

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

and

STATE OF MAINE
LAND USE PLANNING COMMISSION

IN THE MATTER OF

CENTRAL MAINE POWER COMPANY
Application for Site Location of Development
Act permit and Natural Resources Protection
Act permit for the New England Clean Energy
Connect (“NECEC”)

L-27625-26- A-N
L-27625-TB-B-N
L-27625-2C-C-N
L-27625-VP-D-N
L-27625-IW-E-N

SITE LAW CERTIFICATION SLC-9

PRE-FILED TESTIMONY OF
DR. DAVID PUBLICOVER
APPALACHIAN MOUNTAIN CLUB

ON BEHALF OF INTERVENOR GROUP 4
(APPALACHIAN MOUNTAIN CLUB,
NATURAL RESOURCES COUNCIL OF
MAINE AND TROUT UNLIMITED)

February 22, 2019

1 **Q. State your name and current position.**

2 A. My name is David Publicover. I am currently employed as a Senior Staff
3 Scientist and Acting Director of Research with the Appalachian Mountain Club (AMC), a
4 non-profit conservation and recreation organization with headquarters in Boston, MA.
5 My business address is P.O. Box 298, Gorham, NH 03581.

6 **Q. What are your background and qualifications?**

7 A. I have a B.S. in Forestry from the University of New Hampshire (1978), an M.S.
8 in Botany from the University of Vermont (1986), and a D.F. in Forest Ecology from the
9 Yale University School of Forestry and Environmental Studies (1993).

10 I have been employed as a staff scientist by the AMC since 1992. My primary
11 responsibility is to provide scientific information and analyses to AMC in support of our
12 mission in the areas of terrestrial ecology, landscape analysis, land use and conservation
13 planning, sustainable forestry, biological conservation and energy facility siting.

14 For most of my tenure at AMC I have been involved with issues related to energy
15 facility siting. I have served as an expert witness for AMC during interventions in four
16 commercial wind power development applications in Maine and New Hampshire as well
17 as the Northern Pass transmission line project in New Hampshire. I served as an alternate
18 member of the Governor's Task Force on Wind power Development in Maine (2007-08)
19 and was actively involved in the revision of the New Hampshire Site Evaluation
20 Committee's energy facility permitting rules (2013-15). I have conducted multiple
21 landscape-level GIS-based analyses on conflicts between wind power siting and
22 ecological and scenic values.

1 I have also been involved in debates and discussions on sustainable forestry, land
2 management and biological conservation dating back to the Northern Forest Lands
3 Council and the Maine Forest Biodiversity Project in the 1990s. I have served on
4 numerous public policy committees and working groups and am currently a member of
5 the Maine Ecological Reserves Scientific Advisory Committee and the New Hampshire
6 Forest Advisory Board. I was a contributing author to *Good Forestry in the Granite State*
7 and served on the steering committee overseeing the development of *Biodiversity in the*
8 *Forests of Maine: Guidelines for Land Management*. I oversee forest and land
9 management planning, Forest Stewardship Council certification and forest carbon offset
10 project development for AMC's 75,000 acres of forest land in Piscataquis County.

11 My CV is attached as Appendix A.

12 **Q. Have you previously testified before DEP or LUPC?**

13 A. I have not testified before DEP. I have testified before the (then) Land Use
14 Regulation Commission on three wind power project permit applications.

15 **Q. What is the purpose of your testimony?**

16 A. For the DEP Site Law and NRPA applications, my testimony addresses the value
17 of the Western Maine Mountains region, the fragmenting impacts of the new corridor
18 (Segment 1) on wildlife habitat in this region, the failure of the Applicant to adequately
19 assess these impacts, the failure of the Applicant to adequately assess alternatives to the
20 proposed project, and the failure of the Applicant to adequately mitigate the impacts of
21 the proposed project on wildlife habitat.

22 For the LUPC certification, my testimony addresses the special exception criteria
23 related to the crossing of the Appalachian Trail P-RR zone.

1 **Q. Please summarize your testimony.**

2 A. DEP Site Law and NRPA applications: The Western Maine Mountains is the
3 heart of a globally significant forest region that is notable for its relatively natural forest
4 composition, lack of permanent development, and high level of ecological connectivity.
5 The proposed new corridor would be one of the largest permanent fragmenting features
6 bisecting this region and would have an adverse effect on wildlife habitat, wildlife life
7 cycles and travel corridors. The Applicant's assessment of these impacts is cursory,
8 overly general, lacking in specific analyses, and inappropriately conflates the impacts of
9 the corridor with those of timber management. The Applicant has failed to meet the
10 burden of proof requirement of 38 MRS §486-A.2 to demonstrate that the project will
11 not cause an unreasonable adverse impact on the natural environment. The Applicant has
12 also failed the burden of proof to demonstrate that there is not a practicable alternative to
13 the proposed project that is less damaging to the natural environment. Finally, the
14 Applicant has failed to provide adequate mitigation for the project's impacts. For these
15 reasons the DEP should deny the permit.

16 LUPC certification: The proposed project would significantly degrade the
17 experience of Appalachian Trail users at the crossing of the existing transmission line
18 corridor by widening the corridor by 50% and installing a second much larger
19 transmission line. As proposed the project fails the second criteria for a special exception
20 in that this increased impact cannot be buffered from existing uses. The opportunity
21 exists to improve rather than degrade the users' experience by relocating the trail in this
22 area. LUPC should condition the granting of the special exemption on a resolution of this

1 issue between the Applicant and AT trail managers. Absent such a resolution LUPC
2 should deny the special exception.

3
4 **TESTIMONY RELATED TO DEP SITE LOCATION OF DEVELOPMENT AND**
5 **NATURAL RESOURCES PROTECTION ACT APPLICATIONS**

6 **Q. Please describe the values of the Western Maine Mountains region through which**
7 **the new corridor would pass.**

8 A. While the undeveloped forests of the north Maine woods (and the Western Maine
9 Mountains region in particular) may be taken for granted by those who live, work and
10 recreate here, they have been recognized as a regionally, nationally and even globally
11 significant forest region by many analyses.

12 The values of the region have been well summarized by McMahon (2016)¹, who
13 states:

14 The five million acre Western Maine Mountains region is a landscape of superlatives. It includes
15 all of Maine's high peaks and contains a rich diversity of ecosystems, from alpine tundra and
16 boreal forests to ribbed fens and floodplain hardwood forests. It is home to more than 139 rare
17 plants and animals, including 21 globally rare species and many others that are found only in the
18 northern Appalachians. It includes more than half of the United States' largest globally important
19 bird area, which provides crucial habitat for 34 northern woodland songbird species. It provides
20 core habitat for marten, lynx, loon, moose and a host of other iconic Maine animals. Its cold
21 headwater streams and lakes comprise the last stronghold for wild brook trout in the eastern
22 United States. Its unfragmented forests and complex topography make it a highly resilient
23 landscape in the face of climate change. It lies at the heart of the Northern Appalachian/Acadian
24 Forest, which is the largest and most intact area of temperate forest in North America, and perhaps
25 the world. Most importantly, the Western Maine Mountains region is the critical ecological link

¹ References are included as Appendix B.

1 between the forests of the Adirondacks, Vermont and New Hampshire and northern Maine, New
2 Brunswick and the Gaspé.

