of acquired lands throughout the project lifespan. Similarly, there are no provisions for operations, maintenance or replacement of shoreline treatments, interpretive signage or other identified actions to ensure they last through the project lifespan. The extremely limited heritage tourism provisions provide only a single contribution related to a single average annual cost.
>
> The life-cycle or sustainability costs associated with offsets can be quite significant, particularly over a minimum period of fifty years. Including endowments for covering such costs is not uncommon in offset requirements.

Our July 27 comments go further, even providing an example of thoughtful approaches to ensuring durability over the entire fifty year project lifespan.

Given the lack of responsiveness to our concerns in the recent documents, we are unsure of USACE position on this issue. We restate: all of the projects listed in the MOA have lifespans and lifecycle costs;

the draft MOA does nothing to address this or ensure the durability of the proposed mitigation over the lifespan of the project.

Conclusion

The NPS recognizes that the revised draft MOA reflects some of our specific comments regarding the previous MOA, albeit some of our less significant comments. However, neither this revised draft MOA, nor Dominion's Response to Comments, recognizes any of the NPS comments regarding a proper Section 106 process that would lead to an appropriate resolution of effects step, including any proposed mitigation. The Basis for Proposed MOA document Section 3.d asks the question of "whether the current characterization of adversity of effects and the amount of proposed mitigation is sufficient to allow a determination that the proposed mitigation is sufficient ...." The NPS vigorously finds that neither the characterization of adversity of effects nor proposed mitigation is sufficient.

During this consultation process, the NPS has petitioned the USACE to keep in mind that the effects of a crossing in this location will be greater than in the vast majority of other permits that the USACE might grant. The properties affected are crucial to the foundations of our modern nation. While it may be understandable that not everyone comprehends the difference between a farm that is significant to its local community and an early English settlement site that is significant to the history of the entire nation, the NPS, as stewards of the nation's historic resources, does not have that luxury. We must continually make decisions based on the relative importance of historic properties, based on decades of experience and professional practices. That experience and knowledge is what we have tried to share throughout the consultation. We trust that the USACE will defer to the benefits of our experience in your decision-making.

Sincerely,

Rosalyn Fennell
Acting Regional Director

Enclosures (2)

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IEc

Evaluation of Potential Economic Impacts to the Colonial National Historical Park Region: Proposed Surry-Skiffes Creek Transmission Line

January 2017

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EXECUTIVE SUMMARY

Under contract to the National Park Service (NPS), Industrial Economics, Inc. (IEc) was asked to undertake an evaluation of potential adverse economic impacts to cultural, historic, recreational and natural resources associated with the proposed Surry-Skiffes Creek Transmission Line. The proposed line would traverse four miles of the James River in a key segment of the Captain John Smith Chesapeake National Historic Trail downstream of the Colonial National Historical Park. Other resources of significance in the area include a National Historic Landmark, a Wildlife Management Area, and three forts listed on the National Register of Historic Places.

Economic losses would arise primarily from two sources. First, visual impacts associated with the proposed line may discourage use of certain public resources and/or result in a diminished visitor/user experience. Such changes would result in a loss of economic value associated with those opportunities, and a potential diversion of spending and economic activity away from the local area. Second, alteration of the landscape and historic/cultural context may result in non-use losses. These are values held by the general public for preservation of resources independent of current or expected future use. Qualitative factors suggest that the proportion of the public that may hold such values, and in turn potential aggregate losses, may be large.

The likelihood of adverse impacts is supported by appropriate references to the published economics literature. However, the absence of specifically applicable value estimates, and limitations and uncertainties associated with underlying resource use data preclude initial estimation of total losses. Instead, a series of primary studies that will generate information sufficient to develop accurate and reliable estimates are described. These include a survey of NPS visitors, a local boating survey, and a general population household survey.

INTRODUCTION

Under contract to the National Park Service (NPS), Industrial Economics, Inc. (IEc) was asked to undertake an evaluation of potential adverse economic impacts to cultural, historic, recreational and natural resources associated with the proposed Surry-Skiffes Creek Transmission Line. This report was developed by Robert Paterson and Dr. Christopher Leggett, with research assistance from Jacqueline Willwerth and Christopher Smith. Specifically, we were asked to:

- Inventory potential impacts to public and some privately-held resources in the project environment;
- Evaluate the adequacy of existing information/data to quantify and monetize impacts; and,
- Recommend procedures for primary data collection if existing sources are insufficient.

The conclusions and recommendations presented here are based on our professional experience conducting similar analyses, as well as visits to the project area and interviews with stakeholder representatives. Resumes for Paterson and Leggett are attached as Appendix A.

I. BACKGROUND & EVALUATION CONTEXT

Dominion Virginia Power (Dominion) has proposed construction of a 500-kilovolt transmission line running between the Surry Power Station in Surry County and a proposed switching station near Skiffes Creek in southern James City County. The line would span approximately four miles of the James River and be supported by 17 structures in the water ranging in height from 160 to 295 feet.[1]

The proposed project falls within Colonial Virginia's 'Historic Triangle,' formed by the communities of Jamestown, Williamsburg and Yorktown. The James River is part of the Captain John Smith Chesapeake and Washington-Rochambeau Revolutionary Route National Historic Trails, and the proposed crossing lies downstream of the Historic Jamestowne and Colonial Parkway portions of the Colonial National Historical Park (NHP). In addition to these NPS units, there are several properties of historical and natural significance in the vicinity, including Carter's Grove, a National Historic Landmark, three forts listed on the National Register of Historic Places, and the Hog Island Wildlife Management Area. More broadly, there is a keen local and regional interest in preserving lands adjacent to this stretch of the river, with over 1,000 acres currently under protective easements.[2]

[1] Project information at: https://www.dom.com/skiffescreek

[2] Data available at: http://www.dcr.virginia.gov/land-conservation/tools02a; Personal communications: Caren Schumacher, Historic Virginia Land Conservancy; Brad Baskette, VA Outdoors Foundation; Elizabeth Tune, VA Department of Historic Resources, Ania Eckhardt, James City County.

In accordance with the National Historic Preservation Act and other requirements, Dominion commissioned a Cultural Resources Effects Assessment (CREA) that acknowledged some adverse effects to these resources (Brady et al. 2015). NPS has questioned the methods and conclusions set forth in the CREA. In response, Dominion generated a "white paper" that further articulates their position regarding the nature and severity of impacts (Dominion 2016a). Dominion has also generated a white paper that attempts to provide a basis for a proposed $85 million mitigation payment (Dominion 2016b). In focusing only on property values and visitor expenditures as surrogates for project impacts, however, the information presented is both incomplete and inconsistent with established economic theory and practice.

Increasingly, Federal agencies have been called upon to adopt comprehensive approaches to evaluating the implications of programs, policies, and projects in terms of changes in ecosystem services- that is, the contributions of natural resources to economic and societal well-being.[3] Among the ecosystem services potentially affected by the proposed line are the provision and maintenance of aesthetic, cultural, recreational and passive or 'non-use' values.[4] Such values are widely recognized (e.g., see Millennium Ecosystem Assessment 2005) and discussed specifically within relevant framework/guidelines development reports produced by the U.S. Army Corps of Engineers (see Tazik et al. 2013 and Reed et al. 2013), the federal permitting agency for the project.

Specifically, alteration of the river landscape and associated services may result in the following types of impacts:

- Reduced enjoyment and/or use of public resources;
- Loss of non-use value (i.e. values motivated by ethical or altruistic concerns rather than any present or expected use); and,
- Reductions in the value of private property.

Below we discuss the economic framework in which direct use and non-use impacts may be measured. Changes in private property values are self-explanatory. Finally, we note that there may be additional types of adverse impacts that are not amenable to quantification. For example, construction of the line may affect the likelihood of successful nomination of the area as a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site. These additional impacts are discussed in Section II.

[3] In 2015 the Office of Management and Budget and Council on Environmental Quality issued a Directive mandating that all agencies develop explicit policies to integrate ecosystem services into decision making.

[4] Project construction activities and footprint may affect other services, such as habitat provision. Ecological impacts are not addressed in this report.

ECONOMIC IMPACTS

The proposed line may interfere with visitors' ability to appreciate and interpret aesthetic and cultural resources that are fundamental to the NPS units and other identified areas. This in turn may reduce the value of those opportunities to visitors or discourage visitation, with the latter resulting in a loss of economic value and expenditures associated with forgone/displaced visits. It is important to distinguish between these two categories of economic impacts.

The economic value of cultural/historical and recreational opportunities is measured by what an individual is willing to pay for that experience above and beyond what they are required to spend to participate. Referred to as consumer surplus, it is the appropriate measure to characterize changes in ecosystem services that do not have market prices, and is regularly applied in benefit-cost analysis and natural resource damage assessment.[5] The relationship between expenditures and consumer surplus is illustrated in Exhibit 1.

EXHIBIT 1. DEMAND FOR TRIPS TO HISTORIC/RECREATIONAL SITES

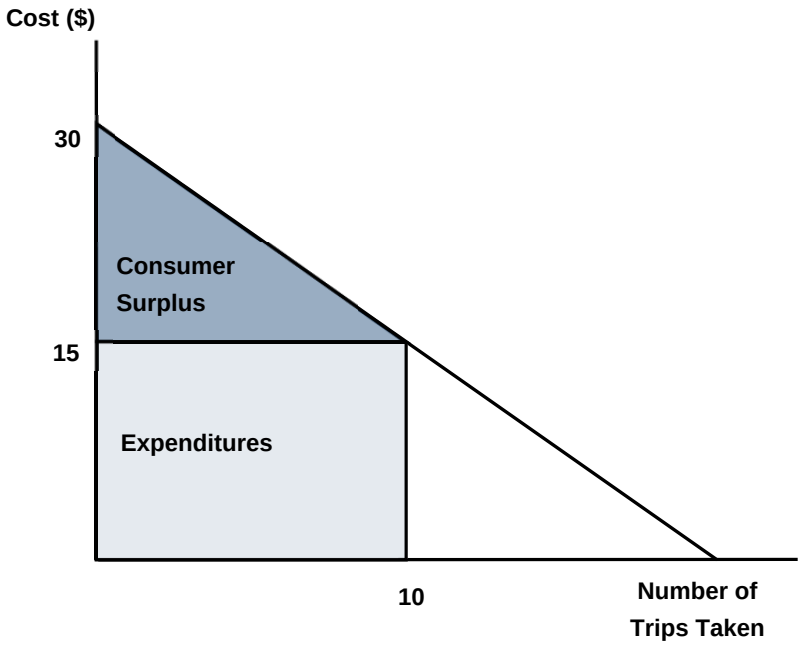


Exhibit 1 depicts an individual's demand curve for visits to a particular historic or recreational site- that is, what they would be willing to pay for different numbers of trips over a given time period. The downward slope reflects the conventional notion that the lower (higher) the cost per trip, the more (fewer) trips an individual will take. As shown, at a cost per trip of $15, the individual would take 10 trips. Additional trips at that price would exceed what the individual is willing to pay. The individual's total expenditures

[5] For example, see U.S. Environmental Protection Agency's Guidelines for Preparing Economic Analyses (2014), Office of Management and Budget's Guidance on Development of Regulatory Analysis (Circular A-4, 2003), and U.S. Department of the Interior Natural Resource Damage Assessment Regulations (43 CFR Part 11).

for these 10 trips is equal to the area of the rectangle labeled "Expenditures," or $150 ($15×10). For each trip leading up to 10, the individual's willingness to pay exceeds the cost per trip. The area of this triangle, labeled "Consumer Surplus," represents surplus value that accrues to the consumer, in this case $75 [½×10×(30-15)].

If the quality of a site is compromised, in this case due to visual impacts associated with the proposed line, the amount that visitors are willing to pay for trips may decrease, they may reduce the number of trips taken, or they may select alternative destinations that are less preferred. Any one of these adjustments would result in a reduction of consumer surplus. However, these individuals may not change their spending behavior. Expenditures may simply be diverted to alternative sites or activities. In this manner changes in consumer surplus represent a net change, while changes in expenditures are typically considered a redistribution. However, within a regional economy, the level of expenditures affects revenues, employment, and tax receipts, all of which are of concern to proprietors, residents and local officials. We consider the potential for both types of economic impacts in this report.

As noted, non-use values are values for resources independent of any present or expected future use. They may be motivated, for example, by a desire to preserve and maintain resources in their present state for the benefit of others and future generations. Non-use values are measured in an analogous manner to the direct use values described above- in terms of individuals' willingness to pay for a resource- in this case given an opportunity to compare current versus some potential degraded condition. Freeman et al. (2014) provide a complete discussion of the theory underlying the existence and measurement of non-use values.

