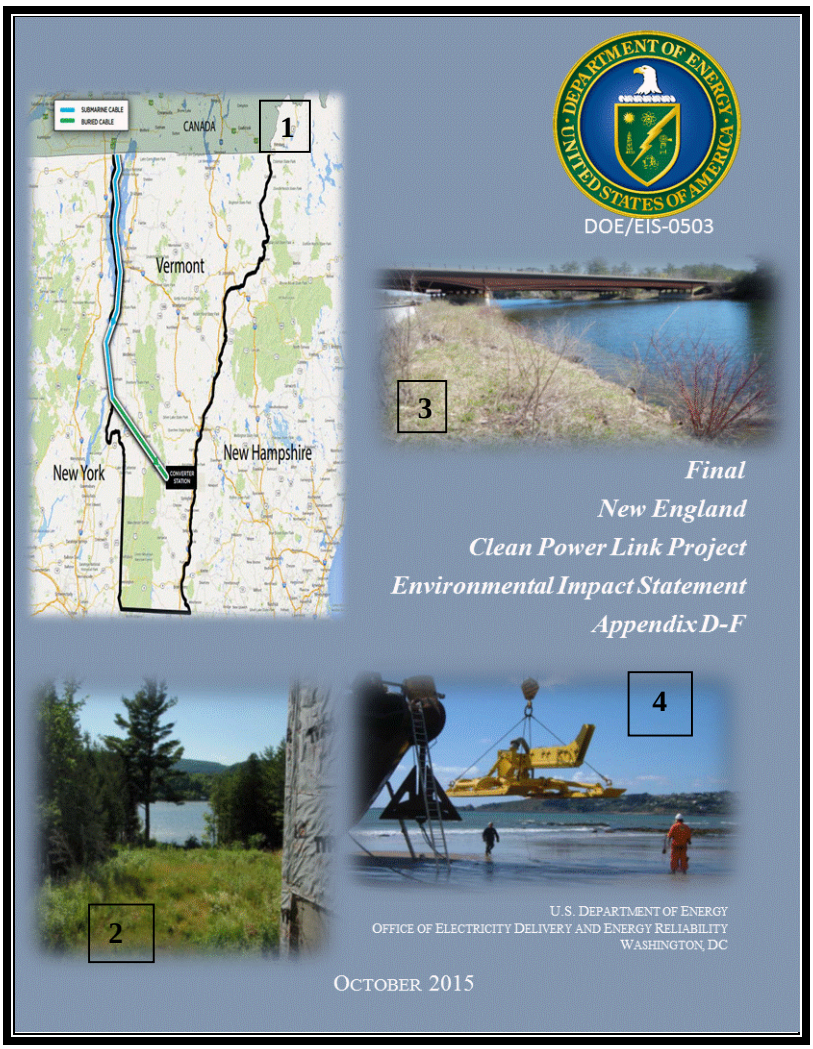
DOE/EIS-0503

Final New England Clean Power Link Project Environmental Impact Statement Appendix D-F

U.S. DEPARTMENT OF ENERGY
OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY
WASHINGTON, DC

OCTOBER 2015



Cover Photo Credits

1. TDI-NE (*http://wamc/files/styles/default/public/201410/new-england-clean-power-link-map-ctsy-tdi-new-england.jpg" alt="">)*
2. NECPL exit from Lake Champlain (Benson, Vermont) courtesy of TDI-NE
3. Lake Bomoseen, Fair Haven, Vermont courtesy of TDI-NE
4. TDI-NE 2014a

FINAL

NEW ENGLAND CLEAN POWER LINK PROJECT
ENVIRONMENTAL IMPACT STATEMENT

DOE/EIS-0503

VOLUME II: APPENDICES

U.S. DEPARTMENT OF ENERGY
OFFICE OF ELECTRICITY DELIVERY
AND ENERGY RELIABILITY

COOPERATING AGENCIES

U.S. ENVIRONMENTAL PROTECTION AGENCY
U.S. ARMY CORPS OF ENGINEERS
U.S. COAST GUARD

OCTOBER 2015

This Page Intentionally Left Blank

Table of Contents

This Page Intentionally Left Blank

APPENDIX D ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

This Page Intentionally Left Blank

New England Clean Power Link Project
Alternatives Considered but Eliminated from Further Analysis

The New England Clean Power Link (NECPL) Project (Project) would transport electricity from Canada on a merchant basis for delivery into Independent System Operator of New England (ISO-New England). Transmission Developers, Inc.-New England (TDI-NE) considered a number of different locations for interconnecting the Project transmission system into the New England grid and for siting the direct current (DC) to alternating current (AC) converter station.

To evaluate potential points of interconnection (POI) (i.e., existing substations) for the Project, TDI-NE conducted initial system screening studies of the following existing 345 kilovolt (kV) substations in Vermont as potential POIs (TDI-NE 2014):

- New Haven 345 kV Substation in Addison County, Vermont
- West Rutland 345 kV Substation in Rutland County, Vermont
- Coolidge 345 kV Substation in Windsor County, Vermont

Potential POI assessment was based on the following criteria:

- Availability of interconnection points (breaker positions) at the substation, or the capability to add interconnection points.
- Capability of existing circuits, connected to the substation that could accommodate the additional capacity of the proposed Project, or the need for system upgrades.
- Proximity of a potential converter station site to the substation and an approximation of expected environmental impacts from a potential converter site.
- Accessibility to the substation property for the high voltage direct current (HVAC) transmission cables from the converter station.

The initial system screening studies indicated that the New Haven 345-kV Substation and West Rutland 345 kV Substation were not practical POI locations because each substation is interconnected to only one existing 345 kV transmission line that could deliver the Project's energy from Canada to load throughout New England. The Coolidge 345 kV substation is interconnected to two existing 345 kV transmission lines. Interconnecting the Project at the New Haven 345 kV substation or the West Rutland 345 kV substation would require an additional 345 kV overhead line from the POI to the Coolidge substation in order to effectively long-distance transmission (TDI-NE 2014).

Constructing new overhead HVAC transmission cables would require a new or expanded right-of-way (ROW) for utility corridors, and in metropolitan and suburban areas, land costs are high and public concern regarding aesthetics and potential environmental and health effects (e.g., electric and magnetic fields [EMF]) from an overhead HVAC transmission line result in few such projects proceeding beyond the planning stage. Capacity at existing overhead HVAC transmission corridors can be increased through upgrading and overbuilding; however, most of the high-voltage corridors in the Project area are already at or near capacity because of either technical constraints or security and contingency considerations regarding the loss of common towers (TDI-NE 2014)

ALTERNATIVES TO CONVERTER STATION LOCATION

In identifying feasible POIs in western Vermont, TDI-NE concurrently identified possible sites for constructing the converter station in proximity to the POIs. Sites were identified and evaluated based on the following criteria:

- Sufficient land available for the converter station facility (approximately 4.5 acres).
- Proximity to the HVDC transmission cable route to minimize environmental impacts, neighborhood disruption (i.e., disturbances, interruptions, or changes), and costs associated with the cable connections to the converter station.
- Consistency with, and potential impacts on, land uses in proximity to the converter station site.
- Potential environmental impacts associated with the transmission cable installation and the construction of the converter station.

TABLE 1: FEASIBLE POINTS OF INTERCONNECTION IN WESTERN VERMONT

Criteria	
	Aquatic Ecosystems
NWI and VSWI Wetlands	• Acres of wetlands within 100' of alternative • Acres of wetlands within 50' of alternative
Stream Crossings	• Number of stream crossings
	Non-Aquatic Ecosystems
Rare, Threatened and Endangered Species	• Number of RTE species within 100' of alternative • Number of RTE species within 50' of alternative • Acres of RTE habitat within 100' of alternative • Acres of RTE habitat within 50' of alternative
Uncommon Species	• Number of uncommon species within 100' of alternative • Number of uncommon species within 50' of alternative • Acres of uncommon species habitat within 100' of alternative • Acres of uncommon species habitat within 50' of alternative
Wildlife Habitat	• Acres of deer wintering areas within 100' of alterative • Acres of deer wintering areas within 50' of alternative
Anthropogenic Resources/Constraints	• Number of Public water sources within 500' of alternative • Number of hazardous waste sites within 500' of alternative

TDI-NE identified two properties as suitable based on these criteria: 1) a 9.8 acre parcel on Nelson Road owned by the Anderson Trust; and b) a 4.8 acre parcel at 278 Nelson Road, both in the Town of Ludlow. The properties are adjacent to each other and located close to the Vermont Electric Power Company (VELCO) Coolidge substation in the Town of Cavendish. Both properties would allow for interconnection to the Coolidge Substation through Nelson Road (a town unpaved road) and/or the VELCO ROW. TDI-NE purchased both properties because of their proximity to the proposed Coolidge Substation POI, combined acreage, potential visual screening by existing vegetation, distance from residential structures, and the presence of only one small wetland on the site in a location that would not affect the siting of the converter station (TDI-NE 2014).