3 The value of the Western Maine Mountains lies in both its ecological diversity
4 (encompassing an array of mountains, lakes and ponds, rivers and streams, wetlands, and
5 hardwood, mixed and softwood forests) and its undeveloped character. Across much of
6 the region the primary human impact has been from timber harvesting and logging roads,
7 and only two major fragmenting features (Routes 201 and 26) traverse the breadth of the
8 region. It is one of the few areas in the eastern United States that is sufficiently intact and
9 natural to maintain viable populations of almost all native species.

10 Globally the Western Maine Mountains lies within the Temperate Deciduous and
11 Mixed Forest ecoregion (Olson et al. 2001). This biome encompasses some of the most
12 heavily settled regions in the world – the eastern United States, much of Europe, and
13 northeastern Asia (China and Japan). Within this biome the region stretching from
14 northern New Hampshire across western and northern Maine into Maritime Canada is the
15 largest area of relatively intact forest blocks due to the lack of permanent settlement,
16 development and land conversion (Haselton et al. 2014; Exhibit 1).

17 Other sources that recognize the value of the region as a large ecologically intact
18 forest region include:

- 19 • The Northern Maine Forest Block is the largest Globally Important Bird Area
20 in the continental United States as identified by the National Audubon Society
21 (NAS 2019; Exhibit 2).
- 22 • The region was identified as one of the largest areas in the eastern United
23 States of above-average climate change “resilience” by The Nature
24 Conservancy, due in part to the high level of “local connectedness” (i.e., the

1 permeability of the landscape to species movement based on fragmentation
2 and barriers to movement). (Anderson et al. 2016; Exhibit 3).

- 3 • The region was identified as a priority ecological linkage by the Staying
4 Connected Initiative, a regional partnership working to “conserve, restore, and
5 enhance landscape connectivity across the Northern Appalachian/Acadian
6 region” (SCI 2019; Exhibit 4). (Maine Department of Inland Fisheries and
7 Wildlife and Maine Department Transportation are partners in this initiative.)

8 The region’s values are also reflected in the Land Use Planning Commission’s
9 2010 Comprehensive Land Use Plan (LUPC 2010) which includes the following:

- 10 – *“One of the four principle values of the Unorganized Territories is “Natural*
11 *Character, which includes the uniqueness of a vast forested area that is largely*
12 *undeveloped and remote from population centers. Remoteness and the relative*
13 *absence of development in large parts of the jurisdiction are perhaps the most*
14 *distinctive of the jurisdiction's principal values, due mainly to their increasing*
15 *rarity in the Northeastern United States.” (CLUP p. 2)*
- 16 – *“Natural resources are generally enhanced when they are part of a large,*
17 *relatively undeveloped area, especially one that encompasses entire watersheds*
18 *or ecosystems.” (CLUP p. 2)*
- 19 – *“The forests of the jurisdiction are part of the largest contiguous block of*
20 *undeveloped forestland east of the Mississippi.” (CLUP p. 197)*
- 21 – *“Scientists are increasingly aware of the value of managing forests in large*
22 *blocks as part of habitat conservation efforts... However, even large habitat*
23 *blocks have less value if they lack connections or corridors linking them to other*

1 *habitat patches that allow genetic flow from one patch to another.” (CLUP p.*
2 233)

3 In addition, a conservation priorities map developed by MDIFW as part of the
4 Wildlife Action Plan (MDIFW 2010) notes that “*Northern Maine is unique as the largest*
5 *area of undeveloped natural land in the eastern US. It is critically important for its*
6 *economically valuable forest base and as a draw for unique outdoor recreational*
7 *experiences, but especially for the habitat it provides for the species characteristic of and*
8 *dependent on the Eastern Forest and especially those species that need large areas to*
9 *maintain viable populations.”*

10 Intact forests such as these are critical to the maintenance of global biodiversity,
11 as noted by Watson et al. (2018), who stated, “*As the terrestrial human footprint*
12 *continues to expand, the amount of native forest that is free from significant damaging*
13 *human activities is in precipitous decline. There is emerging evidence that the remaining*
14 *intact forest supports an exceptional confluence of globally significant environmental*
15 *values relative to degraded forests... Retaining the integrity of intact forest ecosystems*
16 *should be a central component of proactive global and national environmental*
17 *strategies...”.*

18 To summarize, the Western Maine Mountains region is the heart of a globally
19 significant forest region that is notable for its lack of permanent development and
20 fragmentation and high level of ecological connectivity. These are the values that would
21 be most significantly affected by the clearing of the new NECEC corridor.
22

1 **Q. Has the Applicant adequately considered the value of this region in their**
2 **application?**

3 A. They have not. Rather the Applicant consistently minimizes its value, and
4 nowhere is there any discussion of the regional, national or global significance of the
5 region. Instead, we find limited statements such as *“this area of the state is already*
6 *intensively managed (i.e., periodically clearcut) forested land and the creation of a*
7 *transmission corridor is not likely to disrupt or significantly alter existing land uses.”*
8 (Site Law Application Chapter 7, p. 7-24; multiple similar statements may be found in
9 Application Section 7.4.1). CMP’s project website² states *“The new corridor section*
10 *crosses through a large area of commercial woodlands laced with roadways and*
11 *active areas of timber harvesting and forest management.”*

12 By characterizing the region as merely managed forest land, the Applicant fails to
13 recognize that these expansive commercial forest lands are an important part of what has
14 helped to maintain the value of the region. As noted by the Keeping Maine’s Forests
15 coalition (KMF 2010):

16 Maine’s forests, which include the largest unbroken tract of undeveloped forest east of the
17 Mississippi River, sustain tens of thousands of jobs in the forest products and forest-based tourism
18 industries. That this national resource is intact and productive today is a testament to good
19 management by landowners and the ability of the forest-based economy to adapt, strengthen, and
20 diversify markets for forest products and tourism

21 McMahon (2018) similarly notes:

22 Fragmentation has already significantly degraded ecosystems in much of the eastern United States
23 and in temperate forests throughout the world. By contrast, in large part because historical forest

² <https://www.necleanenergyconnect.org/faqs>.

1 management maintained vast connected forest blocks in the region, the Western Maine
2 Mountains' biodiversity, resilience and connectivity are unparalleled in the eastern United States.

3 In addition, the Applicant mischaracterizes the region as "intensively managed".

4 To a large degree these forests are managed using natural regeneration and maintain a
5 relatively natural species composition (though the age-class structure has been
6 significantly altered towards a younger overall condition). Only a small proportion is
7 intensively managed as foresters understand the term, meaning the use of techniques such
8 as planting and herbicide application to maximize timber production. This distinguishes
9 the region from forests that are truly intensively managed such as the pine forests of the
10 southeastern United States.

11 In presentations on their route selection process to AMC and others, CMP
12 representatives described how the route was sited through working forests in a gap
13 between higher value areas³. In reality no such gap exists, as can easily be seen by
14 viewing the landscape in Google Earth – the working forests are an integral part (in fact
15 the major component) of this vast undeveloped landscape.

16 It is true that the Western Maine Mountains region is not pristine wilderness.
17 However, on a scale of human impact from natural wilderness to dense urban
18 development, the forests of the region lie very close to the natural end of the scale. The
19 fact that the new corridor would be carved through managed timberland rather than
20 pristine wilderness in no way diminishes the impact of the corridor on the ecological
21 value of the region.