II. BASIS FOR IMPACTS & FEASIBILITY OF PRELIMINARY ESTIMATES

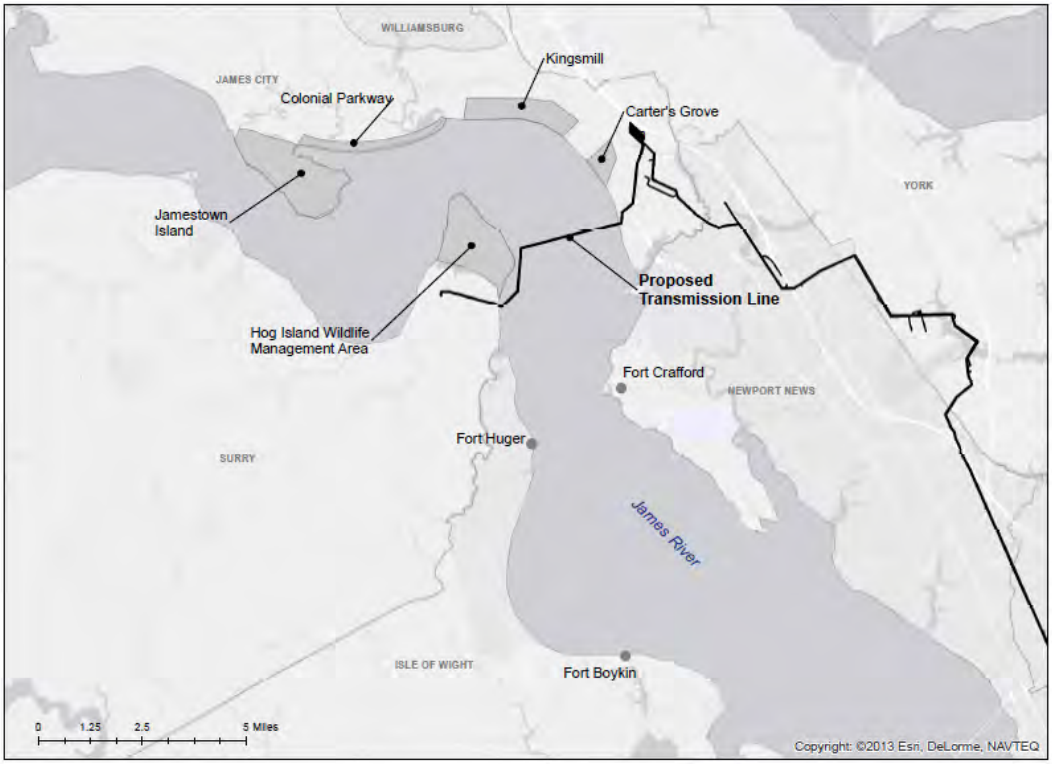
In this section we discuss the rationale for impacts to specific resources and the sufficiency of existing information and data to estimate their magnitude. We focus on six key areas in the vicinity of the proposed line identified in Exhibit 2 below: 1) the James River itself (Captain John Smith Trail); 2) the Jamestown Island and riverside Colonial Parkway portions of the Colonial NHP; 3) the Kingsmill Community; 4) Carter's Grove historic site; 5) Hog Island Wildlife Management Area; and, 6) Forts Huger, Boykin and Crafford.

DIRECT USE IMPACTS

As discussed, visual impacts associated with the proposed line may diminish visitor experience and discourage visitation. The economics literature contains numerous examples of the value of visual quality (e.g., see Boyle et al. 2016), including references to changes in recreational behavior and value in response to changes in scenic quality. For example, Kask et al. (2002) examine the impact of scenery on the number of visits to the Blue Ridge Parkway. The authors find that 25 to 40 percent of survey respondents would decrease their trips if scenic quality declined. They also find that visitors value avoided reductions in scenic quality more highly than improvements (i.e., trip value decreases more for a reduction than it would increase for an equivalent improvement). Siderelis et al. (2000) find that trail users in North Carolina would increase their number

of trips if scenery and other attributes were to improve. Survey respondents indicated they would increase annual trips from six to eight on average if conditions were ideal, and would experience an increase in value per trip of approximately $20. Other examples include Walsh et al. (1990), Englin and Mendelsohn (1991) and Daniel et al. (1989) that examine the influence of scenic quality on recreational values for hiking and camping opportunities, and Lutzeyer et al. (2016) that demonstrates the impact of visual disamenities on vacation site choice in an application to beach recreation and offshore wind farms.

EXHIBIT 2. KEY RESOURCES IN VICINITY OF PROPOSED LINE



Below we summarize the potential for identified resources to experience direct use impacts associated with changes in scenic quality:

- **James River & Captain John Smith Trail-** boaters utilizing this stretch of the river would have unobstructed views to the proposed line and may pass adjacent to supporting structures and directly underneath the line.
- **Colonial NHP-** the proposed line would be visible from the riverside portion of the Colonial Parkway and several established pullouts/observation points, as well as Black Point, a viewing area on Jamestown Island accessed via a walking trail from the park's Island Drive.

- **Carter's Grove-** the historic site would have immediate views to the proposed line. In the past the site received in excess of 200,000 visits per year, but is currently being renovated and the extent of future public access is uncertain.[6]
- **Hog Island Wildlife Management Area-** portions of the area would have immediate views to the proposed line. It is a popular destination for hunting, hiking, birding and general wildlife observation.
- **Forts Huger, Boykin and Crafford-** inspection of these areas suggests that changes in scenic quality are likely to be limited and any impacts to visitors modest.

To estimate changes in economic value and regional economic activity arising from visitor impacts at these areas, the following information and data are required:

1) **Number of affected users/visitors-** an estimate of the total number of boating trips and visits to the identified sites that would be affected by visual impacts on an annual basis.
2) **Visitor expenditures-** an estimate of the average per-trip expenditures for visits to the resources/areas.
3) **Value of interpretive and recreational opportunities-** the per-trip value for use of or visits to the resources/areas.
4) **Change in use/visitation-** an estimate of the annual change in use of or visits to these areas that may occur because of the proposed line.
5) **Change in value of trips-** an estimate of the reduction in value of trips due to visual impacts.

Taking these in order, visitation statistics are available for Colonial NHP. Data from the last decade suggest that the park receives in excess of three million visits annually.[7] However, available data are not sufficiently precise to determine the subset of visitors that may be impacted by the line at the Colonial Parkway and Black Point locations. Use data for the Captain John Smith Trail specifically, or general use of the river in the vicinity of the proposed line, are not available. The Virginia Department of Game and Inland Fisheries (VDGIF) also does not record or estimate visitation (outside of hunting quotas/permits) for the Hog Island Wildlife Management Area. As noted, some historical visitation data for the Carter's Grove site are available.

NPS gathers information on trip expenditures through periodic visitor surveys. For example, the 2001 Colonial NHP survey collected information on local spending for lodging, meals, fuel and other transportation expenses, admission fees, and other items (Visitor Services Project 2001). NPS estimates that Colonial NHP visitor spending contributed over $260 million in total output to the local economy in 2015 (Thomas and Koontz 2016). Given a reliable estimate of the likely change in visitation that may result

[6] Personal communication: Carl Childs, Colonial Williamsburg Foundation

[7] See https://irma.nps.gov/Stats/Reports/Park/COLO

from the proposed line, these information sources could potentially be used to determine regional impacts to output, income and employment associated with changes in Colonial NHP visitor spending. In contrast, there are no available data on trip expenditures for boaters using the impacted stretch of the James River.

Absent primary information, estimates for 3, 4 and 5 would be adapted from existing economic literature that addresses comparable resources and circumstances- a practice referred to as benefit transfer.[8] The literature contains many examples of values for visits to historic and cultural sites (e.g., see Poor and Smith 2004 and Bergstrom and Cordell 1991), including NPS sites specifically (Melstrom 2013 and 2015; Duffield et al. 2013; Neher et al. 2013). Similarly, there is an extensive literature that provides values for relevant recreational opportunities. The Oregon State University Recreation Use Values Database reports values from over 20 studies for motorized and non-motorized boating trips, and a similar number for wildlife observation (Rosenberger 2016). However, while Kask et al. (2002) and Siderelis et al. (2000) described above provide illustrative examples, we are unaware of any studies that examine changes in trip-taking behavior and value for analogous conditions- that is, the mix of historic, cultural and recreational resources and visual impacts from transmission lines.

Given visitation/use data limitations and uncertainties, and the absence of specifically applicable information from existing literature, development of a reliable estimate of total potential direct use impacts is not possible. We describe approaches to primary data collection to measure these losses in Section III.

NON-USE LOSSES

Non-use values are well-established, and recognized within policy and project analysis guidance (e.g., see U.S. EPA 2014 and Bureau of Land Management 2013). While non-use values need not be restricted to unique or well-known resources, they have often been emphasized in this context (Bishop and Welsh 1992). Of particular importance is the extent of relevant population or 'market area'- that is, the total number of individuals or households that hold value for a particular resource. In this case, given the distinct historic and cultural features of the project area it is reasonable to assume that the relevant area is quite large, if not national in scope. For example, as a proxy for general public interest in the proposed line, a media search indicates that it has been the subject of articles, letters to the editor and op-eds in at least 10 states, and has been mentioned in many of the country's major newspapers.[9]

To estimate potential non-use losses associated with construction of the proposed line, the following is required:

[8] Benefit transfer is widely applied in regulatory analysis and natural resource damage assessment, and formally recognized in the U.S. Environmental Protection Agency's Guidelines for Preparing Economic Analyses (2014) and the Office of Management and Budget's Guidance on Development of Regulatory Analysis (Circular A-4, 2003).

[9] Chicago Tribune, Los Angeles Times, Miami Herald, New York Times, USA Today, and the Washington Post.

1) **Relevant population-** an estimate of the total number of individuals or households that would be willing to pay for preservation of the project environment in its current state.

2) **Preservation value-** the average individual or household value.

While the extent of the relevant population is inherently an empirical question, a number of studies have estimated non-use values for preservation of cultural and historic resources domestically (e.g., Turner and Willmarth 2014; Morey and Rossmann 2003; Whitehead and Finney 2003) and outside of the U.S. (Carson et al. 2002; Alberini and Longo 2009; Navrud and Strand 1991; Rolfe and Windle 2003; Sanz et al. 2003; Kim et al. 2007; Hansen 1997). However, as in the case of direct use impacts, we are not aware of any studies that have examined sufficiently similar circumstances to those being evaluated here.

Given uncertainty regarding the appropriate market area for potential non-use losses, and absent an applicable value estimate from the literature, it is not possible to develop a reasonable total loss estimate. However, qualitative aspects of the scenario- an effectively permanent adverse change to the landscape adjacent to unique and widely-recognized cultural and historic resources- suggest that these losses may be large in an absolute sense. As such, failure to consider them in the project design and approval process may lead to a significant resource misallocation (Freeman 2014). We describe an approach to primary data collection to measure non-use losses in Section III.

PRIVATE PROPERTY VALUES

Several studies have estimated nearby residents' willingness to pay to reduce or remove the visual impacts of transmission lines. For example, in a study in England, Atkinson et al. (2004) surveyed residents living within three miles of existing lines and asked their willingness to pay to redesign towers in a more aesthetic manner. Similarly, Navrud et al. (2008) estimate willingness to pay of proximate households to bury transmission lines in Norway.

To estimate potential private property losses associated with construction of the proposed line, the following information is required:

1) **Relevant properties-** the total number of properties with views to the line, and an estimate of the current market value of those properties.

2) **Property value impact-** the average percentage decline in value associated with visual impacts.

Of properties in the area, the Kingsmill residential community (Exhibit 2) has nearly 100 waterfront properties with an unimpeded view to the proposed line. Sales data provided by the Kingsmill Homeowners Association indicates that these properties have an average market value of a little over $1 million each.

A number of hedonic property value studies have demonstrated the influence of view characteristics (e.g., see Paterson and Boyle 2002), including the impact of transmission lines. These studies utilize data on property transactions and characteristics to estimate the implicit value of property attributes, including nearby amenities and disamenities.

Chalmers (2012) and Anderson et al. (2016) provide reviews of this literature, noting that evidence of significant negative effects is mixed, with estimates ranging from 0 to 10 percent. However, the specific applicability of these estimates is uncertain, as they generally examine the relationship between existing lines and nearby properties, as opposed to a before and after comparison for a new project.

The potential to develop a primary estimate of private property losses using market data would be contingent upon identifying a comparable scenario elsewhere, or require relying upon survey-based methods. While overall impacts to private properties are likely to be modest in size relative to those associated with identified public resources, they nonetheless should be acknowledged in evaluating the overall economic impacts of the proposed line.

OTHER POTENTIAL IMPACTS

The proposed line has the potential to manifest in other categories of impacts. For example, by altering the landscape and the historic and cultural integrity of the area, the project may have implications for successful future designation as a UNESCO World Heritage Site. Similarly, this section of the James River is listed on the Nationwide Rivers Inventory, a list of potential candidates for inclusion in the National Wild and Scenic River System, in recognition of its historic value. Specifically, it is described as "One of the most significant historic, relatively undeveloped rivers in the entire northeast region."[10] While it is not clear whether the proposed line would affect this status or the potential for additional recognition, taken together these features reinforce the significance of the area, and likelihood of direct use and non-use losses associated with the proposed project.

III. RECOMMENDED STUDIES TO MEASURE IMPACTS

In this section we articulate plans for primary data collection to develop reliable estimates of direct use and non-use losses associated with the proposed line. Specifically, we describe an intercept and mail follow-up survey of Colonial NHP visitors, a survey of James River boaters, and a general population survey of U.S. households.