TDI-NE applied the environmental evaluation criteria in ***TABLE 2*** to assess the potential impact of each alternative on various environmental resources.

TABLE 2. CRITERIA TO EVALUATE POTENTIAL IMPACTOF EACH ALTERNATIVE ON VARIOUS ENVIRONMENTAL RESOURCES

Criteria	
	Aquatic Ecosystems
NWI and VSWI Wetlands	• Acres of wetlands within 100' of alternative • Acres of wetlands within 50' of alternative
Stream Crossings	• Number of stream crossings
	Non-Aquatic Ecosystems
Rare, Threatened and Endangered Species	• Number of RTE species within 100' of alternative • Number of RTE species within 50' of alternative • Acres of RTE habitat within 100' of alternative • Acres of RTE habitat within 50' of alternative
Uncommon Species	• Number of uncommon species within 100' of alternative • Number of uncommon species within 50' of alternative • Acres of uncommon species habitat within 100' of alternative • Acres of uncommon species habitat within 50' of alternative
Wildlife Habitat	• Acres of deer wintering areas within 100' of alterative • Acres of deer wintering areas within 50' of alternative
Anthropogenic Resources/Constraints	• Number of Public water sources within 500' of alternative • Number of hazardous waste sites within 500' of alternative

ROUTING ALTERNATIVES CONSIDERED

TDI-NE evaluated four alternative routes:

- Lake Segment Alternative- Lake Champlain to West Haven
- Western Segment Alternative – Railroad ROW
- Eastern Segment Alternative – Railroad/Roadway ROW
- Eastern Segment Alternative – VELCO ROW

Lake Segment Alternative - Lake Champlain to West Haven

This alternative overlaps with the Project's proposed initial in-lake routing but would proceed for an additional 3 miles south in Lake Champlain to exit the lake via horizontal directional drilling (HDD) in West Haven, Vermont rather than Benson, Vermont. The alternative route would proceed east through West Haven undergrounded in town road ROWs for 8 miles before transferring to the Route 22A ROW and travelling south to Fair Haven for approximately 3.4 miles (TDI-NE 2014).

Western Segment Alternative – Railroad ROW

The Project route is compared to an alternative whereby the cables would leave U.S. Route 4 at the intersection with U.S. Route 4A and, after a short distance, enter the Vermont Agency of Transportation (VTrans) railroad ROW. For this alternative, the cables would be laid within the railroad ROW for approximately 13 miles before intersecting with the Project route in West Rutland.

Eastern Segment Alternative - Railroad / Roadway ROW

This alternative overlaps with the Project route within the U.S. Route 4 ROW in West Rutland to the east in the Town of North Clarendon. The alternative would enter the railroad ROW and travel south, then east,

to Vermont Route 103 in Ludlow, at which point it would overlap again with the Project route to reach the proposed converter station location. The total length of this alternative would be approximately 30.8 miles to the proposed converter station location, with approximately 23.3 miles in railroad ROW and 7.5 miles in roadway ROW.

Eastern Segment Alternative - VELCO ROW
This alternative would depart from the Project route in West Rutland and follows the VELCO ROW to the south / south east for approximately 24 miles to the proposed converter station location.

Table 3 provides a summary of the alternatives and environmental criteria.

CONSERVATION AND DEMAND REDUCTION MEASURES

Under this alternative, reductions in energy use and demand would offset the need for additional electricity in the New England region, thus rendering the Project unnecessary. Consequently, the Project would not be built.

This alternative is eliminated from detailed analysis because it does not meet the U.S. Department of Energy's (DOE) purpose and need (***Section 1.2***), or TDI-NE's Project Objectives (***Section 1.3***). ISO-NE identified a need to diversify the region's electricity supply. While energy conservation measures are a component of the ISO-NE strategy, there is still a need for adequate electricity supply. Additionally, as defined in ***Section 1.4***, the purpose of the Project is to build and operate an electric transmission line to deliver low-carbon, non-intermittent power (approximately 98 percent hydropower) from Québec to serve the New England region. This alternative would not meet this purpose.

TABLE 3. SUMMARY OF PRACTICAL ALTERNATIVES BY SEGMENT

Evaluation Criteria	**Lake Champlain Segment (Border to Route 4)**		**Western Segment (Route 4 to West Rutland)**		**Eastern Segment (West Rutland to Ludlow)**		
	Benson	West Haven	Road	Railroad	Road	Railroad	VELCO
Length in miles	110.8	111.9	13	13	29.6	30.8	24
Navigation channel within Route	No	Yes	N/A	N/A	N/A	N/A	N/A
Approximate number of permanent easements	1	1	1	1	1	1	Many
Construction/operational access	Off boat	Off boat	Build roads/ off existing	Off existing	Off existing	Build roads/ off existing	Build roads/ off existing
Acres of Wetlands within 100' (NWI)	3.6	1.5	3.6	93.4	18.3	32.2	11.8
Acres of Wetlands within 100' (VSWI)	8	3.1	4.7	129	23.3	37.4	41.2
Stream Crossings	17	13	19	13	36	44	22
Number of RTE Species within 100'	7	10	3	2	4	4	8
Acres of RTE species habitat within 100'	29.2	27.2	17	25	23.8	37.2	50.8
Acres of significant natural communities within 100'	0	1.8	0	5.1	1.8	23.4	5.5
Number of Uncommon Species within 100'	6	8	1	4	2	3	7
Acres of Uncommon Species within 100'	26.5	16.6	0.1	12.2	4.7	1.4	2.7
Acres of Deer Wintering Areas within 100'	1.5	14.3	3.7	0	26.6	47.1	4.5
Number of Groundwater Source Protection Areas within 500'	2	0	8	10	7	6	4
Number of Surface water protection areas within 500'	0	0	0	0	11	5	0
Number of hazardous waste sites within 500'	2	0	2	5	3	3	2
Acres of public land within 500'	0	19.2	101	37.8	101	181	61.7
Acres of 100 year floodplains within 50'	1.6	3.1	4	43.8	41	25.4	12.5
Miles within stormwater impaired watershed	0	0	0	0	0	0	0

Source: TDI-NE 2014

This Page Intentionally Left Blank

APPENDIX E CWA SECTION 404 AND SECTION 10 PERMIT APPLICATION

Incorporated by reference November 7, 2014 from TDI-NE to Mike Adams; December 2014;
http://necplink.com/docs/army_corps/01_NECPL_USACE_Cover_Letter_11-07-14l.pdf

Incorporated by reference: April 1, 2015 from VHB to Ms. Meghan McIntyre, Environmental Analyst;
Vermont Department of Environmental Conservation Watershed Management Division;
http://necplink.com/docs/regulatory/401-water-quality-certification/1_NECPL_401WQC_CoverLetter.pdf

This Page Intentionally Left Blank

14 Gabriel Drive
Augusta, ME 04330

207.620.3800 PHONE
207.621.8226 FAX

www.trcsolutions.com

November 7, 2014

Michael Adams
U.S. Army Corps of Engineers
New England District
Vermont Project Office
8 Carmichael Street, Suite 205
Essex Junction, VT 05452

Subject: New England Clean Power Link Project
Section 404 / Section 10 Permit Application

Dear Mr. Adams:

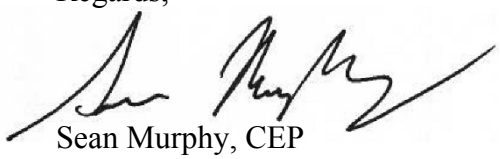
Champlain VT, LLC, d/b/a TDI-New England (Applicant or TDI-NE) is proposing to construct, operate, and maintain the New England Clean Power Link Project (Project) to bring renewable sources of power generation in Canada to Vermont and ISO-NE via underwater and underground high-voltage direct current (HVDC) transmission cables. On behalf of the Applicant, please find enclosed an application for construction permits pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 (Application). The Applicant intends to supplement this Application in the near future with additional information regarding the anticipated impacts associated with the Project.

The Project will include construction, operation, and maintenance of an approximately 154-mile 1,000-MW, high-voltage electric power transmission system that will have both aquatic (underwater) and terrestrial (underground) segments in the State of Vermont. The underwater portions of the transmission line will be buried in the bed of Lake Champlain, except in areas where the water depth exceeds 150 feet, in which areas the Applicant proposes to place the cables on the Lake bottom. The terrestrial portions of the transmission line will be buried underground within roadway and rail system rights-of-way (ROWs) or on private property controlled by TDI-NE.