³ For example, see the recording of CMP's presentation to a forum in Lewiston, ME hosted by the Sierra Club on 8/22/18. (<https://www.youtube.com/watch?v=EelQI-QCWu0> beginning at 26:30)

1 **Q. Please describe the fragmenting impacts of the new corridor.**

2 A. The new corridor would be one of the largest permanent fragmenting features in
3 the Western Maine Mountains region. It would be only the third feature (other than
4 logging roads) that completely bisects the region.

5 The effects of fragmentation on forests have been summarized in numerous
6 studies, both locally (McMahan 2018) and globally (e.g., Saunders et al. 1991, Harper et
7 al. 2005, Haddad et al. 2015). The continued loss and degradation of intact forests is one
8 of the major threats to biodiversity and other ecosystem services worldwide; as noted by
9 Watson et al. (2018), *“the relative value of intact forests is likely to become magnified as
10 already-degraded forests experience further intensified pressures (including
11 anthropogenic climate change).”*

12 The 53 miles of new corridor will have three types of impacts:

13 Direct loss of habitat. The 53.5-mile by 150-foot new corridor encompasses
14 nearly 1,000 acres, the great majority of which would be permanently lost forest habitat.

15 Edge effects. The creation of extensive permanent “hard” edge along both sides
16 of the new corridor would have significant and long-lasting adverse effects on the
17 adjacent forest habitat. Edges alter the adjacent forest in numerous ways including
18 increased penetration of light and wind, increased temperatures, lower humidity and soil
19 moisture, increased blowdown, and increased growth of understory and early
20 successional vegetation (Matlack and Litvaitis 1999, Harper et al. 2005, McMahan
21 2018). These effects cause significant changes in the forest within the edge zone as noted
22 by Matlack and Litvaitis (1999, p. 227):

23 One artifact of the human modification of forests has been the tremendous increase in forest edges.

24 Historically, land managers considered the lush plant growth and diversity of animals at edges as

1 beneficial. However, recent investigations have described radical changes in community structure
2 at edges, suggesting serious problems from a biodiversity perspective. Edge habitats are
3 advantageous to a variety of exotic plants, predators, brood parasites, and herbivores that are
4 capable of altering the composition of local forest communities. Radical changes in the forest
5 microclimate at edges lead to dramatic changes in plant community structure with may persist
6 several decades, at least.

7 A major consequence of edge effect is the consequent decline in interior forest
8 habitat, which is forest sufficiently removed from edge to be free of its effects. While
9 edges are beneficial to some species, many others avoid them and require interior habitat.
10 Pfeifer et al. (2017), in a meta-analysis of fragmentation studies from across the globe,
11 found that while relatively equal numbers of species were attracted to or avoided edges,
12 those that avoided edges (and were dependent on interior forest) were more likely to be
13 habitat specialists of high conservation concern. In contrast, species attracted to edges
14 are more likely to be common generalist species.

15 Mature interior forest in northern Maine comprises less than 3% of the landscape
16 (MDIFW 2015) and some species associated with it are of high conservation concern.
17 These include migratory songbirds such as scarlet tanager, wood thrush, veery, and
18 various warblers as well as mammals such as American marten (Rosenberg 1999, 2003;
19 MDIFW 2015, MAS 2017).

20 Different types of edge effects extend for different distances into the adjacent
21 forest (Harper 2005, McMahon 2018). One hundred fifty to 300 feet (50-100 meters) is
22 commonly used to define the edge zone (Rosenberg 1999), though some effects can
23 extend farther than this. Pfeifer et al. (2017) found that the abundance of interior forest-
24 dependent species was reduced up to 400 meters from edges.

1 The linear configuration of the corridor maximizes the amount of edge zone for
2 the cleared area as compared to a more compact shape. The area within 300 feet of the
3 new corridor encompasses nearly 4,000 acres – about four times the area that will be
4 directly cleared. Not all of this is forest, and not all of the forest is interior forest due to
5 the presence of roads and the shifting patterns of timber harvesting. However, in the
6 absence of the corridor most of the forest is potential interior forest, and would be interior
7 forest at some part of the timber management cycle. With the corridor all of this forest
8 will be permanently subject to edge effects, reducing its ability to support interior forest
9 species.

10 Reduction in connectivity. The high level of ecological connectivity is one of the
11 most significant characteristics of the Western Maine Mountains regions, and the new
12 corridor would be one of the most significant features impeding the connectivity,
13 particularly because it bisects the entire region.

14 This impact is recognized in LUPC's 2010 Comprehensive Land Use Plan (p.
15 241), which states "Scientists have identified fragmentation of habitat as a serious
16 concern. Roads, utility corridors, certain types of recreation trails, structures and
17 clearings create breaks in the landscape. These breaks can act as barriers to animals and
18 isolate populations of both plants and animals." Maintaining connectivity was one of
19 three "super themes" guiding wildlife conservation actions identified in the 2015 Wildlife
20 Action Plan (MDIFW 2015).

21 Not all species will be equally affected. Generalist species that use a range of
22 habitats will likely cross the corridor with little difficulty. Some small-bodied species
23 may find the shrubby vegetation less of a barrier than a 20' bare gravel road. The species

1 that will be most affected are those that avoid large openings or extensive shrub or
2 regenerating forest habitat.

3 For example, American marten in the Northeast avoid openings and regenerating
4 forest, but occupy areas with forest cover at least 30' high with canopy closure of at least
5 30% and diverse forest structure including snags and coarse woody debris (Payer and
6 Harrison 2000, 2003, 2004; Lambert et al. 2017). DeMaynadier and Hunter (1995, 1998)
7 documented significant declines in amphibian populations in recent clearcuts, with red-
8 backed, spotted and blue-spotted salamanders and wood frogs particularly sensitive.
9 These effects can be ameliorated by the retention of microhabitat "refugia" such as
10 patches of retained trees and coarse woody debris. However, the corridor will be
11 maintained in a permanent early-successional condition without retained overstory cover
12 or woody debris inputs, and thus is likely to present a significant barrier to these species.

13 **Q. Has the Applicant adequately assessed these impacts in their application?**

14 A. No they have not. These impacts are discussed in Site Law Application Section
15 7.4.1. However, this section is marred by meaningless general statements and the
16 absence of any significant analysis of fragmentation effects. For example:

17 – *"Habitat conversion along transmission line corridors results in a loss of habitat*
18 *types which, in turn, may adversely impact species that are reliant on the original*
19 *habitat types. Conversely, such alteration provides benefits to several species."*

20 Also, *"Impacts of habitat conversion along the proposed transmission line*
21 *corridor are expected to be minimal, beneficial to some species while detrimental*
22 *to other species."* (Both on Site Law Application p. 7-24.) The Applicant
23 includes a discussion of the habitat benefits of transmission line corridors (which

1 are irrelevant to permitting) but no discussion of which species may be adversely
2 impacted (which is). In fact, it is mature forest habitat that is in short supply in
3 northern Maine, not the early successional habitat that would be created by the
4 new corridor (MDIFW 2015).

- 5 – *“Some bird species within the NECEC Project area that may be sensitive to forest*
6 *fragmentation are the long distance, neotropical migrants that rely on forest*
7 *interior habitats, but plentiful suitable habitat is available near the NECEC*
8 *Project areas for these interior forest species. Most of the potential breeding*
9 *birds that are likely to be found in the vicinity of the transmission line corridor*
10 *are not dependent on mature forest stands... Most of the terrestrial mammal*
11 *species that are likely to be found near the proposed transmission line corridors*
12 *are likewise not dependent on mature forest”* (Site Law Application p. 7-25.)