SURVEY OF HISTORIC JAMESTOWNE VISITORS

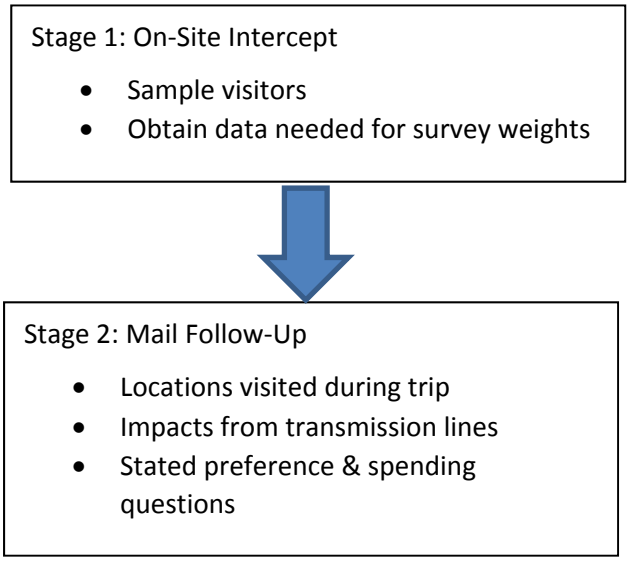
As noted, the proposed line would be visible from several locations, including scenic viewpoints along Colonial Parkway and at Black Point, thus potentially diminishing the quality of the visitor experience. This study involves surveying visitors to Historic Jamestowne to obtain information necessary to quantify potential visitor impacts. The survey would be implemented by mail, with respondents recruited on site during visits to Historic Jamestowne. It would gather data that would allow for estimation of the number of impacted trips and the total lost use value due to the transmission line.

[10] https://www.nps.gov/ncrc/programs/rtca/nri/states/va.html

Sampling and Implementation

The visitor survey would be implemented in two stages (Exhibit 3). The first stage would be a brief, on-site intercept survey at the exit to Jamestown Island. The primary purpose of this on-site intercept would be to obtain a sample of visitors for a follow-up survey. The second stage would be a mail follow-up survey sent to all visitors intercepted on site. The mail survey would include questions about the specific locations visited, as well as stated preference valuation and contingent behavior questions related to the proposed line.

EXHIBIT 3. STAGES FOR HISTORIC JAMESTOWNE VISITOR SURVEY



Stage 1: On-Site Intercept- The first stage of the survey would involve a brief, on-site intercept focused on vehicles, pedestrians, and cyclists leaving Jamestown Island. The on-site intercept would be designed to obtain a sample of visitors for the primary survey, as well as information necessary for developing appropriate survey weights.

All vehicles and pedestrians leaving Jamestown Island must pass over a narrow causeway. Visitors can be efficiently sampled after they leave the Visitor Center area and begin to approach this causeway on Colonial Parkway. There is a small pull-off on the northern side of the road that would safely accommodate 2-3 vehicles (Exhibits 4 and 5). Vehicles would be flagged down and instructed to temporarily park in this pull-off to complete the on-site intercept survey.

The on-site intercepts would be implemented throughout one randomly-selected seven-day period each season (winter, spring, summer, and fall), providing a total of 28 survey days (4 seasons x 7 days). Sampling during contiguous seven-day periods minimizes travel/mobilization costs while ensuring that all days of the week are included. Conducting intercepts during all four seasons allows the survey to represent visitation through the calendar year, which is important given that the nature of the scenery varies by season.

EXHIBIT 4. PROPOSED LOCATION FOR ON-SITE INTERCEPT

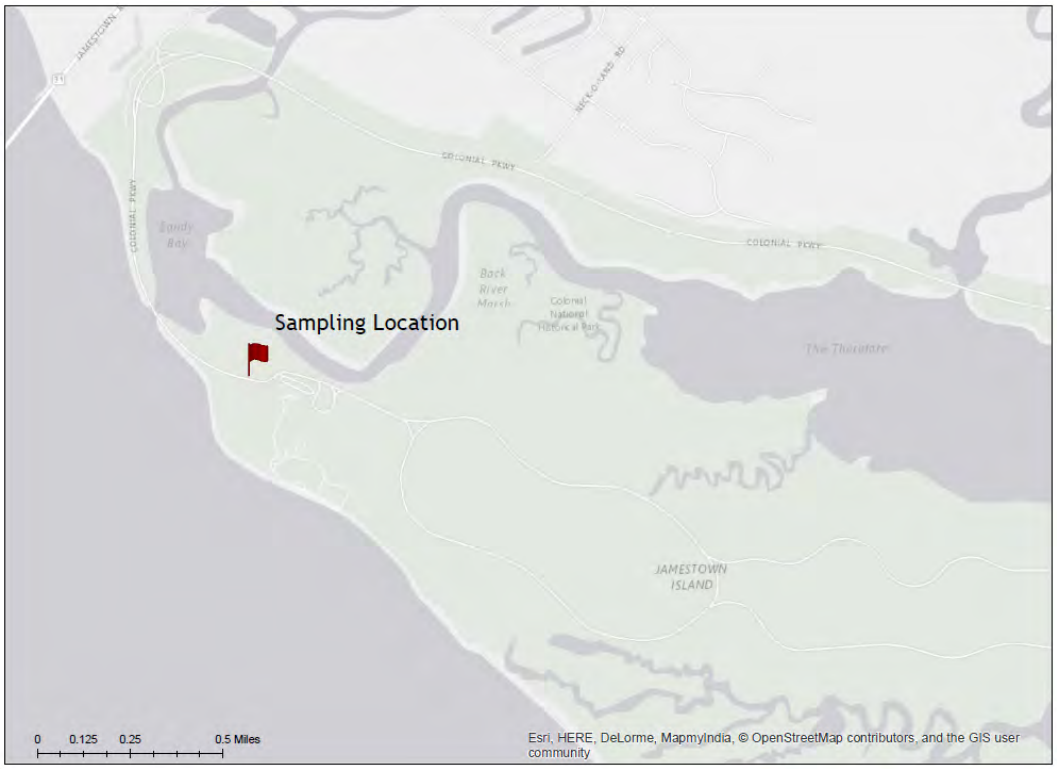


EXHIBIT 5. PROPOSED LOCATION FOR ON-SITE INTERCEPT (LOOKING TOWARDS VISITORS CENTER)

On every day selected for on-site intercepts, a two-person survey team would be stationed at the pull-off from 8:30 a.m. until dusk.[11] The team would flag down departing vehicles, bikers, and pedestrians for the intercept survey. Only one visitor would be interviewed at a time. The survey team would ensure that a queue does not form by allowing all other visitors to pass by while the interview is being completed. Emergency vehicles, law enforcement vehicles, park staff, and educational/tour buses would not be flagged down for interviews.

For each departing group (either vehicle or pedestrian/biker), the interviewer would confirm that the group is leaving for the day, ask for the number of adults and children in the group, then randomly select one adult using the most recent birthday method (Oldendick et al. 1988). The interviewer would ask the selected adult a few brief questions (providing data for an assessment of nonresponse bias), and then invite her to participate in a follow-up mail survey. If she agrees to participate, she will be asked to provide contact information (address and phone).

While one member of the survey team focuses on interviews, the second team member would focus on obtaining hourly counts of the number of departing vehicles and pedestrians/bikers, obtaining separate tallies for runners, walkers, bikers, buses, recreational vehicles, and non-recreational vehicles (i.e., law enforcement vehicles, emergency vehicles, and park staff). These tallies serve two purposes. First, they allow the hourly interview data to be expanded to represent the total number of departing visitors every hour. Second, they allow for post-stratification adjustments (Holt and Smith 1979; Kalton and Flores-Cervantes 2003) if certain types of vehicles or pedestrians/bikers are more likely than others to respond when flagged down for the intercept survey.[12]

A vehicle counter would be installed near the intercept location, providing daily vehicle tallies throughout the full calendar year. These daily vehicle tallies would allow the survey data to be expanded to represent the population of annual visitors departing Jamestown Island. We recommend using a geomagnetic counter (e.g., a TrafX counter), which can be buried in a small, shallow hole in the soil adjacent to the roadway surface.[13] These counters have internal data loggers and batteries that last several months. Vehicle count data would be downloaded at the beginning of each calendar month. Geomagnetic vehicle counters have been used recently in visitor count applications at other NPS units (e.g., Leggett, Curry, and Scherer 2010; Leggett et al. 2013).[14]

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[11] The entrance to Historic Jamestowne is open from 8:30 a.m. to 4:30 p.m., but visitors are allowed to remain on the island until dusk.

[12] For example, runners with headphones are often less likely than other pedestrians to agree participate in a survey effort.

[13] Standard vehicle counters would be difficult to install at Jamestown Island, as the concrete roadway surface would complicate the installation of pneumatic tube or inductive loop counters.

[14] It is challenging to use automated counting methods for bikers/pedestrians when they share the roadway with vehicles. One option would be a time-lapse video setup, but the video data require a significant amount of analysis/interpretation. As an alternative, we recommend simply relying on the assumption that biker/pedestrian visitation is proportional to the number of vehicles.

Stage 2: Mail Follow-Up- The second stage of the study would involve sending a mail survey to all visitors intercepted on site. The mail survey would include questions about the respondent's trip, questions about potential impacts associated with the proposed transmission line, and standard demographic questions. It would be implemented in four separate waves, with each wave beginning immediately after a week of on-site intercepts (Exhibit 6).[15] While the follow-up survey could potentially be administered online, a mail survey has two important advantages: (1) it covers all visitors (including those without internet access); and, (2) it ensures that visual information about the proposed transmission line is presented in a consistent manner.[16]

A number of steps would be taken to maximize the mail survey response rate, thereby reducing the potential for nonresponse bias (Groves 2006). First, the initial mailing would include a small cash incentive (a two-dollar bill) and a letter signed by the park superintendent (Dillman et al. 2009). Second, all materials would be sent via first class mail and have the NPS logo. Third, multiple contacts would encourage non-respondents to complete the survey (including a thank-you/reminder postcard, a reminder phone call, and up to two replacement surveys. We anticipate that a mail survey response rate of 60 percent or higher can be achieved. Any residual nonresponse bias can be assessed by comparing mail survey respondents to mail survey nonrespondents using data available for both groups from the on-site intercepts.

The implementation sequence for the mail survey would be as follows:

Day 1: The survey instrument would be mailed to all visitors sampled during the previous week via first class mail. The survey instrument would include a $2 response incentive, a letter describing the purpose of the survey, a color map of the Historic Jamestowne area, photos depicting views with and without the transmission line as seen from Colonial Parkway and Black Point, and a self-addressed, stamped envelope.

Day 8: After one week, a thank you/reminder postcard would be mailed to all sampled visitors thanking them for responding and encouraging them to complete the survey if they haven't already.

Day 22: After three weeks, a replacement survey would be provided to all sampled visitors who have not yet responded.

Day 36: After five weeks, all sampled visitors who have not yet responded would be called to remind them to complete the survey. Up to six attempts will be made to contact these nonrespondents, with calls made on different days of the week and at different times of day. If the respondent has lost or discarded the survey, a second replacement survey would be mailed to them.

[15] While it is feasible to hand out surveys during the on-site intercept, mailing the survey to the respondent is preferred. Many surveys handed out on site would likely be thrown out or lost before the respondent returns home from the trip. Further, respondents would be less likely to provide contact information for reminder mailings if the survey were handed out on site, leading to reduced response rates.

[16] With an online survey, photos would be displayed on a wide variety of screens, including smartphones.

EXHIBIT 6. ILLUSTRATIVE SCHEDULE FOR SURVEY OF HISTORIC JAMESTOWNE VISITORS

Wave 1: Winter

January

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February

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March

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Wave 2: Spring

April

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May

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June

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Wave 3: Summer

July

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August

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September

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Wave 4: Fall

October

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November

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December

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Key:

- = on-site intercepts
- = mail initial survey instrument
- = mail reminder postcard
- = mail replacement survey (if necessary)
- = phone reminder and second replacement survey (if necessary)

The mail survey would include questions on the following topics:

- Visits to Historic Jamestowne: The first set of questions would be about the respondent's recent visit to Historic Jamestowne. The respondent would be asked to indicate which sections of the park she visited, including whether or not she walked out to Black Point, drove on Colonial Parkway, or stopped at any of the roadside pulloffs along Colonial Parkway.[17] The respondent would also be asked how many times she has been to the park in the last 12 months and whether or not she anticipates returning to the park in the future. Finally, information on trip-related expenditures (to update the 2001 estimates referenced earlier) would be collected.
- Qualitative Impact of Transmission Line: Next, the proposed line would be described to the respondent. A map would be provided that shows the likely location of the line in relation to the Jamestown Island. In addition, several photos would show how the proposed line would alter the views from Black Point and from three roadside pulloffs along Colonial Parkway. After describing these potential future changes the respondent would be asked (1) if she thinks she would have noticed the transmission lines during her recent trip and (2) if she believes that seeing the lines would have adversely affected her recent visit to the park.
- Future Visits & Willingness to Pay for a View without Line: Finally, respondents would be asked questions designed to determine how the line would affect the probability of future visits and elicit their willingness to pay for views without the line. The willingness to pay question could describe an alternative approach to bringing power to the peninsula. The respondent could be told that due to higher electric rates associated with this alternative, the cost of operating Historic Jamestowne would increase, and an entry fee of $X would need to be instituted (with the value of X varying across respondents) in order to offset these higher operating costs. The respondent would then be asked if she thinks that she would have been willing to pay this hypothetical entry fee to come into the park on her current visit, or for a subsequent visit.