In addition to a completed ENG form 4345, the Application provides information related to the project purpose and description, construction methods, alternatives considered, and delineated wetlands and water resources. TDI-NE intends to supplement this application later this year with a quantification of wetlands impacts, avoidance/minimization/mitigation measures, and water quality modeling. The Applicant will also provide a listing of affected property owners at that time as well.

We look forward to speaking with you in the near future about this application. Please feel free to contact me at 207-620-3717 or SFMurphy@TRCsolutions.com if you have any questions about the materials presented.

Regards,



Sean Murphy, CEP
Project Manager

Enclosure

cc: Beth Alafat, USEPA
Maria Tur, USFWS
Billy Coster, VT ANR
Brian Mills, DOE
Don Jessome, TDI-NE
Josh Bagnato, TDI-NE

PUBLIC NOTICE

US Army Corps of Engineers®
New England District
Vermont Project Office
11 Lincoln Street, Room 210
Essex Junction, Vermont 05452

Comment Period Begins: July 21, 2015
Comment Period Ends: Aug 21, 2015
File Number: NAE-2013-2689
In Reply Refer To: Michael S. Adams
Phone: (802) 872-2893
E-mail: Michael.s.adams@usace.army.mil

The District Engineer has received a permit application from the applicant below to conduct work in waters of the United States as described below.

APPLICANT: Champlain VT, LLC d/b/a TDI New England, ATTN: Donald Jessome, P.O. Box 155, Charlotte, Vermont 05445.

ACTIVITY: Place fill in and perform work within waters of the United States in conjunction with the construction of 154.2 miles of a new 1,000-MW, high-voltage direct current (DC) electric transmission line from the international U.S. - Canada border in Alburgh to Cavendish, Vermont. Approximately 97.3 miles of the line will be installed underwater in Lake Champlain and about 56.9 miles will be installed underground within roadway and railroad right-of-ways (ROW). This work will temporarily impact about 5.9 acres of waters of the United States and permanently impact about 2.5 acres of waters of the United States. Construction of a new converter station in Ludlow, Vermont, will convert the electric power from DC to alternating current (AC) will not impact waters of the United States. A detailed description and a partial set of plans of the activity are attached.

WATERWAY AND LOCATION OF THE PROPOSED WORK
The northern end of the project site is located on the Rouses Point, VT-NY USGS quadrangle sheet at UTM coordinates N 4985284.0 and E 631537.0. The southern end of the project site is located on the Ludlow, VT USGS quadrangle sheet at UTM coordinates N 4810890.0 and E 689332.0.

AUTHORITY
Permits are required pursuant to:
__X__ Section 10 of the Rivers and Harbors Act of 1899
__X_ Section 404 of the Clean Water Act
_____Section 103 of the Marine Protection, Research and Sanctuaries Act).

The decision whether to issue a permit will be based on an evaluation of the probable impact of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which may reasonably accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered, including the cumulative effects thereof; among

those are: conservation, economics, aesthetics, general environmental concerns, wetlands, cultural value, fish and wildlife values, flood hazards, flood plain value, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food production and, in general, the needs and welfare of the people.

The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

Where the activity involves the discharge of dredged or fill material into waters of the United States or the transportation of dredged material for the purpose of disposing it in ocean waters, the evaluation of the impact of the activity in the public interest will also include application of the guidelines promulgated by the Administrator, U.S. Environmental Protection Agency, under authority of Section 404(b) of the Clean Water Act, and/or Section 103 of the Marine Protection Research and Sanctuaries Act of 1972 as amended.

NATIONAL HISTORIC PRESERVATION ACT

Based on his initial review, the District Engineer has determined that the proposed work may impact properties listed in, or eligible for listing in, the National Register of Historic Places. Additional review and consultation to fulfil requirements under Section 106 of the National Historic Preservation Act of 1966, as amended, will be ongoing as part of the permit review process.

ENDANGERED SPECIES CONSULTATION

The New England District, Army Corps of Engineers has reviewed the list of species protected under the Endangered Species Act of 1973, as amended, which might occur at the project site. It is our preliminary determination that the proposed activity for which authorization is being sought is designed, situated or will be operated/used in such a manner that it is not likely to adversely affect any Federally listed endangered or threatened species or their designated critical habitat. By this Public Notice, we are requesting that the appropriate Federal Agency concur with our determination.

The following authorizations have been applied for, or have been, or will be obtained:

(X) Permit, License or Assent from State.
( ) Permit from Local Wetland Agency or Conservation Commission.
(X) Water Quality Certification in accordance with Section 401 of the Clean Water Act.

In order to properly evaluate the proposal, we are seeking public comment. Anyone wishing to comment is encouraged to do so. **Comments should be submitted in writing by the above date.** If you have any questions, please contact Michael S. Adams at (802) 872-2893.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider the application. Requests for a public hearing shall specifically state the reasons for holding a public hearing. The Corps holds public hearings for the purpose of obtaining public comments when that is the best means for understanding a wide variety of concerns from a diverse segment of the public.

The initial determinations made herein will be reviewed in light of facts submitted in response to this notice. All comments will be considered a matter of public record. Copies of letters of objection will be forwarded to the applicant who will normally be requested to contact objectors directly in an effort to reach an understanding.

In accordance with 33 CFR 325.2(a)(8), we publish monthly a list of permits issued or denied during the previous month at www.nae.usace.army.mil/reg, under the heading "Monthly General and Individual Permit Authorizations." Relevant environmental documents and the SOFs or RODs are available upon written request and, where applicable, upon the payment of administrative fees. Also visit www.nae.usace.army.mil for more information on the New England District Corps of Engineers programs.

THIS NOTICE IS NOT AN AUTHORIZATION TO DO ANY WORK.

Frank DelGiudice
Chief, Permits and Enforcement Branch
Regulatory Division

If you would prefer not to continue receiving Public Notices, please contact Ms. Tina Chaisson at (978) 318-8058 or e-mail her at bettina.m.chaisson@usace.army.mil. You may also check here ( ) and return this portion of the Public Notice to: Bettina Chaisson, Regulatory Division, U.S. Army Corps of Engineers, 696 Virginia Road, Concord, MA 01742-2751.

NAME: _____
ADDRESS: _____

PROPOSED WORK AND PURPOSE

Place fill in and perform work within waters of the United States in conjunction with the construction of 154.2 miles of a new 1,000-MW, high-voltage direct current (DC) electric transmission line from the international U.S. - Canada border in Alburgh to the existing Coolidge Substation in Cavendish, Vermont. The transmission line will be a bipole line consisting of two transmission cables, one positively charged and the other negatively charged. Approximately 97.3 miles of the line will be installed underwater in Lake Champlain and about 56.9 miles will be installed underground within roadway and railroad right-of-ways (ROW). This work will temporarily impact about 5.9 acres of waters of the United States and permanently impact about 2.5 acres of waters of the United States. Construction of a new converter station in Ludlow, Vermont, will convert the electric power from DC to alternating current (AC) will not impact waters of the United States. The proposed work involves the following:

UNDERWATER CABLE INSTALLATION

The proposed underwater Lake Champlain cable route will enter the lake about 0.5 mile south of the border in Alburgh, Vermont and will exit the lake in Benson, Vermont. The cables will be installed in the transition areas between aquatic and terrestrial portions of the project by using horizontal directional drilling (HDD). A sheet-pile cofferdam or receiver casing will be used in the lake at the aquatic transitions to minimize turbidity. In depths less than 150' the two cables will be bundled and laid together in the same trench about 4 feet below the lake using a jet plow or a shear plow. This portion of the route will be cleared of debris on the lake bottom using various types of grapnels. Both plowing processes will be conducted using a specially designed cable barge and towed plow device that simultaneously lays and embeds the aquatic transmission cables in the trench. At the 21 locations where the transmission cables cross existing utility lines or bedrock, they will be laid over the existing utility line or bedrock and protective articulating concrete mats will be placed over the cable crossing. A total of approximately 108,560 sq. ft. (2.5 acres) of lake bottom will be impacted by the concrete mats. In depths greater than 150 feet the cables will be laid on the lakebed without burial or protection and are expected to settle an average of 1 foot below the lake bottom.