13 The fact that “most” species will not be affected is irrelevant. There is no
14 assessment in the application of which species may be adversely affected, the
15 extent of interior forest habitat in the vicinity of the project, or the effect of the
16 project on this habitat. The Applicant wants to have it both ways – the
17 surrounding managed landscape is already heavily fragmented by timber
18 harvesting, but yet mature interior forest habitat is plentiful. In fact, as noted
19 previously less than 3% of the forest in northern Maine is mature interior forest.

20 The Applicant also consistently and inappropriately conflates the impacts of the
21 new corridor with the impacts of timber harvesting in the surrounding landscape. For
22 example: *“Approximately 27 percent of the Project will require new clearing, however*
23 *this area of the state is already intensively managed (i.e., periodically clearcut) forested*

1 *land...*” and “*In general, given the existing landscape characteristics of the overall*
2 *NECEC Project area, construction and maintenance of the transmission line corridors*
3 *will result in habitat conversion that is already common to the area, i.e. forested to*
4 *scrub-shrub.*” (Both on Site Law Application p. 7-24.) However, the new corridor is
5 qualitatively different than timber harvesting in many ways:

6 Permanence. The new corridor would be an enduring feature in the landscape. In
7 contrast, timber harvesting creates a shifting mosaic of temporary impacts which are
8 ameliorated over time through natural succession.

9 Spatial configuration. The new corridor would be a linear feature extending
10 across the entire Western Maine Mountains region; a configuration that maximizes edge
11 effect and impediments to species movement. In contrast, timber harvest units are
12 smaller and more compact units with lower edge-to-area ratio, and which exist in a
13 mosaic of forest conditions that allow freer movement of species throughout the
14 landscape.

15 Habitat condition. The new corridor will be permanently maintained in an
16 herbaceous or shrubby condition, without residual overstory trees or other forest
17 structures (snags, woody debris, etc.) that provide microhabitats or localized refugia for
18 many species. Contrary to the Applicant’s contention, most timber harvesting in the state
19 is done by various forms of partial harvesting that retains some level of residual overstory
20 and biological legacies. Between 2013 and 2017 clearcutting accounted for less than 7%
21 of harvested acres in the state (MFS 2013-2017).

22 The Applicant’s conclusions regarding the fragmenting impacts of the new
23 corridor consist of little more than general statements such as:

- 1 – *“It is anticipated that local wildlife populations will adapt and respond to any*
2 *additional alterations much as they already do to uses within the vicinity of the*
3 *transmission line corridor.”* (Site Law Application p. 7-24)
- 4 – *“...the creation of a transmission corridor is not likely to disrupt or significantly*
5 *alter existing land uses.”* (Site Law Application p. 7-24)
- 6 – [The new corridor] *“is located in an intensively managed timber production area*
7 *and therefore not likely to significantly alter existing fragmentation.”* (Site Law
8 Application p. 7-25)
- 9 – [The new corridor is] *“located in an intensively managed area for timber*
10 *production; this transmission line segment is therefore not likely to significantly*
11 *alter or increase the existing edge effect.”* (Site Law Application p. 7-26)

12 These statements are unsubstantiated by any analysis or evidence in the
13 application, and are contradicted by extensive evidence on the consequences of forest
14 fragmentation. They are also contradicted by numerous photographs of the Segment 1
15 landscape included in Application Chapter 6 Appendix D (Photosimulations). These
16 photos do not show a landscape dominated by clearcuts, but rather one in which recent
17 harvest units of various shapes, sizes and intensities exist within a matrix of relatively
18 continuous forest. Even during leaf off snowcovered conditions, when harvesting would
19 be most noticeable, harvest units exist as patches within a dominantly forested matrix. In
20 addition, most harvest units retain some level of residual forest overstory.

21 Photosimulation 44 clearly illustrates the difference in spatial configuration and habitat
22 condition between the permanent corridor and the transient harvest units. The new
23 corridor is not just another clearcut.

1 **Q. Are there other impacts of the new corridor that you would like to address?**

2 A. Yes. The new corridor would clear and fragment two occurrences of the rare Jack
3 Pine Forest⁴ natural community where it passes south of No. 5 Bog. Rare natural
4 communities are encompassed in the definition of “unusual natural areas” under DEP
5 rules (Chapter 375.12(B)).

6 Jack Pine Forest is ranked as S1 (“Critically imperiled in Maine because of
7 extreme rarity”) by the Maine Natural Areas Program. S1 communities represent the
8 rarest of the rare in the state. The occurrences that would be impacted by the new
9 corridor represent only the second and third occurrences in the state documented by the
10 Maine Natural Areas Program⁵. The impact of the new corridor on this extremely rare
11 natural community is thus of very high conservation concern.

12 The full extent and condition of these occurrences has not been determined,
13 precluding a full evaluation of the impact of the new corridor. One of them is described
14 as “*fairly extensive, extending outside of the survey area to the north and south.*”⁶
15 However, the corridor would fragment both of these occurrences, separating portions on
16 either side of the corridor. In addition, portions of these occurrences adjacent to the
17 corridor would be subject to edge effects that would alter the structure and composition
18 of this community within the edge zone.

19 It appears that a minor relocation of the proposed corridor would eliminate the
20 impact to these rare natural community occurrences. However, they were only

⁴ This community is distinct from the Jack Pine Woodland community, which is ranked S3. Most documented occurrences of Jack Pine Woodland are located in Hancock and Washington counties.

⁵ Information on documented occurrences of Jack Pine Forest was provided by MNAP in email from Lisa St. Hillaire to David Publicover dated 2/19/19. The Applicant’s Rare Plant Survey Narrative Report (September 2018) lists three occurrences, but two of these are considered a single occurrence by MNAP.

⁶ Application Rare Plant Survey Narrative Report, Appendix F.

1 documented following a request for rare plant and natural community surveys by
2 MNAP⁷. They were not known when the route was being identified, but only after the
3 corridor had been delineated and purchased, precluding the opportunity to route the
4 corridor around them. This is indicative of extremely poor planning on the part of the
5 Applicant, as well as their total lack of understanding of or consideration for the
6 ecological values of the region through which the new corridor would pass.

7 In addition, the fact that these occurrences extend beyond the corridor presents an
8 opportunity for the Applicant to work with the adjacent landowner to conserve and
9 manage these occurrences in a way that maintains their presence and ecological values as
10 mitigation for these impacts. However, this was not done.

11 **Q. Has the Applicant adequately analyzed alternatives to the location of the new**
12 **corridor?**

13 A. No they have not. Such an analysis is required under the Site Location of
14 Development law [38 MRSA §487-A(4); specific to transmission lines] and DEP rules
15 [Chapter 310.5(A)]⁸ as well as LUPC P-WL special exception determination.

16 The alternatives analysis is contained in NRPA application Section 2. The
17 Applicant describes the purpose and need of the project as delivering Quebec hydropower
18 to the New England grid “at the lowest cost to ratepayers”. While cost is a consideration
19 in determining whether an alternative is practicable, defining the purpose and need in this
20 way is inappropriate and cannot be a consideration for DEP. This definition of purpose

⁷ MNAP memo to DEP of 12/12/17.

⁸ While this requirement is specific to wetland impacts, these impacts are dispersed throughout the length of the new corridor, and such an analysis would also serve to address alternatives to other impacts described in this testimony. In addition, the requirement in 38 MRSA §487-A(4) is speaks to “impact on the environment” without limitation and thus encompasses the full range of impacts.