Information Provided

The study would provide data necessary to calculate four separate quantities of interest:

- The annual number of visitors who stop at potentially impacted viewpoints;
- The annual number of visitors who would likely be impacted if transmission lines over the James River were visible from these viewpoints;
- Visitors' annual willingness to pay (per trip and total) to avoid seeing the transmission line at these viewpoints; and,
- An estimate of any related change in the probability of future visits, and associated changes in economic value and regional activity.

[17] During the on-site intercept, the survey team could hand the respondent a one-page map of the site with checkboxes next to these locations as a pneumonic aide.

The study would also provide potentially useful information on the types of visitors who would most likely be impacted by the proposed line. For example, the analysis of the stated preference survey questions would provide information on the impact of age, gender, income, race/ethnicity, length of stay, travel mode (vehicle/pedestrian/cyclist), and respondent origin on willingness to pay.

The proposed study focuses entirely on park visitors, and it therefore would not provide information on non-use values related to the proposed project. In addition, potentially impacted visitors to Colonial Parkway who *do not* visit Jamestown Island would be excluded from the survey effort.[18]

Tasks

The following specific tasks would be required to implement the study:

1) Detailed study plan
2) Site reconnaissance to obtain "before" photos from all relevant viewpoints, conduct preliminary pretesting (with fewer than nine individuals), and identify a suitable location for the vehicle counter
3) Draft survey instruments (mail and intercept), letters, data collection forms, maps, and photographs
4) Office of Management and Budget (OMB) Information Collection Request for pretesting
5) On-site pretest of draft survey instrument, intercept methods, and vehicle counter
6) OMB Information Collection Request for survey implementation
7) Survey implementation
8) On-site intercept
9) Mail follow-up
10) Data entry
11) Analysis and reporting

JAMES RIVER BOATING SURVEY

Boaters' views of the surrounding landscape will potentially be diminished by the transmission line, and navigation may be impacted by the presence of support towers in the river. As a result, some boaters may choose to travel to alternative boating destinations (on the James or at substitute sites) and/or take fewer boating trips. Boaters with limited opportunities for substitution may continue to visit the same areas of the James River but have a diminished experience due to the transmission line and support towers.

[18] If desired, these visitors could be included by stationing additional survey teams at the Colonial Parkway pulloffs, where they would intercept only the subset of visitors who do not visit Jamestown Island.

This study involves surveying local boaters to obtain information necessary to quantify potential impacts. Survey respondents would be recruited from: (1) registered boat owners residing in nearby counties; and, (2) residents of waterfront homes that provide boating access to the James River in the local area. The survey would gather data on current boating trips taken to local sites (i.e., revealed preference data), as well as data about potential changes to those trips with the transmission line in place (i.e., contingent behavior data) (Grijalva et al. 2002; Jeon and Herriges 2010). These data would be combined within the context of a random utility maximization (RUM) travel cost model, allowing estimation of the number of impacted boating trips and the total lost boating value due to the transmission line (Parsons 2003).

Sampling and Implementation

The study would obtain data on boating trips through a survey of local boaters. The survey would comprise three separate stages (Exhibit 7). In the first stage, a mail screener would be used to recruit a panel of individuals likely to go boating on the James River in the upcoming year. In the second stage, these panel participants would be contacted by phone every month throughout the boating season to obtain data on the number and destination of all boating trips. In the third stage, the panel participants would be surveyed after the boating season has ended and asked to describe how their boating trips over the past year might have changed (if at all) had the transmission lines been in place.

Stage 1: Mail Screener- The first stage of the boater survey would involve sending a mail screener to a sample of 5,000 potential James River boaters. The purpose of the mail screener is to identify a set of individuals who (1) are likely to boat on the James River during the upcoming season; and, (2) would be willing to participate in a repeat-contact panel study.[19]

The frame for the mail screener would comprise two non-overlapping groups, or strata (Exhibit 8):

- Stratum A: Waterfront Homes Providing Boating Access to the James River: This stratum includes waterfront homes within 15 water miles of the proposed transmission lines that provide boating access to the James River. These homes may be directly on the James or they may be on a tributary that provides access to the James. Only waterfront homes with docks or boathouses visible via satellite imagery would be included in this stratum.
- Stratum B: Registered Boat Owners: This stratum includes registered boat owners in James City, Surry, Newport News, Isle of Wight, York, and Williamsburg counties, excluding addresses already included in Stratum A.[20]

[19] Respondents would not be informed that the study focuses on the proposed transmission line or the James River. Providing that information prior to data collection may alter the respondent's boating behavior during the season. Instead, the effort would be described as a local boating study.

[20] The sampling approach assumes that addresses of registered boaters would be available through VDGIF. If addresses for registered boaters are not available, Stratum B would consist of all residential addresses in these counties.

EXHIBIT 7. STAGES FOR JAMES RIVER BOATING SURVEY

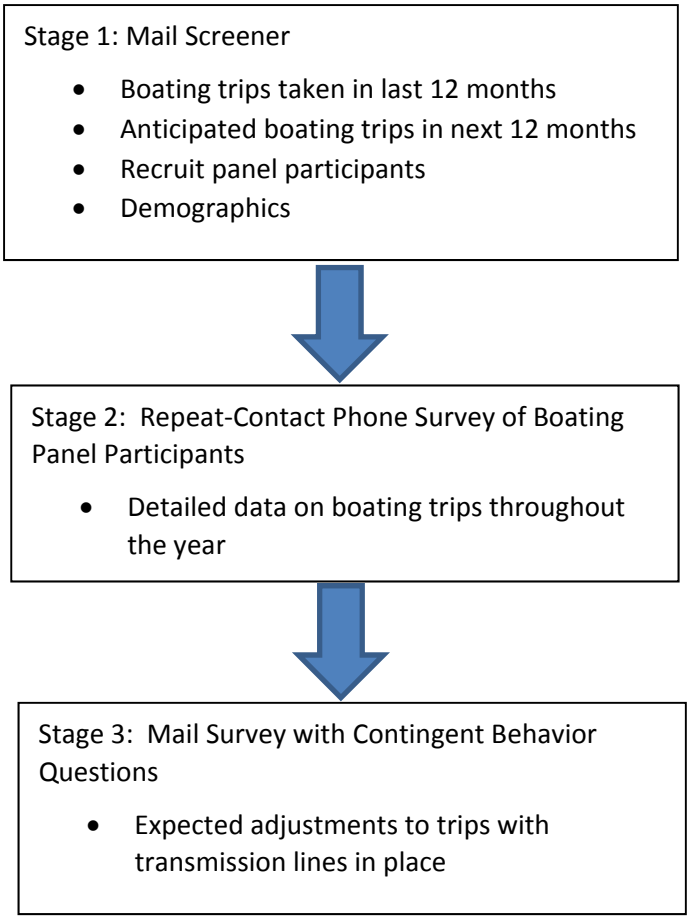
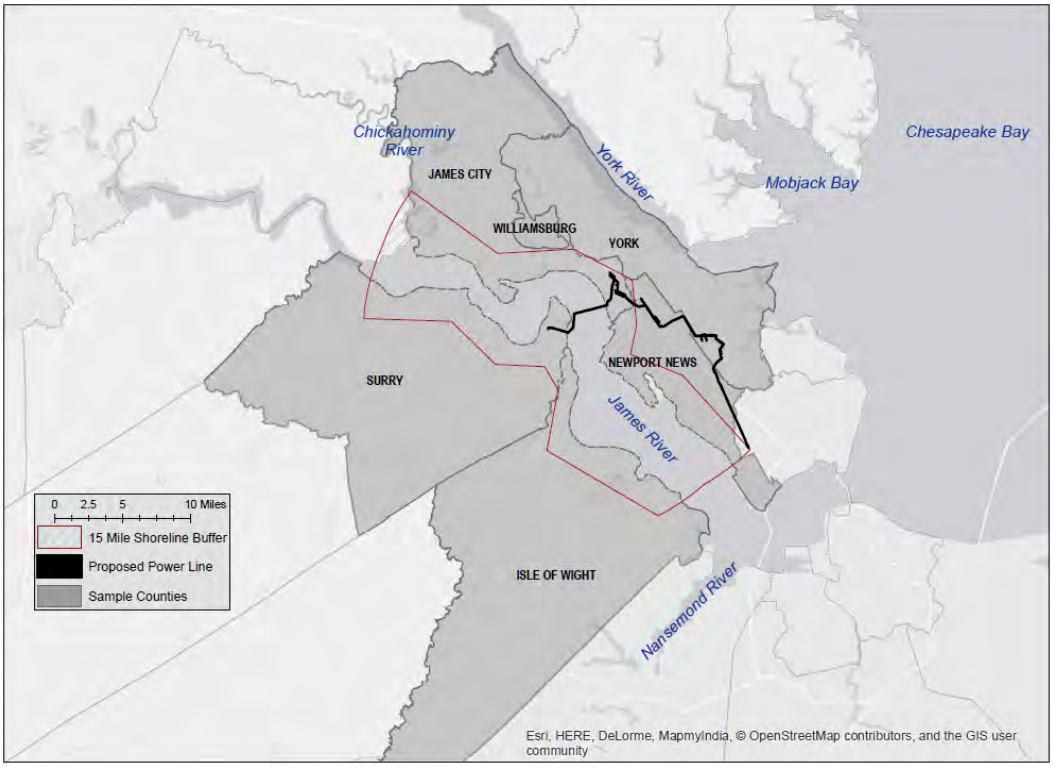


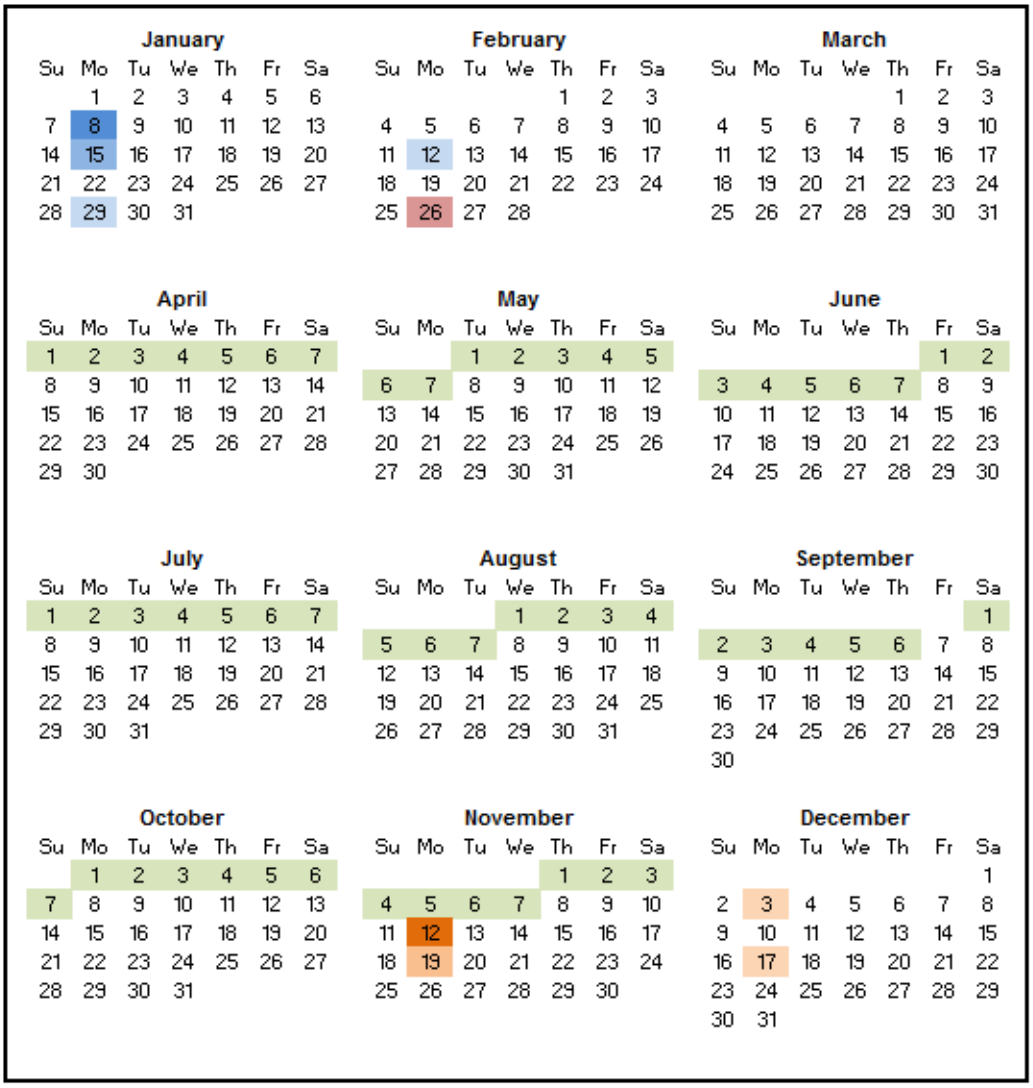
EXHIBIT 8. BOATING SURVEY SAMPLING FRAME



Stratum A would be sampled with certainty, while Stratum B would be sampled at a rate that allows for a total sample size of 5,000 boaters across the two strata. Designating Stratum A as a certainty stratum provides greater efficiency in identifying boaters most likely to visit the James River. Incorporating boaters in Stratum B allows the study to include potential impacts to individuals who trailer their boats to the James River. The analysis would use weights to adjust for differences in selection probabilities across the two groups.