UNDERGROUND CABLE INSTALLATION

With the exception of two privately owned parcels along the lake in Alburgh and Benson, the transmission line will be installed within existing town and state roadway and railroad ROWs. The overland segment consists of a 12' wide permanent project corridor centered on the transmission line alignment. The two cables will be installed side-by-side in a trench approximately 4' wide by 6' deep. Approximately 195,711 sq. ft. (4.5 acres) of wetlands and approximately 63,160 sq. ft. (1.45 acre) of stream bottom will be temporarily impacted by the trench, cofferdams, sidecast material and construction mats. Trenches in which the pipe will be installed will be backfilled with low thermal resistive backfill (when necessary) and indigenous material, with contours restored. The project will cross 151 perennial, intermittent and ephemeral streams. All temporary fills will be removed in their entirety upon project completion and disposed of at an upland, non-wetland location. Tree clearing within the work area will occur in about 84,758 sq. ft. (1.95 acre) of wetlands, with about 52,731 sq. ft. (1.21 acre) being allowed to grow back.

The purpose of the project is to deliver renewable power from Canada into Vermont and the markets operated by the New England Independent System Operator (ISO-NE).

In that this project involves the construction of a long linear project from the U.S. - Canada border in Alburgh to Cavendish, the applicant developed alternatives based on a review of using the lake and/or existing ROWs (roadway, railroad and utility). Three entirely overland routes were identified which follow existing road and/or utility ROWs. In considering alternatives which included Lake Champlain, the applicant identified three distinct segments, each containing specific alternatives. These included the Lake Champlain Segment (two alternatives using the lake from Alburgh and exiting the lake in Benson or West Haven to get to Fair Haven), Western Segment (two alternatives between Fair Haven and West Rutland), and Eastern Segment (three alternatives between West Rutland and Cavendish). Overall the applicant developed ten conceptual alternative routes that utilized existing right-of-ways, with one being the proposed project. The routes were evaluated using a desktop GIS review of potential impacts on wetlands, hydric soils, stream crossings, RTE Species and Significant Natural Communities, uncommon species, wildlife habitat, public water source protection areas, hazardous waste sites, floodplains, and historic sites. The overall project length, number of easements and project cost were also considered. The alternative routes consisted of:

1) Route 7 Alternative - Overland buried from the U.S. - Canada border in Highgate to Clarendon along the US Route 7 ROW for 125.2 miles, then from Clarendon to the existing substation in Cavendish along the Vermont Electric Power Company (VELCO) ROW for 17.8 miles;
2) Interstate Alternative - Overland buried from the U.S. - Canada border in Highgate to White River Junction along Interstate 89 for 127.9 miles, then along Interstate 91 to Ascutney for 18.47 miles, then along VT Route 131 and local roads for 19 miles to the existing substation in Cavendish;
3) Overland Alternative - Overland aerial from the U.S. - Canada border in Highgate to West Rutland to the existing substation in Cavendish for 131 miles using several existing VELCO ROWs;
4) Lake Champlain Segment West Haven Alternative – Lake Champlain from Alburgh to West Haven for 100 miles, then local roads, VT Route 22A and US Route 4 ROWs to Fair Haven for 11.4 miles to connect to the Western Segment;
5) Lake Champlain Segment Benson Landing Alternative - Lake Champlain from Alburgh to Benson for 97.3 miles, then to local roads, VT Route 22A and US Route 4 ROWs to Fair Haven for 12.5 miles to connect to the Western Segment;
6) Western Segment Route 4 Alternative - from Fair Haven to West Rutland along the US Route 4 ROW for 13 miles to connect to the Eastern Segment;
7) Western Segment Railroad West Alternative – from Fair Haven to West Rutland along local roads and VT Route 4A ROWs for 1.7 miles to the VTrans railroad ROW for 11 miles to connect to the Eastern Segment;
8) Eastern Segment Route 103 Alternative – from West Rutland to Cuttingsville along the US Route 4, VT Routes 7 and 103 ROWs for 10.9 miles. Through Cuttingsville on the railroad ROW for 3.5 miles, then back to VT Routes 103 and 100 ROWs for 10.6 miles to Ludlow. From Ludlow to the existing substation in Cavendish using 4.5 miles of local roads;

9) Eastern Segment Railroad East Alternative – from West Rutland to Rutland along US Route 4 and VT Route 7 ROWs for 6.8 miles to the railroad ROW for 20.3 miles to VT Route 103 in Ludlow where the final 5.8 miles would follow VT Route 100 and local roads to the substation in Cavendish; and
10) Eastern Segment VELCO Alternative – from West Rutland to the substation in Cavendish along 24 miles of VELCO ROW.

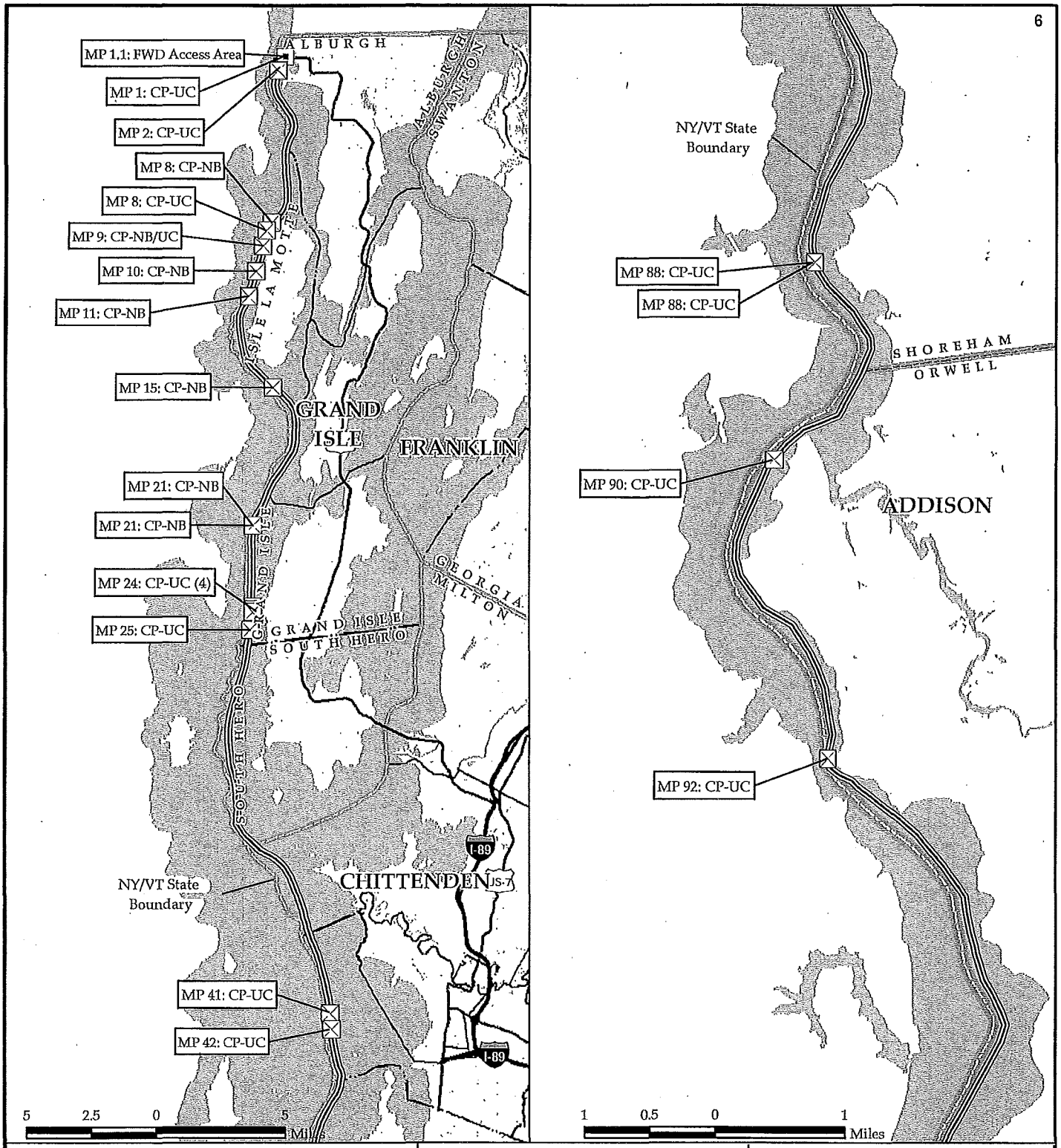
The proposed route follows Alternatives 5, 6 and 8. The applicant concluded that the preferred alternative is the least environmentally damaging and practicable alternative.

New right-of-ways were not considered in that they would likely involve greater impacts to waters of the United States.