1 and need makes any but the lowest-cost alternative not practicable by definition and
2 would render the alternatives analysis meaningless.

3 The Applicant assesses two alternative locations for the new corridor. Neither
4 can be considered a reasonable alternative. Alternative 1 (1980s Quebec Corridor) was
5 denied a permit by the PUC at that time. Subsequent developments, primarily land
6 conservation that has taken place since that time, would make the ability to reacquire
7 rights to this corridor uncertain and in one case “highly unlikely”. Alternative 2
8 (Bigelow Corridor) also presents many difficulties; by CMP’s own admission there are
9 serious impediments and engineering challenges to securing this route.

10 However, there is another alternative that should have been analyzed - burial
11 along existing corridors, most realistically along the Spencer Road (the primary gravel
12 road accessing the Moose River valley; see Exhibit 5) but also potentially Route 201.
13 The new corridor parallels and lies within two miles of the Spencer Road for a distance of
14 over 20 miles, and for the most part lies within the ownership of the same landowner
15 (Weyerhaeuser) from whom CMP acquired the proposed corridor.

16 Burial of HVDC lines is both technologically and financially feasible, as
17 demonstrated by its use in two projects that were competitors to NECEC in the
18 Massachusetts RFP process. Eversource’s Northern Pass project in New Hampshire
19 proposed burial of 60 miles of line along public roadways⁹. TDI’s New England Clean
20 Power Link project in Vermont would bury 56 miles of line along public roadways and
21 railroads¹⁰. Burial along paved public roadways with existing development (as in these
22 projects) would be more difficult than burial along undeveloped gravel logging roads,

⁹ <http://www.northernpass.us/route-info.htm>.

¹⁰ <http://www.necplink.com/about.php>.

1 thus there is no basis to conclude that burial of the NECEC line along logging roads
2 would be technologically or logistically unfeasible.

3 This alternative would almost certainly have less impact on the environment than
4 the proposed new corridor. It would eliminate or greatly reduce the fragmentation
5 impacts, resulting in much less clearing (just a narrow expansion of the existing road
6 corridor), no new edge, no additional loss of existing or potential interior forest habitat,
7 and a minimal increase in impediments to species' ability to cross the corridor. There
8 would be wetland and stream impacts, but these resources are already impacted by the
9 road, and burying the line next to the road would result in limited and marginal additional
10 impacts, as opposed to the greater impacts to relatively intact streams and wetlands
11 located within the new corridor..

12 We recognize that cost is a consideration in analyzing alternatives, and burial
13 would be more expensive. That fact alone does not render an alternative as not
14 practicable. The standard of 38 MRSA §487-A(4) is that the alternative would not
15 “unreasonably” increase the cost. Without any financial information it is impossible to
16 make a determination as to whether the increased cost is reasonable. However, this cost
17 was not an impediment to the Northern Pass or Clean Power Link projects. Given that
18 Northern Pass was the first choice in the Massachusetts RFP process, it is evident that the
19 increased cost of burial was not an impediment to this selection. Thus it appears clear
20 that burial is a financial feasible alternative.

21 To summarize, it appears that there is an alternative that is technologically,
22 logistically and financial feasible, and which would be significantly less damaging to the

1 environment. The failure to include an assessment of this alternative, and to demonstrate
2 why it should not be considered practicable, is a fatal flaw in the application.

3 **Q. In your expert opinion, do the fragmenting impacts of the new corridor constitute**
4 **an adverse effect on natural resources under the Site Location of Development law**
5 **sufficient to support a denial of the permit?**

6 A. Yes they do. My reasons for this conclusion include:

7 Adverse impacts of fragmentation of wildlife habitat. The new corridor would be
8 one of the largest permanent fragmenting features bisecting the largest expanse of
9 relatively undeveloped and intact natural forest in the eastern United States and one of the
10 largest such areas in the Temperate Deciduous and Mixed Forest biome in the world.

11 The corridor would eliminate thousands of acres of existing and potential interior forest
12 habitat through clearing and edge effects, adversely impacting wildlife lifecycles¹¹ for
13 species dependent on this habitat. It would reduce the permeability of the landscape and
14 impede the ability of some wildlife species to move through the region¹². The

15 Applicant's discussion of these impacts is extremely cursory, general and lacking in
16 specific analyses on the adverse fragmenting impacts of the new corridor. The Applicant
17 mischaracterizes the nature of existing timber harvesting in the region and

18 inappropriately equates the impacts of the corridor to those of timber harvesting. The

19 Applicant's conclusions are unsupported by any evidence in the application, are

20 contradicted by extensive scientific evidence on the consequences of forest

21 fragmentation, and amount to little more than "There's lots of forest, it's already heavily

22 impacted, the new corridor is just another clearcut so it's no problem." The Applicant's

¹¹ As recognized in DEP rules Chapter 375 Section 15.B(2).

¹² As recognized in DEP rules Chapter 375 Section 15.B(1).

1 analysis does not come close to meeting the burden of proof for a demonstration of no
2 adverse impact on the natural environment as required under 38 MRSA §486-A.2¹³.

3 Adverse impact on unusual natural areas¹⁴. The new corridor would destroy
4 portions of and fragment two occurrences of Jack Pine Forest, ranked S1 (“critically
5 imperiled”) by the Maine Natural Areas Program and one of the state’s rarest natural
6 vegetation communities. It appears that this impact could have been completely avoided
7 by a minor relocation of the corridor, but this was not done since the ROW was fixed
8 prior to any survey for rare plants and natural communities. This is indicative of
9 extremely poor planning on the part of the Applicant, as well as their total lack of
10 understanding of or consideration for the ecological values of the region through which
11 the new corridor would pass.

12 Lack of adequate alternatives analysis. The Applicant’s analysis of alternative
13 routes for the new corridor considers two alternatives that cannot be considered realistic.
14 By the Applicant’s own admission both would involve significant difficulties in route
15 acquisition and permitting. However, they failed to consider an alternative (burial along
16 existing road corridors) that has been utilized by at least two other major transmission
17 line projects in New England, demonstrating that this approach is both technologically
18 and financially feasible under more difficult conditions than would occur for this project.
19 By not analyzing an obvious and potentially practicable alternative that would have a
20 significantly lower impact on the environment, the Applicant has failed the burden of

¹³ “At the hearings held under this section, the burden is upon the person proposing the development to demonstrate affirmatively to the department that each of the criteria for approval listed in this article has been met, and that the public's health, safety and general welfare will be adequately protected.”

¹⁴ As recognized in DEP rules Chapter 375 Section 12.

1 proof standard as it applies to 38 MRSA §487-A(4) and DEP rules Chapters 310.5(A)
2 and 335.3(A).

3 Lack of adequate mitigation. Mitigation consists of three components: avoidance,
4 minimization and compensation. The Applicant falls short in all three areas.

5 – *Avoidance.* As noted above, the Applicant has failed to demonstrate that there is
6 not an alternative practical route that would avoid the necessity of clearing the
7 new corridor. At a more local scale, the Applicant has failed to avoid the impact
8 to the Jack Pine Forest occurrences by designing a route around them.