The mail screener would be sent in early January, prior to the beginning of the boating season (Exhibit 9). It would be completed by the adult (18 or older) boater in the household who most recently celebrated a birthday (Oldendick et al. 1988). The screener would include questions about the number of boating trips taken within the last calendar year to several nearby waterbodies, including the James River, York River, Nansemond River, Chickahominy River, Mobjack Bay, and Chesapeake Bay. A map would be included to allow the respondent to easily identify boating destinations. After requesting information about past trips, the screener would ask about the number of trips that the respondent *expects* to take to these waterbodies in the upcoming year. These questions about boating trips would be followed by a set of standard demographic questions, an invitation to participate in a follow-up study, and a request for a phone number for the follow-up study.

EXHIBIT 9. ILLUSTRATIVE SCHEDULE FOR JAMES RIVER BOATING SURVEY



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February

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March

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April

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June

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July

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August

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September

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November

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December

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Key:

- = screener (initial mailing)
- = reminder postcard for screener
- = replacement survey for screener (if necessary)
- = mail calendar and map to panel members
- = telephone panel members to obtain trip data for previous month
- = contingent behavior survey (initial mailing)
- = reminder postcard for contingent behavior survey
- = replacement survey for contingent behavior survey (if necessary)

As with the survey of Historic Jamestowne visitors, a number of steps would be taken to maximize the mail screener response rate, thereby reducing the potential for nonresponse bias (Groves 2006). First, the initial mailing would include a small cash incentive (a two-dollar bill) and a letter signed by the park superintendent (Dillman, Smyth, and Christian 2013). Second, the screener would be sent via first class mail and have the NPS logo. Third, multiple contacts would encourage non-respondents to complete the survey (including a thank-you/reminder postcard and up to two replacement screeners). We anticipate that a mail screener response rate of 60 percent or higher can be achieved. The respondent data would be post-stratified to match the frame data with respect to available covariates (Kalton and Flores-Cervantes 2003).

From among the subset of mail screener respondents who anticipate taking boating trips on the James River in the upcoming year, a sample of 1,000 boaters would be drawn for the panel. A calendar (for recording trip dates) and map (for identifying trip destinations) would be mailed to all panel members in late February.

Stage 2: Repeat-Contact Phone Survey of Boating Panel Participants- The second stage of the boater survey would involve contacting boating panel members throughout the boating season (defined as March through October) to obtain data on the number and destination of all local boating trips. In order to minimize recall bias (Sudman and Bradburn 1973; Chu et al. 1992; Connelly, Brown, and Knuth 2000; Connelly and Brown 2011), panel participants would be phoned at the beginning of every month to obtain trip data for the previous month. A similar monthly-contact panel design was used in the United States Coast Guard's National Recreational Boating Survey (ICF 2013) and by Parsons et al. (2009) in a study for NPS designed to obtain data on beach trips in Texas.

For each boating trip, panel members would be asked to report the trip origin (typically the respondent's home), launch location, and destination. Trip destinations would be reported by three-mile river reach. These reaches would be clearly defined on the respondent's map. One of the three-mile reaches on the James River would bracket the proposed transmission line crossing.

Every month, up to six separate phone contacts would be attempted with each panel member. A reminder letter would be sent to any respondent who cannot be reached, and trip data for the respondent would be collected during the subsequent month. If a panel member does not respond for two consecutive months, she would be removed from the panel. The panel observations would be reweighted during the analysis to address any avidity bias due to panel attrition.

Stage 3: Mail Survey with Contingent Behavior Questions- The third stage of the study would involve a mail survey with contingent behavior questions, sent to the respondent after the end of the boating season. The survey would summarize the trips taken by the respondent during the previous nine months. It would then describe the proposed transmission line and ask how the number and destination of the respondent's trips would have differed (if at all) if the transmission line had been in place. In order to provide a complete description of the proposed transmission line, a map and before/after photos of views from the water would be included in the survey materials.

Information Provided

The James River boating survey would provide data on actual and hypothetical boating trips. The actual trip data could be used to estimate the number of annual boating trips currently taken to areas of the James River near the proposed line crossing. The hypothetical trip data could be used to predict the *change* in the number of annual boating trips to each river segment if the proposed transmission line were built.

The two sources of trip data would be combined to estimate a RUM travel cost model (Parsons 2003), allowing for an assessment of losses to boaters associated with the proposed line. For example, a simple RUM model with alternative-specific constants (ASCs) associated with each river segment and time period (i.e., separate ASCs for before and after construction of the transmission line) could be estimated. The impact of the line would then be reflected in changes in the magnitude of the ASCs associated with the river segments that are close to the crossing location. If these ASCs are lower after the construction of the transmission line (based on the hypothetical trip data), then respondents are indicating that they would avoid boating in areas near the proposed line, thus leading to losses. The change in the magnitude of these ASCs could be used within a standard RUM framework (Small and Rosen 1981) to assess annual losses to boaters.

Tasks

The following tasks would be required to implement the study:

1) Detailed study plan
2) Site reconnaissance to obtain "before" photos from all relevant boating viewpoints
3) Draft survey instrument (mail screener, phone survey, mail follow-up) and associated photographs
4) OMB Information Collection Request for pretest
5) Pretest of draft survey instrument
6) OMB Information Collection Request for full survey
7) Survey implementation
8) Mail screener
9) Repeat-contact phone survey
10) Mail survey with contingent behavior questions
11) Data entry
12) Analysis and reporting

DATA COLLECTION FOR OTHER POTENTIALLY IMPACTED SITES

As noted, construction of the proposed line has the potential to impact outdoor recreation in several areas outside of Colonial NHP and the Captain John Smith Trail. These impacts could potentially be evaluated through similar, supplemental studies.

Hog Island

Hog Island Wildlife Management Area is managed by VDGIF, and it is used primarily by hunters, anglers, and bird watchers. As the island's north-south access road is bordered on the east by ponds, shallow marshes, and fields, the proposed line would likely be a prominent feature on the horizon, visible to nearly all visitors.

The impact to Hog Island visitors could potentially be investigated through a mail survey effort. Dominion's security personnel currently inspect all visitors and vehicles entering Hog Island, and they could compile a database of visitors' addresses from which to sample. Alternatively, a self-registration kiosk could be installed at the entrance to the island, and the addresses of self-registered visitors could be sampled, together with the addresses of visitors participating in VDGIF-organized hunts on the island. A mail survey could be sent to these sampled addresses. The survey could cover topics such as the frequency of Hog Island visits, typical activities pursued, desired restoration/enhancement projects, and the potential impact of the proposed line on the respondent's trip.

Any research effort focused on Hog Island visitors would be subject to consultation with VDGIF.

Carter's Grove Plantation

The mansion at Carter's Grove has a majestic lawn/garden that gradually drops down to the river and the proposed line would be a prominent feature visible from these areas. Carter's Grove has been open to visitors in the past, although it is currently closed to the public for renovation. If the mansion opens to the public, a visitor survey similar to that for Historic Jamestowne visitors could be implemented, with an on-site intercept and mail follow-up.

Any research effort focused on Carter's Grove visitors would be subject to consultation with the owners of the property.

GENERAL POPULATION NON-USE SURVEY

As discussed in Section II, qualitative factors suggest that non-use losses associated with the proposed line may be substantial. Stated preference methods (e.g., contingent valuation) are the only valuation methods capable of measuring non-use values. Beginning formally with the National Oceanic and Atmospheric Administration Panel report (Arrow et al. 1993), best practice standards in the conduct of contingent valuation studies have been established (e.g., see Carson 2012).

The first step in the design of a contingent valuation study would involve several focus group sessions designed to: 1) test draft survey language and visual materials; and, 2) gauge the general salience of the proposed project in different regions of the U.S. At a minimum this would likely involve implementing focus groups at southeastern, northeastern, central and west coast locations. The groups would be held in established facilities, with randomly recruited members of the general public that are socioeconomically diverse.

Similar to the visitor survey, the general population survey would feature a neutral, plausible scenario where individuals would be asked their willingness to pay for a more costly alternative to the proposed line that would reduce visual impacts to the area, as conveyed through a map, pictures and verbal descriptions. The survey would be administered via mail to a random sample of households using the U.S. Postal Service Delivery Sequence File. The same design and mailing protocols described in the visitor survey (Dillman et al. 2009) would be followed to maximize the response rate. A relatively recent stated preference mail survey of residents in the southeastern and southwestern U.S. achieved a response rate of 33 to 39 percent (Paterson et al. 2013).[21] A small scale pre-test would be conducted prior to the full survey to ensure that all survey materials and implementation procedures are functioning properly.

Finally, to facilitate investigation of potential bias, a follow-up survey of nonrespondents would be conducted. This follow-up survey would be brief, dissociated from the main survey, administered in a different fashion (e.g., Priority Mail or Fed-Ex), and feature a more generous incentive. The goal of the follow-up survey would be to collect demographic and other data that may be used to correct for differences in respondent and nonrespondent characteristics that may affect average willingness to pay estimates.

Given a household estimate of non-use value, the average can then be aggregated over the relevant population to determine total losses.

Tasks

The following tasks would be required to implement the study:

1) Detailed study plan
2) Draft survey instrument and materials
3) OMB Information Collection Request for focus groups and pretest
4) Conduct focus group testing of survey instrument
5) Pretest of draft survey instrument
6) OMB Information Collection Request for full survey
7) Survey implementation
8) Analysis and reporting

IV. CONCLUSIONS

Following basic economic principles, and drawing upon published research, it is reasonable to expect that the proposed transmission line will result in adverse economic impacts to visitors, boaters, private landowners, and some fraction of the general public. Given the cultural and historic significance of this area of the James River, the magnitude

[21] An alternative implementation strategy that may conserve resources would involve use of an established, representative on-line panel such as the National Opinion Research Center's AmeriSpeak panel. However, this would be contingent upon the ability to satisfactorily present the survey instrument in an on-line environment, and approval by OMB.

of the potential impacts may be quite large. Unfortunately, existing data and information are inadequate to evaluate these impacts. This report describes three studies that, if implemented, could be used to quantify impacts, providing information that would result in a more informed decision regarding approval of the project.

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APPENDIX A. RESUMES

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ROBERT W. PATERSON PRINCIPAL

Overview

Mr. Paterson's academic training, research and professional experience are in the areas of applied economics and econometrics, with an emphasis on environmental and natural resource applications. Mr. Paterson has worked with Industrial Economics, Incorporated for 20 years, providing expert technical support in natural resource damage assessments for state, federal and tribal trustees and conducting numerous other economic analyses for clients such as the U.S. Fish and Wildlife Service, the U.S. Department of Justice, the National Park Service, the National Oceanic and Atmospheric Administration, Health Canada, the U.S. Environmental Protection Agency and several private law firms.

Education

Master of Science in Resource Economics and Policy, University of Maine, Orono

Bachelor of Arts, Economics, with Distinction, Colby College

Mr. Paterson is a member of the American Economic Association and the Association of Environmental and Resource Economists.

Selected Project Experience

For the **NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION**, leading the final development, implementation and analysis phases of a national stated-preference study designed to estimate the value of ecological and human use losses resulting from the 2010 Deepwater Horizon oil spill.

For the **U.S. DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE**, designing and implementing a national stated-preference study to estimate the benefits of improved visibility at park units and Class I wilderness areas.

For state and federal trustees, estimated damages to recreational resources resulting from PCB contamination on Lake Hartwell, South Carolina/Georgia, negotiated settlement, and developed a Restoration and Compensation Determination Plan.

For a group of private law firms representing the **STATE OF NEW JERSEY**, utilized valuation and equivalency methods to estimate damages associated with MTBE groundwater contamination at sites throughout the state.

For the **ILLINOIS ATTORNEY GENERAL'S OFFICE**, estimated the benefits of improved water quality in Chicago's urban waterway system to support a negotiated rulemaking regarding wastewater disinfection.

For state, federal and tribal trustees, estimated economic damages to recreational and tribal resources resulting from contamination on the lower St. Louis River, Minnesota.

