APPENDIX 15G:
FOREST COMPOSITION REPORT

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MEMO

To:	Carol Henderson - New Hampshire Department of Fish and Game
From:	Kara Moody - TRC
Subject:	Chinook Solar Project – Proposed Clearing Limit Estimate and Forest Composition
Date:	January 23, 2018
CC:	Aaron Svedlow, Mark Trumbauer, Isabel Johnson - NextEra Energy Resources Kim Tuttle and Sandra Houghton - New Hampshire Department of Fish and Game

The purpose of this memorandum is to provide an overview of the current forest composition and covertypes within the development area of the proposed Chinook Solar Project (Project). Additionally, in order to provide a quantitative measure of potential forested habitat conversion that may result from the Project, the anticipated clearing limits and associated forest clearing for the Project are also described.

Methods

TRC estimated forest covertypes and vegetative composition based on current and historical aerial imagery, as well as field data and photographs collected in 2017. Most of the Project area is managed for forestry, and the majority of the proposed development footprint of the Project has been harvested by the landowners within the past five to 15 years. Additionally, approximately 23 acres of the proposed Project area were harvested by landowners in 2017. Based on conversations with landowners, harvesting is expected to continue on the northern two parcels within the Project area.

TRC identified six primary forested covertypes within the proposed development area of the Project (Attachment 1). These six forested areas were differentiated and classified based on the following characteristics:

- Forestry practices (ranging from selectively cut to clear cut);
- Percent aerial coverage by trees[1] (whereas the percentage is a measure of aerial coverage within an area estimated during leaf-on conditions);
- Approximate average age of standing trees; and

[1] Percent aerial coverage was determined using 2017 imagery available from Google Earth.

- Dominant and secondary tree species as determined from on-the-ground surveys during December 2017.

In order to determine the areas of clearing in each covertype noted, Tighe and Bond, the solar and civil engineering design subcontractor for the Project, provided the estimate of the clearing area. This area is based on the anticipated design of the Project layout (arrays, shading, roads, and interconnections), which has been developed to minimize impacts to natural resources. Although minor modifications to the Project layout are anticipated, the clearing area currently identified should provide a fair representation of the clearing that will likely be required.

Additionally, based on conversations with the landowners, TRC has learned that the landowners intend to continue or begin harvests on multiple parcels within the Project area before the lands are leased for the Project. Given that landowners plan to continue to harvest trees, the forested habitat that was observed in 2017 and described herein may vary from actual conditions at the time of proposed Project construction.

Results

Based on the clearing area identified for the Project, approximately 193.1 acres of clearing are anticipated within six different forest covertypes (see Table 1). The majority of forest clearing (40%, 77.3 acres) will occur in an area that has been selectively cut within the past five years and is currently approximately 60% forested, with an average age of standing trees at 40 years. As stated above, the forest conditions within the Project area may change prior to construction of the Project due to anticipated harvesting. The northern two parcels where additional harvesting is expected contain three forest covertypes: mature forest (currently 100% forested), selective cut numerous times over the last 14 years (currently 20% forested), and selective cut within the past year/current logging (currently 65% forested). At present, these three covertypes represent a total of 41.9% (80.8 acres) of the anticipated clearing: 16.3% (31.4 acres), 13.5% (26.0 acres), and 12.1% (23.4 acres), respectively. We expect that there will be less tree clearing than estimated within this 80.8-acre area since these forests are continuously being harvested. In addition to the mature forest area within the northern portion of the Project area, there is another area of mature forest (currently 95% forested) located in the southern portion of the Project area. Of the total anticipated clearing, 17.5% (33.7 acres) will occur within this area of mature forest. Additionally, a small amount of clearing (0.7%, 1.3 acres) will occur in an area of forest that has been clear cut within the past 10 years.

Table 1 describes the six covertypes and their associated characteristics, as well as the estimated acreage of clearing within each covertype. Representative photographs are included as Attachment 2, and a figure displaying the six forest habitat areas, clearing areas, and photograph locations is included as Attachment 1.