9 – *Minimization.* DEP rules (Chapters 375.9 and 375.15) envision buffer strips as a
10 way to provide wildlife travel corridors between areas of habitat. However, the
11 riparian buffers proposed by the Applicant do not sufficiently minimize the
12 impediment to species movement created by the new corridor. As described in
13 Application Chapter 10 Exhibit 10-2 (Post-Construction Vegetation Management
14 Plan) vegetation within the wire zone of riparian buffers will be maintained at a
15 height of 10 feet. This is insufficient to provide habitat for American marten and
16 other species that require taller forest cover of minimum density. In addition, in
17 multiple locations mapped streams are a mile or more apart. These measures do
18 not adequately minimize the impact of the new corridor on landscape
19 connectivity.

20 – *Compensation.* The Applicant's final Compensation Plan focuses on
21 compensation for resources considered under the Natural Resources Protection
22 Act and for which compensation is specifically required. However, the Site Law
23 considers impacts at a broader level. 38 MRSA §484(3) addresses impacts to

1 “other natural resources” without limitation. In addition, DEP rules Chapter
2 375.15.A addresses “the need to protect wildlife and fisheries by maintaining
3 suitable and sufficient habitat”, indicating consideration of the full range of
4 wildlife. Chapter 375.15.B(1) and (2) speak generally of “travel lanes” and “fish
5 and wildlife lifecycles” without reference to specific species or habitats (which
6 are considered in 375.15.B(3)). Finally, 375.15.C addresses the need for the
7 Applicant to provide that they have made “adequate provision for the protection
8 of wildlife and fisheries” (again without limitation), and 375.15.C(2) includes
9 habitat preservation as a component of mitigation for adverse impacts to wildlife.
10 In total this section makes clear that compensatory mitigation is not limited just to
11 NRPA-protected resources but may be applied to all wildlife habitat impacts.

12 The new NECEC corridor would be one of the largest permanent
13 fragmenting features in a globally significant forest region that is distinguished by
14 its high level of ecological connectivity. It would eliminate thousands of acres of
15 existing and potential interior forest habitat and reduce the permeability of the
16 landscape to species movement. The landscape includes extensive streams
17 (particularly cold water fisheries) and wetlands that exist not as isolated features
18 but as integral and connected parts of the broader ecological system.

19 The new corridor is not a compact feature such as a sawmill or shopping
20 mall impacting degraded wetlands in an already developed area. It is a sprawling
21 feature that will impact multiple natural resource values across a broad area of
22 high ecological value. The 13 parcels proposed as compensatory land
23 conservation are small (averaging about 215 acres in size), scattered and have

1 little nexus to the landscape-level fragmentation impacts of the project. The
2 Applicant has provided compensation for the impact to individual pieces but not
3 the cumulative impact to the whole interconnected ecosystem. Compensation for
4 this cumulative impact should be held to a higher standard than provided by the
5 Applicant.

6 Though we contend that the project should not be permitted as proposed,
7 if it is permitted then very significant habitat protection should be required as
8 compensation given the ecological values of this region and the magnitude of the
9 impact of the new corridor on wildlife habitat. We support the position of The
10 Nature Conservancy and Maine Audubon Society¹⁵ that land conservation in the
11 range of 75,000 to 100,000 acres is the appropriate scale to compensate for the
12 project's very significant fragmenting impacts.

13 For these reasons, we believe that the proposed new corridor constitutes an
14 unreasonable adverse impact on the environment and that DEP should deny the permit.

15 **Q. Does this conclude your testimony relative to the issues before DEP?**

16 A. Yes.

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¹⁵ See <https://bangordailynews.com/2018/10/16/opinion/contributors/hydro-line-project-doesnt-go-far-enough-to-mitigate-conservation-concerns/>.

1 **TESTIMONY RELATED TO LAND USE PLANNING COMMISSION**
2 **CERTIFICATION**

3 **Q. Please describe the situation regarding the crossing of the Appalachian Trail by the**
4 **existing transmission line corridor (Segment 2).**

5 A. Currently the Appalachian Trail (AT) crosses the existing 150-foot-wide
6 transmission line corridor three times within a stretch of two-thirds of a mile. Hikers are
7 exposed to an unnatural linear opening and multiple 45-foot-high transmission line
8 structures that compromise the backcountry experience. We recognize that the
9 transmission line corridor predates the establishment of the AT as a National Scenic
10 Trail.

11 **Q. What would be the impact of adding the new line to this corridor on the experience**
12 **of hikers?**

13 A. As proposed the addition of the new line would make the existing situation worse.
14 The widening of the corridor and the addition of a second transmission line with taller
15 towers would increase the exposure of hikers to the open corridor and intensify the
16 experience of being in a developed rather than backcountry environment. The
17 Applicant's Visual Impact Assessment (Application Chapter 6 pp. 6-43 to 6-44) rates the
18 impact as "minimal to moderate". The Applicant also states (Application Chapter 25,
19 Section 25.3.1.3) that there would be a "negligible" change in visual impact. However,
20 these conclusions are contradicted by the revised Chapter 6 Appendix F (Scenic
21 Resources Chart, 1/30/19) that rates the impact as "Moderate/Strong".

22 The Applicant also states (Application Chapter 6 p. 6-50), "*The Project should*
23 *not negatively affect the hikers' experience or their continued use and enjoyment the*
24 *Appalachian Trail.*" The statement that the project will not negatively affect hikers'

1 experience is made without any supporting evidence, and is contradicted by the revised
2 impact rating of Moderate/Strong and the Applicant's recognition of the need to mitigate
3 this impact through vegetative screening. There is a noticeable difference between a
4 single line with wooden towers shorter than the surrounding forest and a corridor that is
5 50% wider with two lines, one with steel towers considerably taller than the surrounding
6 forest, which are experienced by hikers passing directly under the line. The change is
7 quite noticeable in the photosimulation from this area (Application Chapter 6, Appendix
8 E, Photosimulation B, pp. 27-28). The photosimulation of the proposed vegetative
9 screening (Appendix D: Photosimulations – Leaf Off/Snow Cover, Photosimulation 50A)
10 does not inspire confidence that the proposed mitigation will be adequate. Vegetative
11 screening alone cannot mitigate the exposure of hikers to the wider corridor and an
12 additional larger transmission line.

13 **Q. Does the proposed project satisfy the first requirement for a special exception in the**
14 **AT P-RR district that “*there is no alternative site which is both suitable to the***
15 ***proposed use and reasonably available to the applicant*”?**

16 A. Yes. We accept that co-locating the new line in the existing right-of-way is the
17 preferred solution, and that an alternate location in a new corridor would have a greater
18 impact on the AT by creating a new crossing where none currently exists.

19 **Q. Does the proposed project satisfy the second requirement for a special exception in**
20 **the AT P-RR district that “*the use can be buffered from those other uses and***
21 ***resources within the subdistrict with which it is incompatible*”?**

22 A. As proposed it does not. While the existing situation is not ideal, the addition of a
23 second larger line in a wider corridor constitutes an additional incompatible use of

1 moderate to strong impact that cannot be buffered from the AT. The available evidence
2 does not support the contention that the proposed vegetation planting will be sufficient to
3 buffer the trail from this increased impact

4 However, this requirement could be satisfied by a realignment of the AT that
5 moves it away from the transmission line corridor in this area and leaves only a single
6 crossing that minimizes exposure of hikers to the transmission line. If this were done
7 there would be an improvement in the experience of AT hikers in this area rather than a
8 diminishment as would occur with the project as proposed, and the increased buffering of
9 the trail would satisfy the second requirement. This was noted as an appropriate
10 mitigation strategy by the Applicant (Application Chapter 6 Section 6.2.2.7). We are
11 aware that Appalachian Trail managers have had discussions with Applicant on ways to
12 address the NECEC project impacts on trail users but we have not seen any resolution or
13 conclusions from these discussions.