For the **NATIONAL PARK SERVICE**, estimated the value of recreational and ecological impacts expected to result from an upgraded transmission line traversing the Delaware Water Gap National Recreation Area and the Appalachian Trail.

For the **DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL**, directed a study to measure the value of coastal and inland wetland ecosystem services using integrated ecological and economic models.

Additional examples of Mr. Paterson's project experience include:

Natural Resource Damage Assessment & Environmental Valuation

For the **U.S. DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE**, estimated recreational fishing damages associated with fish consumption advisories and avoided stocking activities on the Sheboygan River in Wisconsin due to PCB contamination.

For the **STATE OF NEW JERSEY**, served as co-Principal Investigator for a statewide stated-preference groundwater valuation study.

For the **STATE OF ARKANSAS**, developed a contingent behavior study to estimate recreational fishing damages resulting from the Mayflower oil spill.

For the **NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION**, estimated recreational fishing damages associated with fish consumption advisories on the lower Delaware River.

For the **U.S. ENVIRONMENTAL PROTECTION AGENCY, OFFICE OF THE CHIEF FINANCIAL OFFICER**, estimated the recreational and ecological benefits of several American Recovery and Reinvestment Act funded water quality and land cleanup projects.

For the **NATIONAL PARK SERVICE**, leading a stated-preference study designed to estimate the value of reducing noise pollution in park units.

For the **WAMPANOAG TRIBE OF AQUINNAH**, estimated damages to subsistence and cultural resources associated with the Bouchard oil spill in Buzzards Bay, Massachusetts.

For a private law firm, developed models to estimate residential property value diminution along a dioxin-contaminated floodplain in Michigan.

For the **U.S. ENVIRONMENTAL PROTECTION AGENCY, NATIONAL CENTER FOR ENVIRONMENTAL ECONOMICS**, conducted parallel hedonic property value and stated preference studies to estimate the benefits of preventing/remediating releases from underground storage tanks.

For a private law firm, estimated economic damages suffered by a class of commercial fishermen associated with pesticide contamination of the Long Island Sound lobster fishery in Connecticut/New York.

For the **NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION**, led a cooperative process to evaluate recreational resource restoration projects on the Passaic River, New Jersey.

For a private law firm representing the **STATE OF NEW JERSEY**, provided expert support in estimating damages associated with ecological injuries at two large refinery sites.

Provided technical support in estimating economic damages suffered by a class of residential property owners adjacent to an industrial facility in Lakeland, Florida.

Provided technical support in estimating economic damages to property owners associated with emissions from an industrial-scale meat processing plant in Nebraska.

For the **UNITED NATIONS COMPENSATION COMMISSION**, evaluated natural resource damage claims arising from Iraq's invasion and occupation of Kuwait in 1991.

For the **MISSOURI DEPARTMENT OF NATURAL RESOURCES**, developed a travel cost recreational demand model to estimate losses at a state park compromised by a reservoir breach.

For the **U.S. ENVIRONMENTAL PROTECTION AGENCY, OFFICE OF AIR QUALITY PLANNING & STANDARDS**, developing hedonic property value models incorporating urban/residential visibility conditions.

For the **U.S. DEPARTMENT OF JUSTICE**, developed estimates of recreational fishing damages on a contaminated waterway in northeastern New Jersey.

For the **NATIONAL PARK SERVICE**, providing programmatic support in damage assessment under the System Unit Resource Protection Act, including updating internal guidance, establishing best practice in valuation of vegetation injuries, and recommending methods for recovery of response/restoration equipment costs.

Provided technical support in estimating economic damages suffered by a class of residential property owners in Brooklyn, New York associated with groundwater contamination.

For the **STATE OF MAINE**, conducted reviews of economic damage determination and proposed restoration actions at a former nuclear power facility and a Superfund site.

For the **STATES OF MASSACHUSETTS AND NEW JERSEY**, developed guidance on groundwater damage assessment.

For the **NATIONAL PARK SERVICE**, assisted in developing a claim for damages to historic landscapes and other park resources at Saratoga National Historical Park, New York resulting from PCB contamination of the Hudson River.

For the **STATE OF NEW MEXICO**, provided technical support in estimating groundwater damages from a Superfund site.

Provided technical support in estimating economic losses associated with groundwater contamination at two sites in the **U.S. VIRGIN ISLANDS**.

Provided technical support in estimating damages to a Rhode Island water district associated with municipal well contamination and closure.

For the **WASHINGTON SUBURBAN SANITARY COMMISSION** and the **NATIONAL PARK SERVICE,** estimated the value of recreational and ecological impacts expected to result from a new water intake project along the Chesapeake and Ohio Canal National Historical Park.

For the **U.S. FISH AND WILDLIFE SERVICE**, developed a comprehensive database of sportfishing valuation literature and conducted meta-analyses of estimated values.

Provided technical support in estimating economic damages suffered by a class of residential property owners in Lisle, Illinois associated with groundwater contamination.

For the **U.S. DEPARTMENT OF JUSTICE** and other federal agencies, provided technical support in estimating groundwater damages at former military sites in Rhode Island, Ohio, Colorado and Minnesota.

Developed models to estimate economic damages to a class of private property owners adjacent to a refinery site in southwestern Illinois.

Developed preliminary estimates of economic damages to recreational resources at several additional sites, including the Shenandoah River, Virginia; TVA/Kingston plant, Tennessee; Southeast Lead Mining District, Missouri; Richland, Clear and Salt Creeks, Indiana; Oak Ridge Reservation, Tennessee; Jamaica Bay, New York; St. Lawrence River, New York; and the White River, Indiana.

Regulatory & Other Economic Analyses

For the **NATIONAL PARK SERVICE**, conducted a cost-benefit analysis of a proposed commercial fishing management plan at Biscayne National Park.

For the **NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION**, developed a spatial economic model to evaluate climate change threats to potential coastal restoration sites in the Puget Sound.

For the **U.S. FISH AND WILDLIFE SERVICE**, estimated costs and benefits associated with critical habitat designation under section 7 of the Endangered Species Act for several species in the southwest U.S., California and Florida.

For the **U.S. ENVIRONMENTAL PROTECTION AGENCY, OFFICE OF POLICY ANALYSIS AND REVIEW**, provided technical support in estimating the benefits of improved residential visibility for the Section 812 Second Prospective analysis of the Clean Air Act Amendments.

For the **U.S. FISH AND WILDLIFE SERVICE**, designed and conducted research on the housing market impacts of critical habitat designations for endangered species.

For the **U.S. DEPARTMENT OF JUSTICE**, provided critiques of econometric analyses submitted in conjunction with a lawsuit brought against the U.S. Environmental Protection Agency regarding CERCLA.

For the **MINNESOTA FOREST RESOURCES COUNCIL**, advised on approaches to incorporating non-market benefits in riparian forest management policies.

For the **NATIONAL WILDLIFE FEDERATION**, conducted an economic analysis of recreational resources in the vicinity of a proposed underground mine site in northern Michigan.

For **HEALTH CANADA**, designed and implemented a national stated-preference study to evaluate increased efficacy of smoking cessation therapies.

For the **U.S. CITIZENSHIP AND IMMIGRATION SERVICE**, conducted an econometric analysis of the demand for immigration services and benefits.

For the **U.S. FISH AND WILDLIFE SERVICE**, conducted economic analyses of several existing and proposed National Wildlife Refuges (NWRs), including the Necedah NWR in Wisconsin, the Monomoy and Nantucket NWRs in Massachusetts and the proposed Aldo Leopold NWR in Wisconsin.

For the **NATIONAL PARKS CONSERVATION ASSOCIATION**, developed a report on the economic benefits of instream flows and lake levels in Colorado River watershed park units.

For the **U.S. FISH AND WILDLIFE SERVICE**, conducted a comprehensive economic analysis of migratory shorebird recovery activities on the Atlantic coast.

For **HEALTH CANADA**, designed and implemented a national stated-preference study to value elimination of certain harmful attributes of chemical substances in commerce.

For **HEALTH CANADA**, adapted and implemented a stated-preference study to value avoided children's health risks from lead paint exposure.

Selected Publications

Boyle, Kevin J., Robert Paterson, Richard Carson, Christopher Leggett, Barbara Kanninen, John Molenar and James Neumann, "Valuing Shifts in the Distribution of Visibility in National Parks and Wilderness Areas in the United States," *Journal of Environmental Management,* 173, May 2016.

Boyle, Kevin J., Christopher F. Parmeter, Brent B. Boehlert and Robert W. Paterson, "Due Diligence in Meta-Analysis to Support Benefit Transfers," *Environmental and Resource Economics*, 55(3), July 2013.

Flight, Maura J., Robert Paterson, Kate Doiron and Stephen Polasky, "Valuing Wetland Ecosystem Services: A Case Study of Delaware," Environmental Law Institute National Wetlands Newsletter, 34(5), September/October 2012.

Friberg, Richard, Robert W. Paterson and Andrew D. Richardson, "Why is there a Home Bias? A Case Study of Wine," *Journal of Wine Economics,* 6(1), April 2011.

Huguenin, Michael T., Michael C. Donlan, Alexandra E. Van Geel and Robert W. Paterson, "Assessment and Valuation of Damage to the Environment," in Gulf War Reparations and the UN Compensation Commission, Oxford University Press, 2011.

Paterson, Robert W., Kevin J. Boyle, Christopher F. Parmeter, James E. Neumann and Paul De Civita, "Heterogeneity in Preferences for Smoking Cessation," *Health Economics,* 17(12), December 2008.

Nguyen, To N., W. Douglass Shaw, Richard T. Woodward, Robert W. Paterson and Kevin J. Boyle, "An Empirical Study of Option Prices for Hunting Permits," *Ecological Economics* 63(2-3), August 2007.

Moeltner, Klaus, Kevin J. Boyle and Robert W. Paterson, "Meta-Analysis and Benefit Transfer for Resource Valuation- Addressing Classical Challenges with Bayesian Modeling," *Journal of Environmental Economics and Management* 53(2), March 2007.

Zabel, Jeffrey E. and Robert W. Paterson, "The Effects of Critical Habitat Designation on Housing Supply: An Analysis of California Housing Construction Activity," *Journal of Regional Science* 46(1), February 2006.

Paterson, Robert W., Kevin J. Boyle, Mary Ahearn, Anna Alberini, John Bergstrom, Larry Libby and Michael P. Welsh, "Public Preferences for Farmland Attributes in Conservation Easement Programs," in Land Use Problems and Conflicts, Routledge Publishers, 2005.

Paterson, Robert W. and Kevin J. Boyle, "Out of Sight, Out of Mind? Using GIS to Incorporate Visibility in Hedonic Property Value Models," *Land Economics* 78(3), August 2002.

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DR. CHRISTOPHER LEGGETT **CONSULTING ECONOMIST**

Overview

Dr. Leggett is an economist with extensive applied experience with recreation count and valuation studies, statistical sampling, and survey design. His work has focused on valuing and quantifying outdoor recreation for public agencies, assessing economic losses in natural resource damage assessments (NRDAs), and program evaluation. He has led several major survey and recreation count efforts throughout the United States for federal and state agencies. Many of these efforts have involved innovative statistical sampling designs or survey strategies. Dr. Leggett has provided extensive support to a variety of public-sector clients, including the Department of Justice (DOJ), the National Oceanic and Atmospheric Administration (NOAA), Fish and Wildlife Service (FWS), the National Park Service (NPS), the state of California, and the New York State Attorney General's Office.

Dr. Leggett has published in leading journals such as Land Economics, Journal of Environmental Economics and Management, Marine Resource Economics, Environmental and Resource Economics, and Journal of Environmental Management. He has taught introductory statistics as an Adjunct Professor at the University of Massachusetts, Amherst.

Education

Doctor of Philosophy in Agricultural and Natural Resource Economics, University of Maryland, College Park.

Master of Science in Agricultural and Natural Resource Economics, University of Maryland, College Park.

Bachelor of Arts in Earth and Planetary Sciences, Harvard University, Cambridge, Massachusetts.