To minimize the impacts to aquatic resources the transmission line will be installed directly beneath existing town roads, within the ROW of state roads and by directional bore across Lake Bomoseen, 18 stream channels including Otter Creek, and several large wetland complexes. The project has been designed such that impacts to wetlands and waterways have been avoided and minimized to the maximum extent practicable while maintaining the project objectives. All areas of temporarily disturbed soils, including access and construction areas will be regraded, reseeded, and restored upon project completion. The overland portion of the project will not involve any permanent fill within waters of the United States.

To compensate for unavoidable impacts to waters of the U.S. of the proposed project, the applicant proposes to make a payment to the Ducks Unlimited – Vermont In-Lieu Fee Program.

The work is partially described on the enclosed plans, in thirty one sheets, entitled "TDI-NE" (dated "March 31, 2015", revised "June 10, 2015") and "TDI – New England Clean Power Link (NECPL)" (dated "March 31, 2015", revised "July 9, 2015" and "June 10, 2015"). The entire set of wetland and stream impact plans can be viewed by contacting Josh Bagnato with TDI New England at (802) 477-3830.



Approximate Activity Locations

- FWD Access Area
- CP = Cable Protection
- UC = Utility Crossing
- NB = Natural Bedrock
- Interstate
- US Highway

NECPL Proposed Route

- Aquatic Route
- Waterbody (VHD)
- Stream (VHD)
- County Boundary
- Town Boundary

TDI-NE

New England Clean Power Link Project
Grand Isle, Rutland, Windsor Counties, and Lake Champlain, VT
Impact Exhibit - Lake Champlain
Approximate Impact Locations

Sheet # 3 of 215

March 31, 2015
Revised: June 10, 2015

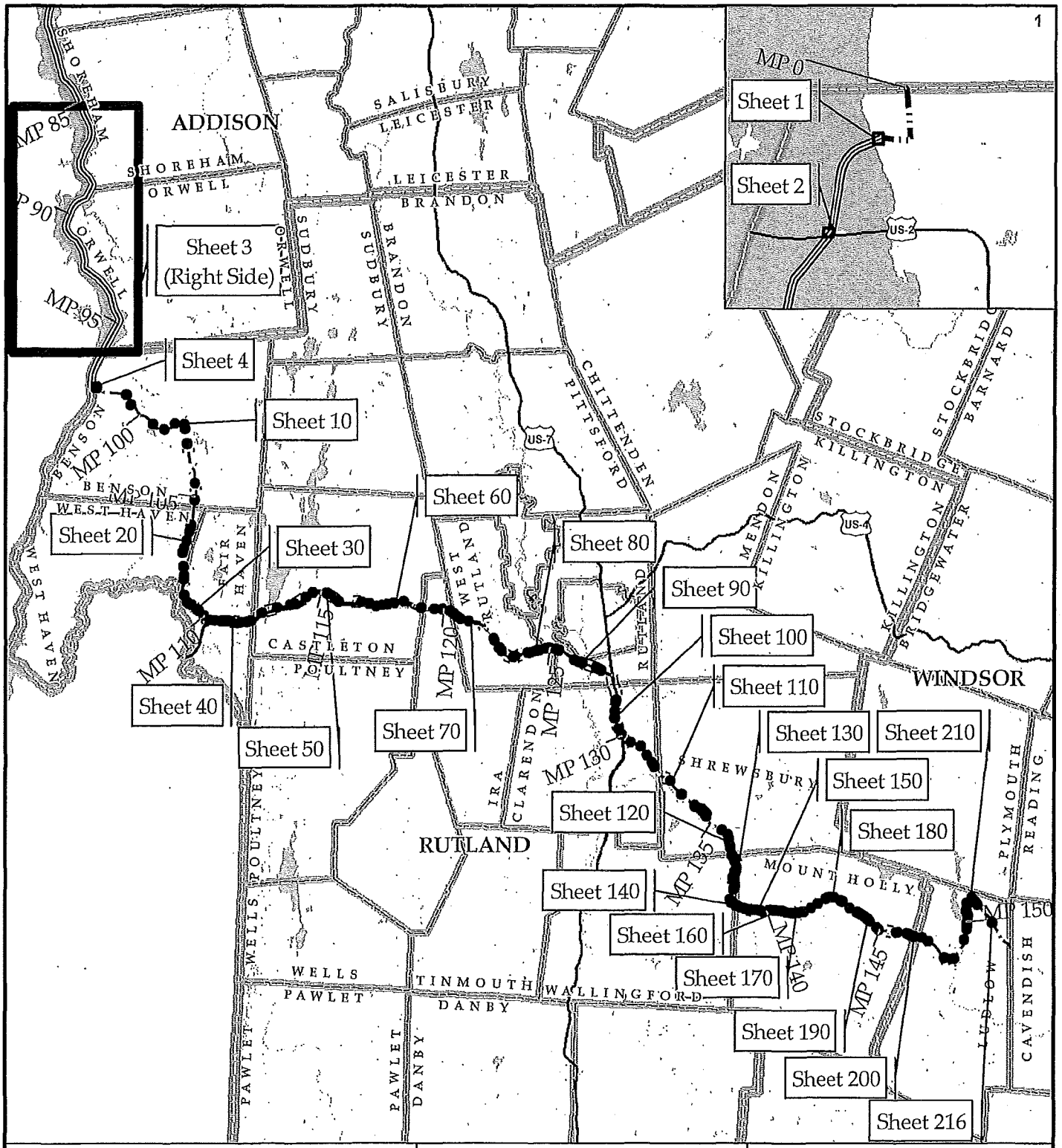
Sources Roads downloaded from VCGI (2013); VHD Streams & Waterbodies by VHD and downloaded from VCGI (2009), Town and County Boundaries by VCGI (2009); Proposed Cable Alignment by TRC (2015); Proposed Lake Activity Impacts by TRC/VHB (2015).

vhb

TRC

\\VTNFDATA\projects\57666.00 NE Clean Power Link\GIS\Project\Impacts\January_2015\401_401\401_LakeImpacts.mxd LastExported: by acoplin

1/31



NECPL Proposed Route
- Terrestrial Cable Route/Duct Bank
- HDD/Jack and Bore
- Aquatic Cable Route/Lake HDD

Sheet Outline
County Boundary
Town Boundary
Waterbody (VHD)
Interstate
US Highway

TDI-NE
New England Clean Power Link Project
Grand Isle, Rutland, & Windsor Counties, VT
Wetland and Stream Impact Exhibit - Index Map

March 31, 2015
Revised: June 10, 2015

5 2.5 0 5 Miles

Sources: Roads downloaded from VCGI (2013); VHD Streams & Waterbodies by VHD and downloaded from VCGI (2009), Town and County Boundaries by VCGI (2009); Proposed Cable Route by TRC (2015)

vhb

TRC

\\VTNFDATA\projects\57666.00 NE Clean Power Link\GIS\Project\Impacts\January_2015\404_401\401_Index_LCLU.mxd Last Exported: by acoplin

2/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Wetland Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

VHB Impact Exhibit #	Wetland ID[1]	NR Sheet #	Town	Cowardin Classification[2]	Delineated Area (Sq Ft)	Proposed Wetland Impacts					TOTAL IMPACTS (SQ FT)	Abutters[9]	
						Permanent Impacts (Sq Ft)[3]	Temporary Impacts (Sq Ft)[4]			Secondary Impacts (Sq Ft)		LLN #	Last Name of Abutting Property Owner
							Trenching/ Earthwork[5]	Forested Areas[6]	Non-Forested Areas[7]	Forest Conversion[8]			
1	V-AL-W-2	1	Alburgh	PEM/ PFO	17400	0	0	0	0	0	0	6, 8	Leon and Shirley Aubin, Matthew Buron Trustee
4	V-BE-W-1	2	Benson	PSS	3310	0	0	0	0	0	0	16, 17, 17.01	Lombardi/TDI, Cushing Family, LLC, Deirdre Denehy
4	V-BE-W-2	2	Benson	PFO	3930	0	0	0	0	0	0	16, 17, 17.01	Lombardi/TDI, Cushing Family, LLC, Deirdre Denehy
7	V-BE-W-14	4	Benson	PSS/PFO	1480	0	0	49	356	0	405	12, 38	Town of Benson, Eunice Munger Life Estate
10	V-BE-W-100	5	Benson	PEM	740	0	29	0	45	0	74	63, 84	David & Debra Tyler, Vermont Agency of Transportation
11	V-BE-W-101	5	Benson	PEM	910	0	788	0	119	0	907	63, 84	David & Debra Tyler, Vermont Agency of Transportation
15	V-WH-W-101	9	West Haven	PEM	140	0	113	0	29	0	142	84, 94, 95	Vermont Agency of Transportation, Williams Properties, LLC, Williams Properties, LLC
15	V-WH-W-100	9	West Haven	PEM	100	0	90	0	8	0	98	84, 94, 95	Vermont Agency of Transportation, Williams Properties, LLC, Williams Properties, LLC
17	V-WH-W-5	9	West Haven	PEM	1450	0	1168	0	286	0	1454	84, 96, 99	Vermont Agency of Transportation, The Nature Conservancy, The Nature Conservancy
18	V-WH-W-6	9	West Haven	PEM	120	0	106	0	10	0	116	84, 96, 97	Vermont Agency of Transportation, The Nature Conservancy, Langis Anctil