14 **Q. Are there any conditions that the Commission should impose under Part (c) of the**
15 **special exception criteria?**

16 A. Yes. The Commission should condition the granting of the special exception on
17 the Applicant reaching an agreement with AT managers on the relocation of the trail and
18 providing funding for the relocation. As noted by the Applicant this would be an
19 appropriate mitigation strategy for the increased impact on the AT experience in this area.
20 In the absence of such an agreement the Applicant should provide funding for off-site
21 mitigation that would be used to protect other AT viewsheds.

22 **Q. Does that conclude your testimony relative to the LUPC certification?**

23 A. Yes.

APPENDIX A: CURRICULUM VITAE**DAVID A. PUBLICOVER**

Appalachian Mountain Club

PO Box 298

Gorham, NH 03581

(603) 466-8140, email: dpublicover@outdoors.org**Education:**

Massachusetts Institute of Technology, Cambridge, MA.		1972-74
University of New Hampshire, Durham, NH	B.S. (Forestry)	1978
University of Vermont, Burlington, VT	M.S. (Botany)	1986
Yale School of Forestry & Env. Studies, New Haven, CT	D.F. (Forest Ecology)	1993
DF Thesis: <i>Nutrient Cycling and Conservation Mechanisms in an Oligotrophic Pine-Oak Forest in the New Jersey Pine Barrens.</i>		

Employment History:

2001- present: Senior Staff Scientist/Assistant Director of Research, Appalachian Mountain Club, Gorham, NH.

1992-2000: Senior Staff Scientist, Appalachian Mountain Club, Gorham, NH.

1987-92: Research Assistant, Yale School of Forestry and Environmental Studies, New Haven, CT.

1979-84: Forester, USDA, Bureau of Indian Affairs, Yakima Agency, Toppenish, WA.

1976-78: Park Technician, USDA, National Park Service, Glacier National Park, West Glacier, MT (summers).

Publications:

- Publicover, D., K. Kimball, C. Poppenwimer and D. Weihrauch. 2018. *Ecological Atlas of the Upper Androscoggin River Watershed 2nd Edition* (Appalachian Mountain Club, Gorham, NH).
- Publicover, D.A., C.J. Poppenwimer and K. D. Kimball. *Northeastern High Elevation Areas: An Assessment of Ecological Value and Conservation Priorities. (AMC Technical Report in prep).*
- Publicover, D.A. and K. D. Kimball. *High-Elevation Spruce-Fir Forest in the Northern Forest: An Assessment of Ecological Value and Conservation Priorities* (submitted to proceedings of 2012 ECANUSA Forest Science Conference).
- Publicover, D.A., K.D. Kimball and C.J. Poppenwimer. 2011. *Ridgeline Windpower Development in Maine: An Analysis of Potential Natural Resource Conflicts* (AMC Technical Report 2011-1).
- Publicover, D.A. and C.J. Poppenwimer. 2006. *Roadless Areas in the Northern Forest of New England: An Updated Inventory* (AMC Technical Report 2006-1).
- Publicover, D. 2004. *A Methodology for Assessing Conflicts Between Windpower Development and Other Land Uses* (AMC Technical Report 2004-2).
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- Publicover, D.A. and K.A. Vogt. 1991. *Canopy stereogeometry of non-gaps in tropical forests: a comment*. Ecology 72:1507-1510.

Public Policy

Service on numerous public policy technical committees and working groups addressing issues of biological conservation, sustainable forest management and renewable energy development, including:

- Appointed alternate member of Governor's Task Force on Windpower Development in Maine (2007-08), a year-long effort which compiled information on and developed recommendations for the appropriate development of this technology in the state. My GIS-based research (Publicover *et al.* 2011) was instrumental in the development of a recommendation for the designation of an "expedited wind power permitting area" that guided development to more suitable areas of the state. The Task Force's recommendations were subsequently enacted into law by the Maine legislature.
- Member of Maine Ecological Reserves Scientific Advisory Committee (1996-present), which developed information and recommendations for a legislatively-established system of ecological reserves on state land. On-going work with the committee includes evaluating research proposals within the reserves and advising the Maine Natural Areas Program on long-term monitoring protocols.
- Member of New Hampshire Forest Sustainability Standards Work Team (1995-97), which provided guidance to the State Forester on methods for evaluating and promoting sustainable forest management within the state. In this role I served as a primary author of multiple sections of the first edition of *Good Forestry in the Granite State: Recommended Voluntary Forest Management Practices for New Hampshire* (1997). Subsequently I served on the Good Forestry in the Granite State Steering Committee and served as a reviewer of the second edition of this document (2010).
- Member of the New Hampshire Forest Advisory Board (2000-present), which provides guidance to the State Forester on the management of state forest lands and issues of public policy affecting the forests of the state.
- Active participant in the Maine Forest Biodiversity Project (1994-98), a multi-year collaboration between the scientific community, state agencies, private forest landowners and environmental NGOs that provided a forum for information sharing and mutual education on issues related to forest land management and the conservation of the state's biodiversity. I served as a member of the Working Forest Committee which oversaw the development and publication of the Cooperative Extension publication *Biodiversity in the Forests of Maine: Guidelines for Land Management*.
- Member of the Forest Stewardship Council Northeast Regional Working Group that developed the first regional standards for FSC certification in the Northeast.
- Member of the Forest Guild Northeast Biomass Retention and Harvesting Guidelines Working Group that developed *Forest Biomass Retention and Harvesting Guidelines for the Northeast*.
- Participant in other forest policy working groups and technical committees including New Hampshire Forest Law Recodification Roundtable, New Hampshire Ecological Reserves Scientific Advisory Committee, Nash Stream Forest Citizens' Advisory Committee, and Maine Bureau of Parks and Lands Integrated Resource Policy working group.

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Dated: 2/22/19

by: 
David Publicover

Date: 2/22/19

The above-named David Publicover did personally appear before me and made oath as to the truth of the foregoing pre-filed testimony.


Notary Public

My Commission Expires **DENISE M. HORNE**
Notary Public - New Hampshire
My Commission Expires **April 19, 2022**