Project Experience

For the **U.S. Department of the Interior, National Park Service**, serving as Principal Investigator for a report designed to provide guidance on methodologies for estimating visitation in national parks and other public lands. The report provides a detailed description of the intuition and mathematics underlying various statistical sampling techniques, approaches to conducting on-site count studies, general population survey techniques, and automated count technologies. (2014-2015)

For the **National Oceanic and Atmospheric Administration**, serving as Principal Investigator (with Dr. Timothy Haab) for a study designed to assess the benefits of reductions in marine debris on beaches in Orange County, California. The study involved the collection of data on beach characteristics (including marine debris levels) and beach trips for use in a random utility maximization (RUM) model of beach visitation. Dr. Leggett moderated focus groups, designed a general population address-based sampling mail survey, provided assistance and oversight during data collection, developed design-based survey weights, estimated the model, and drafted major sections of the final report. (2012-2014)

For the **U.S. Department of the Interior, National Park Service**, conducting an economic analysis of Texas Gulf Coast beach visitation. Working with a team of academic economists, Dr. Leggett developed a repeat-contact, mixed-mode (telephone and mail) survey of Texas residents, estimated a beach visitation random

utility model (RUM) using data from the survey, and used the estimated model to calculate losses associated with potential beach closures. The study was conducted in anticipation of natural resource damage assessments associated with future oil spills on the Texas Gulf Coast. (2000-2003)

For the **U.S. Department of the Interior, National Park Service**, assisting with the development and implementation of a stated preference survey designed to assess the value of visibility improvements at national parks and wilderness areas. Working with a team of top academic experts, Dr. Leggett provided assistance with a general population address-based sampling (ABS) mail survey. He participated in meetings with OMB economists and statisticians to discuss the advantages and disadvantages of various sampling approaches and survey modes. He was responsible for analyzing all survey data from the pilot study, including the development of statistical weights and the estimation of models using choice question data. (2008-2013)

For the **U.S. Department of the Interior, National Park Service**, designing and implementing an on-site survey of visitors to Lake Roosevelt National Recreation Area. Dr. Leggett worked with academic statisticians to design the sampling approach, which involved stratified random sampling of days and interview locations. The survey involved twelve months (including over 450 separate shifts for field personnel) of on-site sampling at over 30 different access points, and it provided a detailed assessment of visitor activities on the 150-mile long lake, including boating, angling, camping, and beach activities. Avid anglers intercepted on site were recruited to participate in a three-month fish consumption diary study. While the survey was designed primarily to provide estimates of exposure for use in an EPA human health risk assessment, visitor exit counts were completed at all sampling locations, allowing for the development of visitation estimates. In addition, automated vehicle counters were deployed at nine locations to provide supplemental data on the temporal distribution of trips. Dr. Leggett coordinated the design, implementation, analysis, and report writing for the project. (2004-2013)

For the **U.S. Department of the Interior, National Park Service**, conducting an economic analysis of visits to southwestern national parks. Dr. Leggett assisted academic experts in modifying the traditional random utility model in order to address multiple-destination trips. He developed and implemented a mail survey that was sent to nearly five thousand individuals visiting national parks in the southwest. Dr. Leggett then worked closely with academic experts to estimate the multiple-destination random utility model and to estimate the economic losses associated with a temporary park closure. (2000-2004)

For the **National Oceanic and Atmospheric Administration**, working with a team of leading academic economists in assessing recreational losses resulting from the 2010 Deepwater Horizon Oil Spill. Dr. Leggett's participation focused on analyzing and organizing a variety of datasets used as input for the random utility maximization (RUM) travel cost model, providing input on methodological issues, assisting with the calculation of driving and flying travel costs, and providing assistance in evaluating and estimating the RUM travel cost model. (2013-2015)

For the **State of California**, assessing recreational losses from the 2015 Refugio Beach Oil Spill near Santa Barbara. Dr. Leggett's involvement has included assessing and analyzing existing data sources, designing an on-site data collection effort for the spill anniversary period in 2016, and communicating with expert consultants hired by the responsible party. (2015-2016)

For the **National Oceanic and Atmospheric Administration**, designing a major on-site data collection effort to estimate baseline visitation at coastal parks in the San Francisco Bay area, including Golden Gate National Recreation Area and San Francisco Maritime National Historic Park. The effort provided information required for a natural resource damage assessment associated with the Cosco Busan Oil Spill. The natural

resource damage assessment evaluated lost recreational opportunities for swimmers, anglers, crabbers, surfers, and other coastal visitors due to the spill. The data collection involved on-site visitor counts by several dozen field personnel at 23 locations impacted by the spill, including parks, beaches, piers, boardwalks, and bike paths. Automated vehicle and pedestrian counters were deployed at 14 locations to leverage on-site efforts and to provide high quality use estimates in a cost effective manner. Dr. Leggett coordinated the design, implementation, analysis, and report writing for the project. (2008-2010)

For the **National Oceanic and Atmospheric Administration**, developing a study designed to (1) assess the performance of automated visitor count technologies and (2) estimate visitor use at a newly constructed coastal wetland area within Lincoln Park in Jersey City, New Jersey. Dr. Leggett designed a two-month data collection effort that incorporates a combination of on-site counts and OMB-approved surveys by field personnel, automated pedestrian counts from an infra-red device at the main entrance, and counts by personnel remotely viewing video footage of the main entrance. One of the goals of the study was to develop low-cost approaches to assessing visitation at coastal sites that have been restored as part of natural resource damage assessments. Dr. Leggett coordinated the design, analysis, and report writing for the project. (2009-2012)

For the **U.S. Department of the Interior, National Park Service**, designing and implementing a study to assess visitor activities at two popular units within Golden Gate National Recreation Area in San Francisco. The study was implemented in order to gather data in support of an Environmental Impact Statement for a proposed rulemaking related to the management of dog walking activities in the park. Dr. Leggett developed the statistical approach and data collection forms, supervised a team of ten field personnel during on-site data collection, and led the data analysis and report writing. (2011)

For a **State Client** (confidential), developing a phone survey designed to assess use of coastal areas of the state by boaters, anglers, and beach visitors. The survey was conducted using a sample of landline and cell phone numbers within a dual frame, non-overlapping design. Dr. Leggett conducted the data analysis, including the development of design-based weights and iterative proportional fitting (i.e., raking) to match demographic controls. (2012-2013)

For the **Commonwealth of Virginia**, designing a mail survey of licensed anglers in southwest Virginia. The survey collected information useful for management purposes, as well as data on angler trips to support a natural resource damage assessment. Dr. Leggett developed the draft and final survey materials, he provided assistance with survey implementation, and he analyzed the survey data. (2007-2012)

For the **U.S. Department of the Interior, Fish and Wildlife Service**, Dr. Leggett is working closely with NRDA Trustees and the Responsible Party in a cooperative assessment designed to assess recreational losses due to contamination in Onondaga Lake, New York. As part of that effort, he estimated a random utility maximization (RUM) model of New York angler site choice. To calibrate the RUM model, Dr. Leggett designed an on-site count study to assess current angling and boating activity on the lake. (2011-2016)

For the **U.S. Department of the Interior, Fish and Wildlife Service**, providing assistance to federal, state, and tribal Trustees in a cooperative assessment process designed to evaluate natural resource damages due to the release of toxic substances in the Grasse, Raquette, and St. Lawrence Rivers. In cooperation with RP consultants, Dr. Leggett used a random utility model to estimate angler losses due to fish consumption advisories and to scale restoration. He provided assistance to the Trustees in identifying suitable restoration projects for recreational anglers, and he moderated a focus group with local anglers in order to identify priorities for new angler access to local waterways. (2007-2009)

For the **U.S. Department of the Interior, Fish and Wildlife Service**, assisting federal and state Trustees in a cooperative assessment process focused on evaluating natural resource damages due to zinc emissions in Palmerton, Pennsylvania. Dr. Leggett developed preliminary estimates of losses to hikers, hunters, and anglers. He also developed and oversaw the implementation of a complex, on-site survey designed to estimate the number of potentially impacted hiking trips. The hiking survey was conducted over a seven-month period with on-site intercepts at six different trailheads that provide access to the Appalachian Trail in the Palmerton area. Fifty-eight sampling days were systematically allocated throughout the seven months to ensure adequate coverage of holidays, weekends, and weekdays. (2006-2009)

For the **U.S. Environmental Protection Agency's Evaluation Support Division**, working with EPA/IEc team to develop and implement a study designed to assess behavioral changes associated with compliance assistance provided by EPA to auto body shops. The study design involved a combination of experimental techniques (i.e., random assignment to treatment/control groups) and quasi-experimental techniques to assess the degree to which EPA assistance contributed to changes in behavior. Data were gathered through phone surveys with shop managers and through on-site inspections by trained personnel. Dr. Leggett led the statistical analysis for the project and worked collaboratively with EPA on the study design (including preparation of Information Collection Request for the Office of Management and Budget), study implementation, and report writing. (2008-2011)

For the **New York State Office of Attorney General (NYSOAG)**, analyzing economic losses due to fish consumption advisories in Lake Ontario. Dr. Leggett was hired as a potential expert witness in economics for NYSOAG's natural resource damage claim against Occidental Chemical. He developed a unit-value benefit transfer analysis, presented his analysis of losses to consultants and attorneys representing Occidental, and provided assistance to New York State during settlement negotiations. (2003-2005)

For **National Oceanic and Atmospheric Administration**, developing an estimate of recreational fishing losses resulting from the Cosco Busan Oil Spill. The spill led to a temporary closure of recreational fisheries throughout the San Francisco Bay area. Dr. Leggett used data from California's Recreational Fisheries Survey (CRFS) and benefit transfer techniques to estimate welfare losses to recreational anglers. (2008-2010)

For **National Oceanic and Atmospheric Administration**, estimating the recreational fishing losses resulting from the release of toxic substances in a major Louisiana estuary. This project required the use of data from a National Marine Fisheries Service survey to estimate the number of fishing trips taken to the estuary. Dr. Leggett applied a unique approach to benefits transfer in estimating losses. (2002-2004)

For **National Oceanic and Atmospheric Administration**, coordinated and moderated focus groups with recreational anglers in Louisiana. The focus groups were organized to provide an initial assessment of recreational fishing in the area, including anglers' site choice decisions and reactions to fish consumption advisories. Dr. Leggett developed a telephone screener, designed a participant booklet, and served as moderator for the focus groups. After conducting the focus groups, Dr. Leggett worked closely with an academic expert to develop a detailed study plan for an assessment of losses due to the release of toxic substances. (2003-2004)

For the **U.S. Department of the Interior, National Park Service**, estimating visitor user day values for an historic fort using contingent valuation techniques. The survey was conducted using a split sample design in order to investigate the impact of survey mode on visitors' willingness-to-pay. Dr. Leggett conducted the statistical analysis and prepared a manuscript describing the results for submission to an academic journal. (2002)

For **New York State**, developing and delivering a training seminar on the use of random utility models (RUMs) in natural resource damage assessments. The seminar included an introduction to the basic economic theory underlying the RUM, a discussion of estimation techniques and welfare analysis, and an application using a simple RUM data set. (2004)

Selected Reports

Travel Cost Computation. Memorandum to Craig O'Connor, National Oceanic and Atmospheric Administration for Deepwater Horizon Oil Spill Natural Resource Damage Assessment. August 7, 2015.

Value of Travel Time and Income Imputation (with Eric English and Kenneth McConnell). Memorandum to Craig O'Connor, National Oceanic and Atmospheric Administration for Deepwater Horizon Oil Spill Natural Resource Damage Assessment. August 7, 2015.

Estimating Visitation in National Parks and other Public Lands. April 13, 2015. Report prepared for the National Park Service under contract to Bioeconomics, Incorporated, under award number P13PD02250.

Assessing the Economic Benefits of Reductions in Marine Debris: A Pilot Study of Beach Recreation in Orange County, California. June 15, 2014.

Assessment of Visitor Use of Restored Areas of Lincoln Park. July 1, 2013.

Recreational Consumption and Resource Use Survey for the Upper Columbia River Site Human Health Risk Assessment and Remedial Investigation/Feasibility Study: Data Summary Report. May 10, 2013.

Measuring the Effects of EPA Compliance Assistance in the Auto Body Sector: A Statistically Valid Pilot Project. Prepared for EPA Office of Strategic Environmental Management, Evaluation Support Division. June 14, 2012.

Assessment of Visitor Activities at Six Sites within Golden Gate National Recreation Area. Prepared for National Park Service, Golden Gate National Recreation Area. December 20, 2011.

Baseline Shoreline Use Estimates for the Cosco Busan Oil Spill Damage Assessment. Prepared for Cosco Busan Natural Resource Damage Assessment. December 30, 2010.

Recreational Fishing Damages Due to the Cosco Busan Oil Spill. Prepared for Cosco Busan Natural Resource Damage Assessment. December 30, 2010.

Recreational Consumption and Resource Use Survey Sampling and Analysis Plan for the Upper Columbia River Site Human Health Risk Assessment and Remedial Investigation/Feasibility Study. Prepared for U.S. Department of the Interior, National Park Service. August 30, 2010.

Palmerton Zinc Pile Superfund Site: Draft Data Report for the Appalachian Trail Hiker Count Study. April 22, 2008.

Valuing Visibility in National Parks: Final Study Plan, prepared for the National Park Service Air Resources Division, July, 2004.

Valuing Visibility in National Parks: An Overview of the Challenges, prepared for the National Park Service Air Resources Division, July, 2004.

Southwestern National Park Visitor Day Values, prepared for the National Park Service Environmental Quality Division, February 2004.

Documentation of Visitor Impacts from Howard/White Unit No.1 Oil Spill, prepared for the National Park Service Environmental Quality Division, April 2003.

Padre Island National Seashore Visitor Day Values, prepared for the National Park Service Environmental Quality Division, January 2003.

Losses to Recreational Anglers Due to Contamination in the Calcasieu Estuary, prepared for the Damage Assessment Center, National Oceanic and Atmospheric Administration, March 2002.

Fort Sumter National Monument Visitor Day Values, prepared for the National Park Service Environmental Quality Division, March 2002.