3/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Wetland Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

VHB Impact Exhibit #	Wetland ID[1]	NR Sheet #	Town	Cowardin Classification[2]	Delineated Area (Sq Ft)	Proposed Wetland Impacts					TOTAL IMPACTS (SQ FT)	Abutters[9]	
						Permanent Impacts (Sq Ft)[3]	Temporary Impacts (Sq Ft)[4]			Secondary Impacts (Sq Ft)		LLN #	Last Name of Abutting Property Owner
							Trenching/ Earthwork[5]	Forested Areas[6]	Non-Forested Areas[7]	Forest Conversion[8]			
19	V-WH-W-8	9	West Haven	PEM	6360	0	1898	0	587	0	2485	84, 96, 99	Vermont Agency of Transportation, The Nature Conservancy, The Nature Conservancy
20	V-WH-W-10	9	West Haven	PEM	1800	0	0	0	2252	0	2252	84, 101	Vermont Agency of Transportation, Linda Benissi
20	V-WH-AW-10	9	West Haven	PEM	7150	0	0	0	241	0	241	84, 101	Vermont Agency of Transportation, Linda Benissi
21	V-WH-W-11	10	West Haven	PEM	1220	0	0	0	680	0	680	84, 101, 102	Vermont Agency of Transportation, Linda Benissi, Peter Doran
27	V-FH-W-22	11	Fair Haven	PEM	1130	0	138	0	962	0	1100	84, 118	Vermont Agency of Transportation, Kathleen Knapp
28	V-FH-W-21	11	Fair Haven	PEM/PSS	8780	0	654	988	307	828	2777	84, 122	Vermont Agency of Transportation, Phillip Stannard, Sr. & Kathleen Knapp
30	V-FH-W-19	12	Fair Haven	PEM	9070	0	0	0	43	0	43	84, 124	Vermont Agency of Transportation, Kevin & Aileen Durkee
32	V-FH-W-29	12	Fair Haven	PEM / PSS	920	0	124	0	796	0	920	128, 252	Paul & Colleen Heibler, Vermont Agency of Transportation
35	V-FH-W-5	13	Fair Haven	PEM	6290	0	0	275	0	0	275	252	Vermont Agency of Transportation
36, 37	V-FH-W-4	13	Fair Haven	PEM / PFO / PSS	85510	0	15	1035	544	707	2301	252	Vermont Agency of Transportation
38	V-FH-W-6	13	Fair Haven	PEM	5320	0	1092	138	1228	0	2458	252	Vermont Agency of Transportation

4/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Wetland Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

VHB Impact Exhibit #	Wetland ID[1]	NR Sheet #	Town	Cowardin Classification[2]	Delineated Area (Sq Ft)	Proposed Wetland Impacts					TOTAL IMPACTS (SQ FT)	Abutters[9]	
						Permanent Impacts (Sq Ft)[3]	Temporary Impacts (Sq Ft)[4]			Secondary Impacts (Sq Ft)		LLN #	Last Name of Abutting Property Owner
							Trenching/ Earthwork[5]	Forested Areas[6]	Non-Forested Areas[7]	Forest Conversion[8]			
45	V-CN-W-103	15	Castleton	PEM / PSS	25930	0	27	0	733	0	760	252, 182	Vermont Agency of Transportation, JAMAC Corp.
46	V-CN-W-104	15	Castleton	PFO / PEM / PSS	119100	0	0	1007	0	0	1007	252, 182	Vermont Agency of Transportation, JAMAC Corp.
47	V-CN-W-113	16	Castleton	PEM / PSS / PFO	30220	0	155	425	846	28	1454	188, 252	Myrtle Hall, Vermont Agency of Transportation
48	V-CN-W-115	16	Castleton	PEM	17290	0	0	0	2265	0	2265	252, 192	Vermont Agency of Transportation, Daniel Amrick
49	V-CN-W-11	17	Castleton	PEM/PSS/PFO	5940	0	0	95	97	0	192	252	Vermont Agency of Transportation
50	V-CN-W-12	17	Castleton	PEM/PSS	12060	0	340	0	413	0	753	195, 252	Wayne Doane, Vermont Agency of Transportation
51, 52	V-CN-W-15	17	Castleton	PEM/PSS	21510	0	3044	292	11467	397	15200	201, 252	James Dodge, Vermont Agency of Transportation
54	V-CN-W-3/6	18	Castleton	PEM/PSS	9900	0	817	0	1428	0	2245	252, 221	Vermont Agency of Transportation, Breton Brook Properties, Inc.
59	V-CN-W-1	19	Castleton	PEM / PSS	12780	0	0	218	357	58	633	252	Vermont Agency of Transportation
66	T-WR-W8	22	West Rutland	PSS/PEM	6720	0	0	341	0	198	539	252	Vermont Agency of Transportation
68	T-WR-W7	22	West Rutland	PEM	1380	0	0	384	0	0	384	252	Vermont Agency of Transportation

5/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Wetland Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

vhb

VHB Impact Exhibit #	Wetland ID[1]	NR Sheet #	Town	Cowardin Classification[2]	Delineated Area (Sq Ft)	Proposed Wetland Impacts					TOTAL IMPACTS (SQ FT)	Abutters[9]	
						Permanent Impacts (Sq Ft)[3]	Temporary Impacts (Sq Ft)[4]			Secondary Impacts (Sq Ft)		LLN #	Last Name of Abutting Property Owner
							Trenching/ Earthwork[5]	Forested Areas[6]	Non-Forested Areas[7]	Forest Conversion[8]			
84	T-RU-W8	26	Rutland	PEM/PFO	22590	0	2161	2088	2823	1275	8347	252, 356	Vermont Agency of Transportation, Paul Grabowski
91, 92, 93, 94, 95	T-RU-W4	27	Rutland	PEM/PSS	223760	0	737	13367	1175	3325	18604	252, 379	Vermont Agency of Transportation, Dyer Management, LLC
96	T-CL-W11	29	Clarendon	PFO	2340	0	0	426	21	243	690	388, 410	Vermont Agency of Transportation, John and Barbara Pratt
97	T-CL-W12	29	Clarendon	PEM	1190	0	0	480	203	42	725	388, 410	Vermont Agency of Transportation, John and Barbara Pratt
98	T-CL-W7	29	Clarendon	PFO/PEM	11020	0	604	896	576	962	3038	388, 416	Vermont Agency of Transportation, Loomis & Allen Darby
99	T-CL-W5	29	Clarendon	PEM	2700	0	335	14	1810	0	2159	388, 417, 418	Vermont Agency of Transportation, Marjorie Southard, John, Winona & Bradley Gilman
100	T-CL-W2	30	Clarendon	PFO/PEM	770	0	0	39	16	0	55	388, 420	Vermont Agency of Transportation, Caroll Adams
101	T-CL-W1	30	Clarendon	PEM	2550	0	0	0	163	0	163	388, 427	Vermont Agency of Transportation, Robert Turgeon
102	T-CL-W15	30	Clarendon	PEM	280	0	0	0	820	0	820	428, 429, 469	Thomas Pierce et al, Thomas Pierce et al, Vermont Agency of Transportation
103	T-CL-W18	31	Clarendon	PFO	910	0	0	208	5	0	213	431, 433, 469	Thomas Pierce et al, J P Carrara & Sons, Vermont Agency of Transportation
104	T-CL-W20	31	Clarendon	PFO	2420	0	0	27	0	0	27	433, 469	J P Carrara & Sons, Vermont Agency of Transportation

18/6

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Wetland Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