Table 1: Chinook Solar Project Estimated Clearing Summary		
Forested Covertype	***Estimated Clearing Area (acres)***	***Estimated Percent of Clearing***
Clear Cut: cut within 10 years, 20%[a/] early successional cover • Average Age of Standing Wood - 3-5 Years • Dominant Species - Gray birch (*Betula populifolia*), White pine (*Pinus strobus*) • Secondary Species - Balsam fir (*Abies balsamea*), Black cherry (*Prunus serotina*), Red oak (*Quercus rubra*) *See P1 in Attachments 1 and 2.*	1.3	0.7%
Selective Cut: cut within one year or less (active logging ongoing), 65% forested in the fall of 2017 • Average Age of Standing Wood - 30-40 years • Dominant Species - White pine, Red oak, Red maple (*Acer rubrum*) • Secondary Species - Gray birch, Hemlock (*Tsuga canadensis*), American beech (*Fagus grandifolia*) *See P6 in Attachments 1 and 2.*	23.4	12.1%
Selective Cut: cut multiple times within past 14 years, 20% forested (select mature seed trees remaining) • Average Age of Standing Wood - 35 years • Dominant Species - White pine, Red oak, Hemlock, Red maple • Secondary Species - American beech, White ash (*Fraxinus americana*) *See P4 in Attachments 1 and 2.*	26.0	13.5%
Mature Forest – cut more than 25 years ago, 100% forested • Average Age of Standing Wood - 60-70 Years • Dominant Species - Hemlock, White pine Secondary Species - Gray birch, Red maple, Red oak *See P5 in Attachments 1 and 2.*	31.4	16.3%
Mature Forest - cut more than 25 years ago, 95% forested • Average Age of Standing Wood – 60-70 years • Dominant Species - White pine, Hemlock, Balsam fir • Secondary Species - Red oak, Gray birch, White spruce *See P2 in Attachments 1 and 2.*	33.7	17.5%

Table 1: Chinook Solar Project Estimated Clearing Summary		
Forested Covertype	***Estimated Clearing Area (acres)***	***Estimated Percent of Clearing***
Selective Cut - cut within five years, 60% forested • Average Age of Standing Wood - 40 years • Dominant Species - Hemlock, Balsam fir, Red maple • Secondary Species - American beech, White spruce (*Picea glauca*), Gray birch, Red oak *See P3 in Attachments 1 and 2.*	77.3	40.0%
Approximate Total Area of Clearing/Conversion for the Project	***193.1***	
a/ Percentage values represent percent aerial cover.		

Please do not hesitate to contact me if you have any questions about the information presented herein or if you have any additional information needs regarding existing forest covertypes and anticipated clearing within the Project area.

Respectfully submitted,

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TRC Project Manager/Wildlife Biologist