Onondaga Lake Recreational Impact Assessment, prepared for the Natural Resources Damages Unit, New York State, August 2001.

Selected Publications

Leggett, Christopher G. "Sampling Strategies for On-Site Recreation Counts." *Journal of Survey Statistics and Methodology*. Submitted revision, January 2017.

Boyle, Kevin J., Paterson, Robert, Carson, Richard, Leggett, Christopher, Kanninen, Barbara, Molenar, John, and James Neumann. "Valuing Shifts in the Distribution of Visibility in National Parks and Wilderness Areas in the United States." *Journal of Environmental Management* 173: 10-22. 2016.

Leggett, Christopher G., Nora Scherer, Timothy C. Haab, Ryan Bailey, Jason P. Landrum, and Adam Domanski, "Assessing the Benefits of Reductions in Marine Debris at Southern California Beaches: A Random Utility Travel Cost Model." *Marine Resource Economics*. Invited to revise and resubmit. July 2015.

Parsons, George, Kang, Ami, Leggett, Christopher, and Kevin Boyle, "Valuing Beach Closures on the Padre Island National Seashore." *Marine Resource Economics* 24: 213-235. 2009.

Leggett, Christopher G., Kleckner, Naomi S., Boyle, Kevin J., Duffield, John, and Robert C. Mitchell, "Social Desirability Bias in Contingent Valuation Surveys Administered Through In-Person Interviews," *Land Economics*, 79(2003): 561-575.

Leggett, Christopher G., "Environmental Valuation with Imperfect Information: The Case of the Random Utility Model," *Environmental and Resource Economics*, 23 (2002): 343-355.

Leggett, Christopher G. and Nancy E. Bockstael, "Evidence of the Effects of Water Quality on Residential Property Values," *Journal of Environmental Economics and Management*, 39 (2000): 121-144.

Leggett, Christopher G., "Three Essays on Perceptions of Environmental Quality and Behavioral Approaches to Environmental Valuation." Ph.D. Dissertation, University of Maryland, College Park, Maryland, 2000.

Selected Presentations

Leggett, Christopher and Jennifer Baxter, "Tailored Comparison Groups: Implementing a Difference-in-Differences Analysis When the Timing of the Intervention Varies Across Observations." Invited Presentation at the Society for Benefit Cost Analysis Annual Meeting, Washington D.C., 2016.

Leggett, Christopher, "Measuring Outdoor Recreation," Invited Seminar at the Center for the Environment, Plymouth State University, September 10, 2008.

Leggett, Christopher G., "Social Desirability Bias in Contingent Valuation Surveys Administered Through In-Person Interviews," Invited seminar at the Department of Resource Economics, University of Massachusetts, Amherst, 2002.

Leggett, Christopher G., "Evidence of Social Desirability Bias in Contingent Valuation Surveys Administered Through In-Person Interviews," Selected paper at the 2nd World Congress of Environmental and Resource Economists, Monterey, California, 2002.

Leggett, Christopher G., "Environmental Valuation with Imperfect Information," Invited seminar at the Department of Economics, University of New Hampshire, 2001.

Leggett, Christopher G., "The Effect of Neighborhood Parks on Residential Property Values," Selected paper at the American Agricultural Economics Association Annual Meeting, Nashville, Tennessee, 1999.

Leggett, Christopher G., "Evidence of the Effect of Water Quality on Residential Property Values," Invited presentation at the Southern Economics Association Annual Meeting, New Orleans, Louisiana, 1999.

Leggett, Christopher G., "Evaluating the Benefits of Reductions in Fecal Coliform Bacteria: A Water Quality Hedonic." Invited presentation at the U.S. EPA Economy and the Environment Seminar Series, Washington, D.C., 1998; Selected paper at the American Agricultural Economics Association Annual Meeting, Salt Lake City, Utah, 1998.

RESPONSE TO *DOMINION VIRGINIA POWER RESPONSE TO COMMENTS MADE BY THE CONSULTING PARTIES CONCERNING THE REVISED DRAFT MEMORANDUM OF AGREEMENT COORDINATED JUNE 13, 2016*

Sullivan 1/10/2017

1. On Page 52 of *DOMINION VIRGINIA POWER RESPONSE TO COMMENTS MADE BY THE CONSULTING PARTIES CONCERNING THE REVISED DRAFT MEMORANDUM OF AGREEMENT COORDINATED JUNE 13, 2016*, Dominion states that it agrees that visual impacts must be considered under NEPA, and asserts the Corps should rely on the existing visual impact analysis prepared for Section 106 compliance to comply with NEPA. On Page 53, Dominion states that "The CREA's evaluation of impacts under 36 C.F.R. § 800.5, the facts surrounding the location of the transmission line and towers, and other record evidence, provide USACE with the information necessary to make significance conclusions regarding visual impacts under NEPA." These assertions are incorrect. Section 106 analysis is only to be used for evaluating impacts to historic properties, and it is scientifically unsound, inappropriate, and completely contrary to accepted professional practice to use a Section 106 analysis for assessing impacts to scenic resources and visitor experience. A cultural resource analysis is fundamentally different than a visual resource analysis, and cannot be substituted for it. The two analyses assess different impacts to different resources and use methods specific to the resources and impacts they were designed to analyze. There are many reasons why using an impact assessment methodology designed to assess impacts to historical properties is inappropriate for assessing impacts to scenic resources and visitor experience, but two major reasons include limiting visual impacts to the integrity of the historic setting and the very limited area of potential effect used for Section 106 analysis. These limits simply do not apply to scenic resource and visitor impacts. Any conclusions about visual impacts made by the CREA are relevant only to impacts to historic sites, and do not address impacts to scenic resources or NPS visitor experience, and thus cannot be used to make assertions about the nature, magnitude, or significance of those impacts.

2. On page 53, Dominion states that "An EIS is not required here because the unmitigated adverse effects are not significant…" This statement is incorrect. As noted by NPS in *National Park Service Comments on Draft Memorandum of Agreement and Related Documents Surry-Skiffes Creek-Whealton Aerial Transmission Line Proposal* of July 27, 2016, the project, because of its extremely large size (both the project as a whole and its individual components) and its other visual properties would create a high degree of visual contrast for a very large number of viewers, many with long duration views, and many sensitive to its distinctly man-made industrial appearance, which is wholly inconsistent with the historic character of the landscape and its scenic values. The substantially affected lands include a National Park, a National Historic Trail, a National Scenic Byway/All American Road, a National Historic Landmark, two National Register Historic Districts and several sites listed or eligible for listing on the National Register of Historic Places. NPS has documented that the scenic and recreation experiences of millions of visitors are likely to be adversely affected over the 50-year life of the project. As noted by NPS, users of

the National Historic Trail will pass directly under the transmission line, in very close proximity to the towers. There is no question that at least some of the NPS units and many visitors will be substantially adversely affected, but that determination requires a thorough analysis of the impact on scenic and recreational resources, and NPS unit visitor experiences, and none has been conducted. The significant impacts of the proposed project in an area of national importance merits a formal visual impact analysis based on standard methodology for completing such an analysis.

3. On page 54, Dominion states the following: "Here, the effects of the Project are localized, not national. As discussed in the CREA, Severity White Paper, Context Document, and Mitigation Correlation, the visual effects are negligible to moderate…" These statements are incorrect. First, by definition, National Parks, National Historic Trails, National Scenic Byways/All American Roads, National Historic Landmarks, and National Register Historic Districts are of national importance, and impacts to them cannot be considered "localized." Secondly, as noted above, a Section 106 analysis cannot be substituted for a visual impact analysis. Impacts to the integrity of historic resources are fundamentally different than impacts to scenic and recreation resources, and applying Section 106 impact analysis standards to scenic and recreation resources will often come up with incorrect results, as in this case.

4. On Page 55, Dominion mentions *River Rd. Alliance v. Army Corps of Engineers*, and asserts that a finding of the court is that "Aesthetic impacts alone will rarely compel the preparation of an environmental impact statement…" As per NPS comments in *National Park Service Comments on Draft Memorandum of Agreement and Related Documents Surry-Skiffes Creek-Whealton Aerial Transmission Line Proposal* of July 27, 2016, the court likely deliberately and carefully chose the term "rarely" rather than "cannot" or "can never." In fact, the court's choice of the word "rarely" clearly shows that there could be situations where aesthetic impacts alone will, in fact, compel the preparation of an environmental impact statement. When the proposed project is a highly visible major industrial development that crosses, is adjacent to, and/or passes very close to multiple historic sites of national importance (in some cases designated as such by Congress), it is a case where a thorough analysis of impacts using approved methodology appropriate to the impact resources is justified, and such an analysis has not been conducted for the proposed project. A full and proper visual impact assessment conducted as part of an environmental impact statement under NEPA is most definitely the appropriate type of analysis for the proposed project; as noted by NPS in *National Park Service Comments on Draft Memorandum of Agreement and Related Documents Surry-Skiffes Creek-Whealton Aerial Transmission Line Proposal*, EISs are routinely conducted for major transmission projects, even when they do not impact multiple areas of national historic significance. As discussed in the same document (pages 15-17), the proposed project meets the criteria for "significance" (both in terms of intensity and context) set forth in Sec. 102 [42 USC § 4332] of NEPA. The improper use of the CREA (a cultural resource assessment) for analysis of scenic, recreational, and visitor experience impacts to conclude that there are insignificant impacts is completely invalid.

5. On Page 58, Dominion refutes NPS's assertion that the decision to approve the project must include consideration of visitor experience and aesthetic impacts, by asserting that the cultural resource analysis and the simulations created to support the cultural resource analysis provide adequate analysis of visual impacts. Similar statements to the effect that the CREA thoroughly analyzed visual impacts are made on page 60. Again, a cultural resource analysis cannot be substituted for a visual impact analysis.

6. On Page 65, dominion states that "…the CREA followed NPS Guidance regarding the evaluation of visual impacts. In particular, it evaluated the visual impacts from key observation points, where people are likely to be, as well as worst case viewing scenarios." The NPS Guidance is for conducting a visual impact assessment, not a cultural resources assessment, and therefore to suggest that the CREA used "NPS approved" methods is incorrect and misleading. In fact, the NPS visual impact assessment guidance requires consideration of impacts to the scenic resource itself, i.e., the nature, quantity, and distribution of scenic quality in and around the project area, as well as consideration of the number and types of viewers, the duration of expected views, and the sensitivity of the viewers to changes in the landscape. None of these considerations factored into the CREA; in fact, it did not address scenic or recreation impacts at all, which is why it cannot possibly be considered to be an adequate visual impact analysis for the proposed project. In truth, except for using key observation points and simulations, the CREA did not follow the NPS visual impact guidance.

7. On Page 75 (Issue 15), Dominion mischaracterizes NPS statements made in *National Park Service Comments on Draft Memorandum of Agreement and Related Documents Surry-Skiffes Creek-Whealton Aerial Transmission Line Proposal* regarding sensitivity of viewers to the project "given its massive size." The NPS comment referred to the sensitivity of viewers to changes in the landscape, based on their characteristics, including the activities in which they are engaged at the time they experience the impact. For example, people seeking a scenic experience are, on average, more sensitive to changes in the landscape than people who are simply traveling through the landscape. Many visitors to the nationally designated historic sites that would be adversely affected by the proposed project would be seeking to experience the landscape as it was experienced in the time period of historic interest, while many others will be seeking to enjoy scenic views. These people will have heightened sensitivity to major industrial intrusions into the view. This is not simply a commenter's opinion; it is an established principle of visual impact analysis.

In summary, a central issue concerning visual impact assessment for the proposed project is Dominion's position that the CREA analysis adequately and accurately assessed the visual impacts of the proposed project, and the Corps and the SHPO agreed. The CREA is a cultural resource assessment that analyzes impacts to historic properties, and that is all.[1] It does not, and cannot

[1] We note the NPS has submitted extensive comments on the inadequacies of the CREA from a cultural resource assessment perspective. However, that is not the focus of this particular analysis.

analyze impacts to scenic resources and the visitor experience of the historic properties and surrounding landscape beyond the historic properties, which will unquestionably be subjected to substantial impacts in some areas. The conclusions of the CREA are applicable solely to the impacts to the historic properties. They do not assess the important and likely significantly adverse impacts of the proposed project to scenic resources and visitor experience, thus Dominion's assertion that the CREA fully and accurately analyzed the visual impacts of the proposed project is fundamentally flawed. No analysis of the impacts of the proposed project's impacts to scenic resources, recreation resources, and the visitor experience has been conducted, and thus potentially significant impacts of the project (arguably the most significant impacts) are not addressed by any analysis to date. While the Corps and the SHPO may have agreed generally with the results of the CREA, their agreement is relevant only to the cultural resource assessment findings contained in the CREA, and cannot be represented as agreement with any findings regarding scenic, recreation, or visitor experience impacts, which are completely outside the domain of the SHPO in any event.

NEPA requires analysis of the aesthetic impacts of the proposed project. A cultural resource assessment is not an aesthetic impact assessment. No analysis of the aesthetic impacts of the proposed project has been conducted, thus the requirements of NEPA are unmet.