VHB Impact Exhibit #	Wetland ID[1]	NR Sheet #	Town	Cowardin Classification[2]	Delineated Area (Sq Ft)	Proposed Wetland Impacts					TOTAL IMPACTS (SQ FT)	Abutters[3]	
						Permanent Impacts (Sq Ft)[4]	Temporary Impacts (Sq Ft)[4]			Secondary Impacts (Sq Ft)		LLN #	Last Name of Abutting Property Owner
							Trenching/ Earthwork[5]	Forested Areas[6]	Non-Forested Areas[7]	Forest Conversion[8]			
105, 106, 107, 108	T-CL-W22	32	Clarendon	PEM	34150	0	3394	7566	22909	284	34153	436, 447, 448, 469	Airport Properties Corp, Brian & Jeffrey Godnick, Bonnie Wood, Clayton Webster, Karen Webster, Vermont Agency of Transportation
111	V-SH-W-7	34	Shrewsbury	PEM/PSS	1690	0	104	447	0	1108	1659	469, 481, 482	Vermont Agency of Transportation, Donna & Richard Swartz, Trustees, Thedora & Jonathan Kingsbury, Co-Trustees
113	V-SH-W-201	34	Shrewsbury	PFO	5410	0	0	37	0	0	37	491, 520	Robert & Judith Landon, Vermont Agency of Transportation Rail Program
114	V-SH-W-202	34	Shrewsbury	PSS/PFO	680	0	0	680	0	0	680	491, 520	Robert & Judith Landon, Vermont Agency of Transportation Rail Program
116	T-SH-W6	35	Shrewsbury	PFO	1860	0	0	728	43	1091	1862	499, 501, 520	John & Jackson Ridlon & John Ridlon, II, Timothy & Kathi Faulkner, Vermont Agency of Transportation Rail Program
118, 119, 120	T-SH-W9	35	Shrewsbury	PFO	9180	0	0	5291	0	3614	8905	514, 520	Ryan Wood-Beauchamp & Kara Fitzgerald, Vermont Agency of Transportation Rail Program
120	T-SH-W10	36	Shrewsbury	PFO	4000	0	0	1951	0	2050	4001	514, 520	Ryan Wood-Beauchamp & Kara Fitzgerald, Vermont Agency of Transportation Rail Program
121	T-SH-W12	36	Shrewsbury	PEM	770	0	0	762	8	0	770	508, 514, 520	Donald Larson, Ryan Wood-Beauchamp & Kara Fitzgerald, Vermont Agency of Transportation Rail Program
124, 125	T-SH-W13	36	Wallingford	PSS	11760	0	625	906	5781	4292	11604	517, 517.01, 518, 520	David Parker & Patricia Moriel, Town of Wallingford, Michelle Martin Shaw, Vermont Agency of Transportation Rail Program
126	T-WA-W3	36	Wallingford	PFO	6638	0	0	871	484	1085	2440	520, 530, 533	Vermont Agency of Transportation Rail Program, Walter F. Semrow, Daniel Gram
127, 128	T-WA-W3b	37	Wallingford	PEM	2526	0	0	1363	0	1164	2527	520, 536	Vermont Agency of Transportation Rail Program, Daniel Gram

7/21

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Wetland Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

vhb

VHB Impact Exhibit #	Wetland ID[1]	NR Sheet #	Town	Cowardin Classification[2]	Delineated Area (Sq Ft)	Proposed Wetland Impacts					TOTAL IMPACTS (SQ FT)	Abutters[9]	
						Permanent Impacts (Sq Ft)[3]	Temporary Impacts (Sq Ft)[4]			Secondary Impacts (Sq Ft)		LLN #	Last Name of Abutting Property Owner
							Trenching/ Earthwork[5]	Forested Areas[6]	Non-Forested Areas[7]	Forest Conversion[8]			
128, 129	T-WA-W4	37	Wallingford	PFO	8620	0	0	3872	0	4326	8198	520, 536	Vermont Agency of Transportation Rail Program, Daniel Gram
130	T-WA-W6	37	Wallingford	PFO	1300	0	0	461	0	834	1295	520, 536	Vermont Agency of Transportation Rail Program, Daniel Gram
131	T-WA-W9	37	Wallingford	PEM	1270	0	0	738	0	359	1097	520, 542	Vermont Agency of Transportation Rail Program, Phillip & Florence Carroll
131	T-WA-W10	37	Wallingford	PEM	1050	0	0	806	0	247	1053	520, 542	Vermont Agency of Transportation Rail Program, Phillip & Florence Carroll
134	V-WA-W-102	37	Wallingford	PEM/ PSS	60	0	64	0	0	0	64	543, 548, 549	Vermont Agency of Transportation, George and Donna Chamberland, Robert Kapusta & Katherine Wade
136, 137, 138	V-WA-W-101	38	Wallingford	PEM/ PFO	2300	0	1120	231	0	953	2304	543, 550, 555, 556	Vermont Agency of Transportation, Jonathan and Monica Rogers, Doris Roach, Alfred and Iona Bumps
139, 140	T-MH-W55	38	Mount Holly	PSS	550	0	314	14	0	222	550	543, 556, 559, 565, 566	Vermont Agency of Transportation, Alfred and Iona Bumps, Daniel & Diane Gray, Daniel Susco, Al Gates & Kathy Swift
141	T-MH-W56	38	Mount Holly	PEM	540	0	539	0	0	0	539	543, 569	Vermont Agency of Transportation, Geoffrey Stone
142, 143	T-MH-W53 NORTH	38	Mount Holly	PFO	230	0	0	17	212	0	229	543, 569, 570	Vermont Agency of Transportation, Geoffrey Stone, William & Ruth Johnson
145	T-MH-W54	38	Mount Holly	PEM	630	0	290	0	340	0	630	543, 570	Vermont Agency of Transportation, William & Ruth Johnson
146, 147	T-MH-W50	38	Mount Holly	PEM/PSS	5380	0	2400	48	1068	148	3664	543, 575	Vermont Agency of Transportation, David Johnson

12/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Wetland Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

VHB Impact Exhibit #	Wetland ID[1]	NR Sheet #	Town	Cowardin Classification[2]	Delineated Area (Sq Ft)	Proposed Wetland Impacts					TOTAL IMPACTS (SQ FT)	Abutters[9]	
						Permanent Impacts (Sq Ft)[3]	Temporary Impacts (Sq Ft)[4]			Secondary Impacts (Sq Ft)		LLN #	Last Name of Abutting Property Owner
							Trenching/ Earthwork[5]	Forested Areas[6]	Non-Forested Areas[7]	Forest Conversion[8]			
148	T-MH-W48-North	38	Mount Holly	PEM	130	0	130	0	0	0	130	543, 576	Vermont Agency of Transportation, Grover Taylor Sr.
149	T-MH-W51	38	Mount Holly	PSS	290	0	192	0	103	0	295	543, 577, 582	Vermont Agency of Transportation, William & Mary Ellen Jacobs, Randy Hawkins
150, 151	T-MH-W52	39	Mount Holly	PEM	2140	0	996	390	410	253	2049	543, 582, 583	Vermont Agency of Transportation, Randy Hawkins, Charles Ripchick
154, 155, 156, 157	T-MH-W45	39	Mount Holly	PSS/PEM	8460	0	3859	0	4602	0	8461	543, 597, 598	Vermont Agency of Transportation, Brian Buffum, Randy Hawkins
158	T-MH-W41	39	Mount Holly	PEM	2510	0	242	0	1285	0	1527	543, 598	Vermont Agency of Transportation, Randy Hawkins
160, 161	T-MH-W38	39	Mount Holly	PSS/PFO	1060	0	463	0	0	597	1060	543, 605, 606	Vermont Agency of Transportation, Johnny & Sally Butler, Bernard Wheeler Sr.
162	T-MH-W37	39	Mount Holly	PSS	440	0	325	10	95	0	430	543, 606	Vermont Agency of Transportation, Bernard Wheeler Sr.
163	T-MH-W34	40	Mount Holly	PSS	360	0	99	172	13	74	358	543, 604	Vermont Agency of Transportation, Rodney Cole
163	T-MH-W35 NORTH	40	Mount Holly	PSS	130	0	16	22	0	90	128	543, 604	Vermont Agency of Transportation, Rodney Cole
164	T-MH-W36	40	Mount Holly	PSS	900	0	312	469	122	0	903	543, 604, 607	Vermont Agency of Transportation, Rodney Cole, Mary and Walter Surething
165, 166	T-MH-W33	40	Mount Holly	PSS	950	0	555	50	348	0	953	543, 608, 609	Vermont Agency of Transportation, Charleen Cole, Joseph Fitzgerald

9/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Wetland Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