EXHIBIT 1

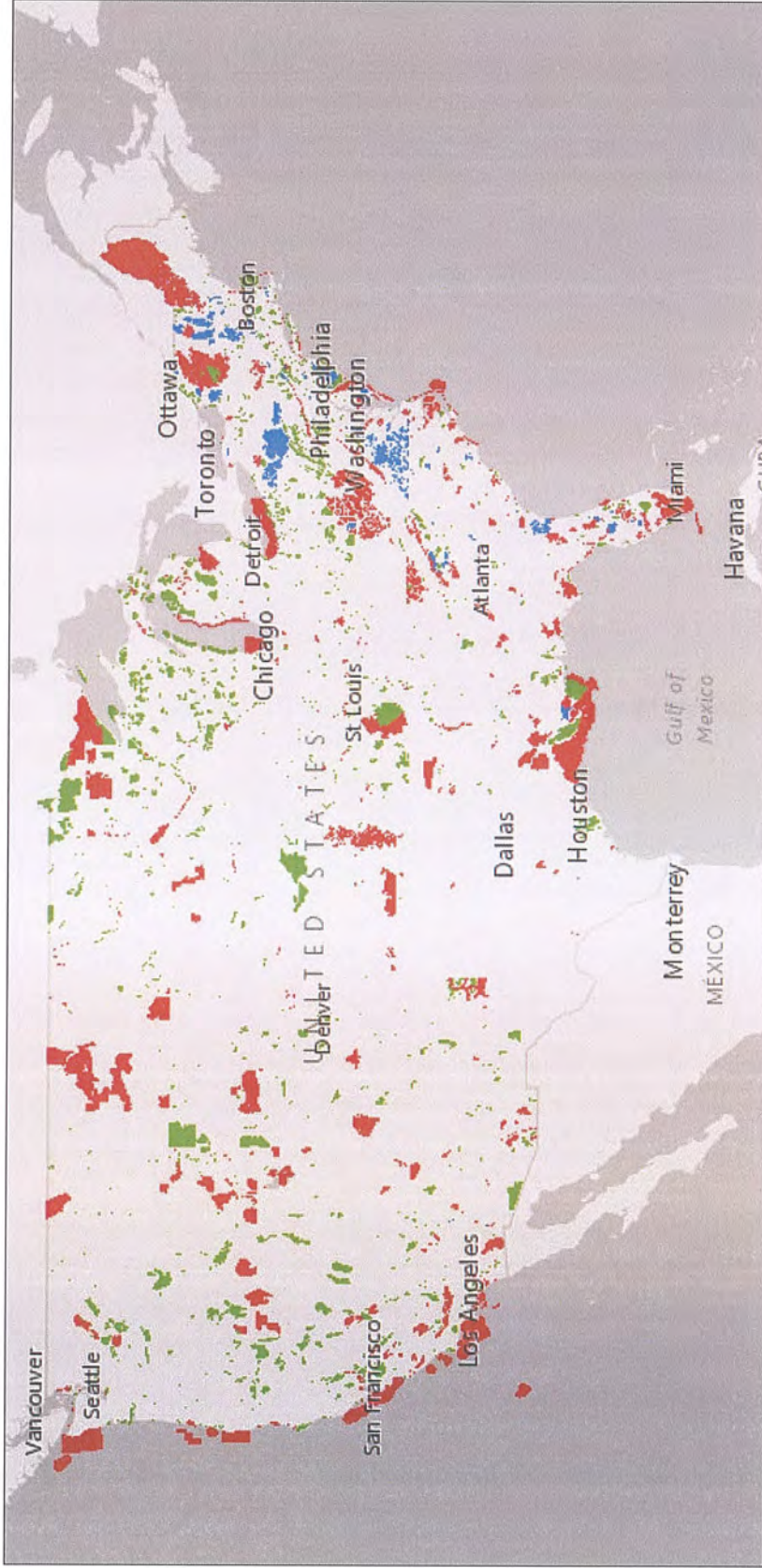


(Top) The Temperate Broadleaf and Mixed Forest ecoregion.

(Bottom) Relatively intact large forest blocks within the Temperate Broadleaf and Mixed Forest Ecoregion.

Source: Haselton et al. 2014.

EXHIBIT 2



Important Bird Areas (red – global priority, blue – continental priority, green – state priority).

Source: National Audubon Society (2019).

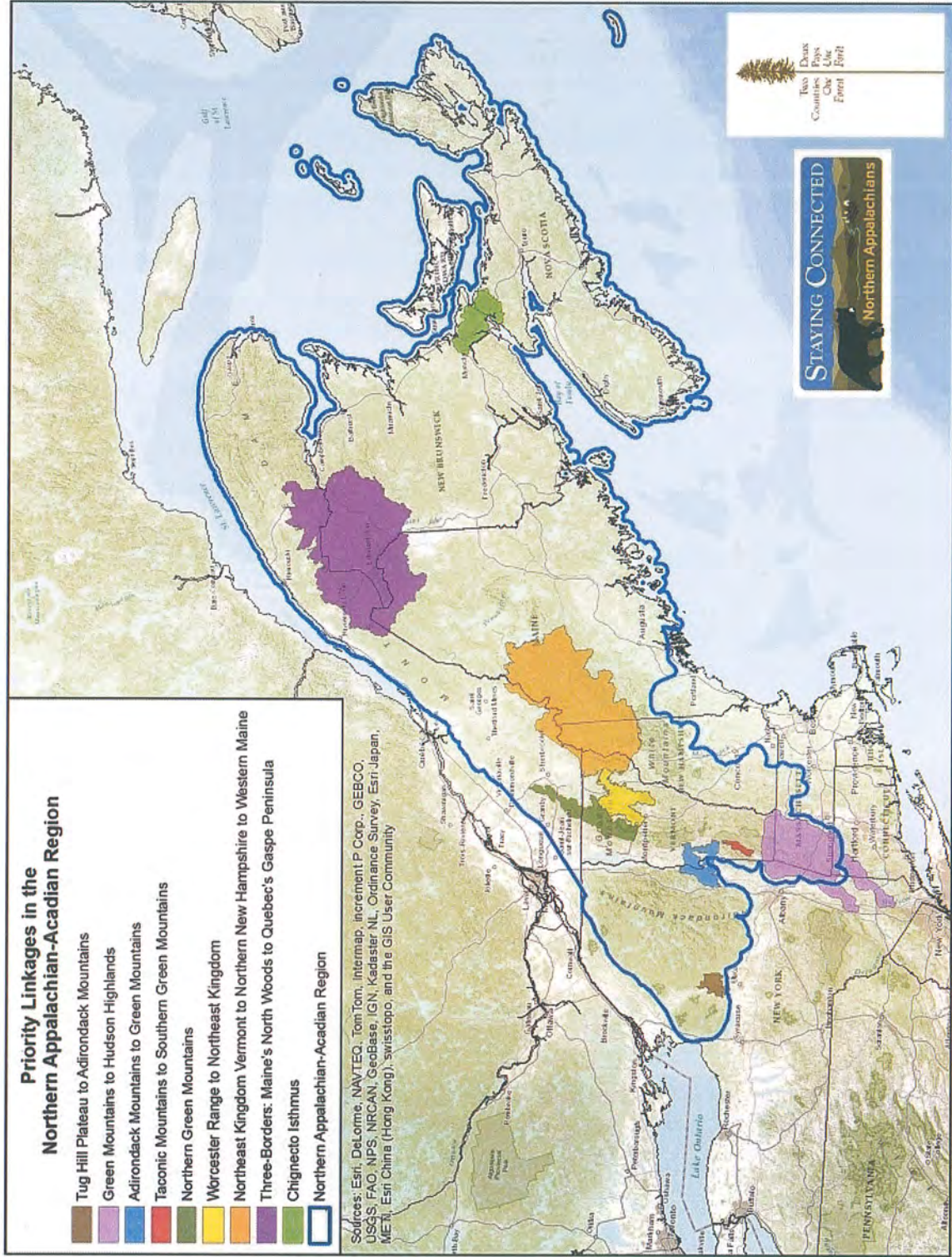
Group 4
Exhibit 15-DP

EXHIBIT 3



Source: Anderson et al. (2016), Map 3.31.

EXHIBIT 4



Source: SCI (2019); <http://stayingconnectedinitiative.org/our-region/geography/>.

EXHIBIT 5



The new corridor (yellow) parallels the Spencer Road (white) for over 20 miles.

Group 4
Exhibit
18-DP