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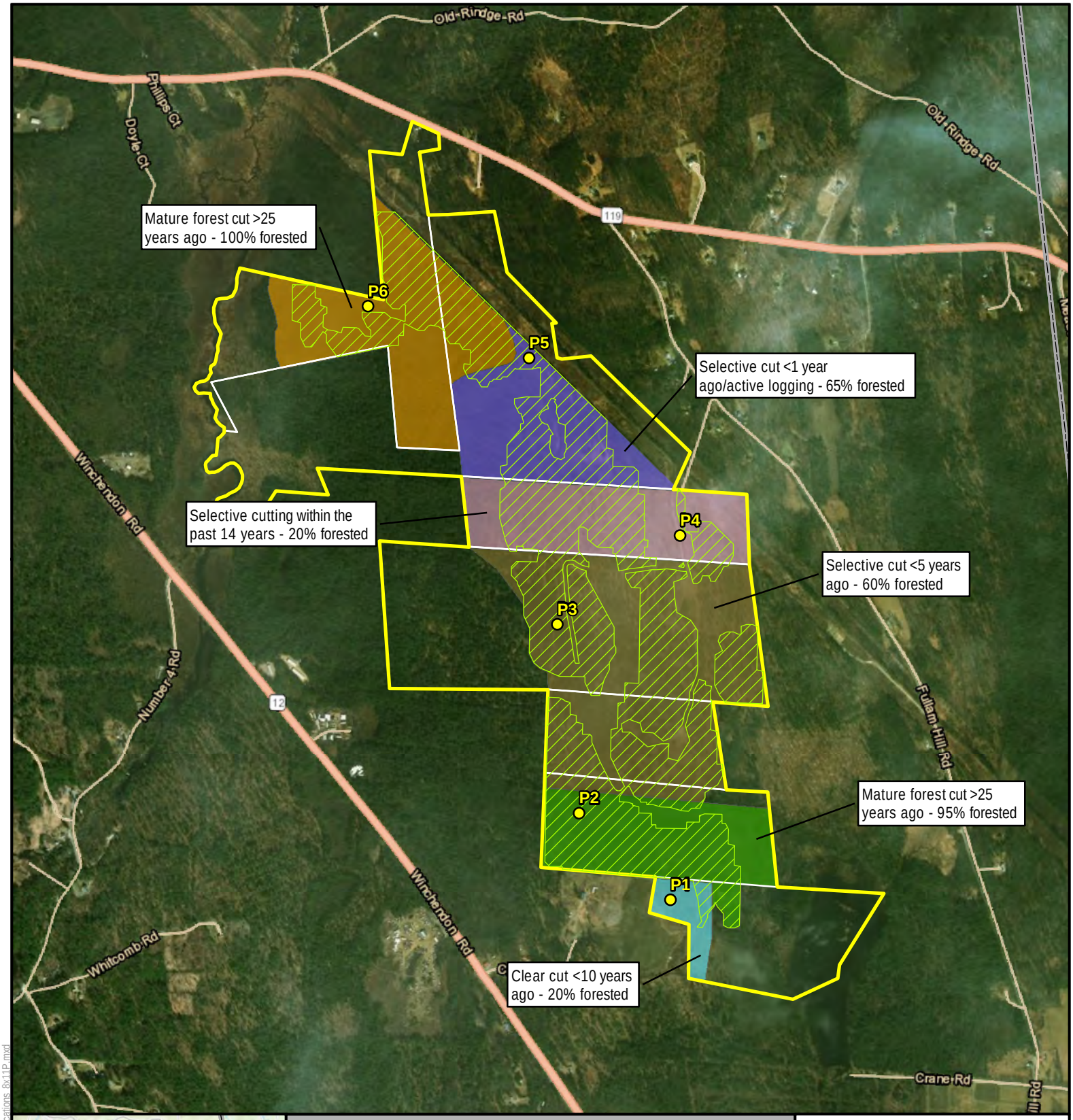
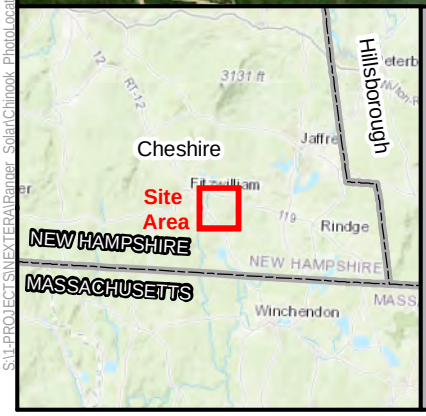
ATTACHMENTS 2

Attachment 1. Covertypes, Clearing Limits, and Photo Locations Figure





- Photo Location
- Anticipated Clearing Area
- Current Project Boundary
- Town Boundary
- Parcel Boundaries
- Clear Cut - 20% forested
- Selective Cut - 20% forested
- Selective Cut - 60% forested
- Selective Cut - 65% forested
- Mature forest - 95% forested
- Mature forest - 100% forested

N

0 0.25 Miles

Sources: ESRI, TRC, NH GRANIT

Chinook Solar Project

Estimated Forested Habitat and Clearing within the Development Area

NEXTera ENERGY RESOURCES

Created: 1/12/2018

TRC

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Attachment 2. Photographs

P1 – Clear cut within 10 years. View north from clear cut area.

P2 – Mature forest cut more than 25 years ago (95% forested). View west from logging road.

P3 – Selective cut within previous five years. View north into selective logging area.

P4 – Selective cut 14 years ago. View west from logging road.

P5 – Selective cut within one year. View west along logging trail into hemlock grove.

P6 – Mature forest cut more than 25 years ago (100% forested). View south of active logging.