VHB Impact Exhibit #	Wetland ID[1]	NR Sheet #	Town	Cowardin Classification[2]	Delineated Area (Sq Ft)	Proposed Wetland Impacts					TOTAL IMPACTS (SQ FT)	Abutters[9]	
						Permanent Impacts (Sq Ft)[3]	Temporary Impacts (Sq Ft)[4]			Secondary Impacts (Sq Ft)		LLN #	Last Name of Abutting Property Owner
							Trenching/ Earthwork[5]	Forested Areas[6]	Non-Forested Areas[7]	Forest Conversion[8]			
167	T-MH-W32	40	Mount Holly	PEM	570	0	358	0	240	0	598	543, 611	Vermont Agency of Transportation, Philip & Marilyn Dunwoody
167, 168	T-MH-W31	40	Mount Holly	PEM	970	0	401	0	565	0	966	543, 611	Vermont Agency of Transportation, Philip & Marilyn Dunwoody
168	T-MH-W30	40	Mount Holly	PEM	300	0	216	0	86	0	302	543, 611	Vermont Agency of Transportation, Philip & Marilyn Dunwoody
170	T-MH-W28	41	Mount Holly	PSS	4740	0	37	0	0	0	37	543, 614.01	Vermont Agency of Transportation, Vermont Agency of Transportation Rail Program
173	T-MH-W23	41	Mount Holly	PEM/PSS	220	0	220	0	0	0	220	543, 623, 628, 629	Vermont Agency of Transportation, Neil Pelsue Jr. Trustee, Maria Howard, Maria Rae Howard C/O Mary Nortunen
175, 176	T-MH-W21	42	Mount Holly	PSS	2520	0	1504	245	60	927	2736	543, 630, 631, 632	Vermont Agency of Transportation, Angelo Chiari & Cynthia Dilworth, Ginger & Clarence Palmer, Ginger & Clarence Palmer
176, 177	T-MH-W20	42	Mount Holly	PEM/PSS	1180	0	878	115	44	141	1178	543, 631, 632	Vermont Agency of Transportation, Ginger & Clarence Palmer, Ginger & Clarence Palmer
182, 183	T-MH-W17	43	Mount Holly	PEM	3420	0	115	268	3340	0	3723	543, 663	Vermont Agency of Transportation, Gene Syria
185	T-MH-W16	43	Mount Holly	PEM	6570	0	0	0	31	0	31	543, 672	Vermont Agency of Transportation, Keith Demers
188	T-MH-W9	43	Mount Holly	PSS	1060	0	61	5	559	0	625	543, 678, 679	Vermont Agency of Transportation, Stanton Wyman, Joseph & Gina Labate
190	T-MH-W6	43	Mount Holly	PSS	110	0	0	0	0	105	105	543, 701	Vermont Agency of Transportation, Tammy Harrington

10/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Wetland Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

VHB Impact Exhibit #	Wetland ID[1]	NR Sheet #	Town	Cowardin Classification[2]	Delineated Area (Sq Ft)	Proposed Wetland Impacts					TOTAL IMPACTS (SQ FT)	Abutters[9]	
						Permanent Impacts (Sq Ft)[3]	Temporary Impacts (Sq Ft)[4]			Secondary Impacts (Sq Ft)		LLN #	Last Name of Abutting Property Owner
							Trenching/ Earthwork[5]	Forested Areas[6]	Non-Forested Areas[7]	Forest Conversion[8]			
195	T-MH-W2	45	Mount Holly	PEM	340	0	0	47	5	0	52	543, 715.01, 725	Vermont Agency of Transportation, Vermont Agency of Transportation Rail Program,
195, 196	T-MH-W3	45	Mount Holly	PEM	440	0	0	173	11	0	184	543, 715.01, 725	Vermont Agency of Transportation, Vermont Agency of Transportation Rail Program,
200	T-LU-W13	46	Ludlow	PEM	11140	0	0	1046	214	0	1260	543	Vermont Agency of Transportation
201	T-LU-W1	46	Ludlow	PEM	140	0	0	138	0	0	138	730.01, 768	Vermont Agency of Transportation, Village of Ludlow
			Impact Subtotal (Sq Ft)			0	34,264	52,731	76,689	32,027	195,711		
							163,684						
			Impact Subtotal (Acres)			0.00	0.79	1.21	1.76	0.74	4.50		
							3.76						

Note: GIS impact analysis conducted using Limits of Disturbance created by TRC-engineering- Drafted 06/05/2015

[1]VHB/TRC wetland delineations have been field-reviewed (representative areas) by USACE and VT DEC personnel.

[2]Wetland classifications based on Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitat of the United States. U.S. Fish and Wildlife Service. FWS/OBD-79/31. 103pp.

[3] Permanent impacts are calculated as areas of direct fill or grading. There will be no permanent wetland impacts as a result of project construction.

[4]Temporary impacts have been divided into three types, for the purpose of calculating compensatory mitigation credits required, in consultation with the USACE. Temporary wetland impacts consist of: 1) impacts from trenching and/or earthwork; 2) impacts from tree clearing in forested areas and 3) impacts from non-trenching/earthwork type activities in non-forested areas. Deatils are provided in footnotes 6, 7, and 8.

[5] Temporary impacts from trenching/earthwork will occur within the approximately 12-foot wide Permanent Project Corridor as a result of excavation of an approximately 4-foot wide trench for the cable Following construction, these areas will be restored per the project EPSC plan (see Block 18 Attachment of 404 Permit Application).

[6] Temporary impacts in forested areas will occur as a result of required tree clearing in Temporary Workspaces, which will be allowed to regenerate after construction.

[7] Temporary impacts in non-forested areas will occur in the Temporary Workspace where construction mats will be utilized to minimize rutting and compaction from equipment. These areas will be allowed to regernate after construction.

[8]Secondary impacts will occur in the Permanent Project Corridor as a result of permanent tree clearing, which will result in the conversion of forested wetlands to emergent or scrub-shrub wetlands.

[9] Abutter information, including mailing addresses and Line List Numbers are found in the Adjoining Property Owners table in the 404 Permit Application.

11/21

TDI – New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Stream Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

Impact Exhibit #	Stream ID	Natural Resource Map Series Sheet #	Town	Flow Regime[2]	Average Ordinary High Water (OHW) Width (Ft)[3]	Unique Associated Stream Culvert ID	Associated Stream Culvert Diameter (Ft) (TRC)	Stream Culvert Activity[2]	Proposed Stream Impacts[4,5]												Abutter[10]	
									Permanent Impact		Temporary Impact								TOTAL IMPACTS[9]			
											Trenching/Earthwork (Stream)		Culvert Work[6]		Dewatering (Stream)[7]		Dewatering (Culvert)[8]		IMPACT (LF)	IMPACT AREA (SQ FT)	LLN #	Last Name of Abutting Property Owner
									Impact (Linear Feet)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)				
5	V-BE-AS-3	3	Benson	Perennial	3	SC-1	2	At Culvert Splice	0	0	0	0	21	42	0	0	50	100	76	157	12, 21, 28	Town of Benson, Anne M. Munger, Anne M. Munger
6	V-BE-AS-5	3	Benson	Intermittent	7	SC-4	4.5	At Culvert Splice	0	0	0	0	21	95	0	0	30	135	56	265	12, 28, 30	Town of Benson, Anne M. Munger, Anne M. Munger
7	V-BE-S-8	4	Benson	Perennial	7	SC-12	2	Remove and Replace	0	0	0	37	26	52	0	168	0	0	31	257	12, 33, 38	Town of Benson, Robert J. Phelps & Karen A. Barber, Eunice Munger Life Estate
8	V-BE-AS-10	4	Benson	Perennial	5	SC-17	3	Remove and Replace	0	0	0	0	55	165	0	0	0	0	60	190	12, 45	Town of Benson, Caleb R. Symons, Jr. & Paul A. Millette
9	V-BE-AS-11	5	Benson	Intermittent	4	SC-21	2.5	At Culvert Splice	0	0	0	0	22	55	0	0	18	45	45	120	12, 56, 57	Town of Benson, James & Betty Arthur, Francis Munger life Estate
10	V-BE-S-100	5	Benson	Perennial	3	SC-24	2	At Culvert Splice	0	0	9	27	15	30	0	0	34	68	68	140	63, 64, 84	David & Debra Tyler, David & Debra Tyler, Vermont Agency of Transportation
12	V-BE-S-101	6	Benson	Ephemeral	1.5	SC-36	2	At Culvert Splice	0	0	108	162	11	22	0	0	42	84	166	276	65, 66, 84	Timothy B. Bird & Janice C. Bird, Robert M. Butler & Juliet N. Butler, Vermont Agency of Transportation
13	V-BE-AS-105	7	Benson	Intermittent	1.5	CU-50	1.25	Open Trench Excavate	0	0	10	15	12	15	0	0	37	46	64	84	80, 81, 84	Bartholomew Brothers Inc., Vermont Agency of Transportation, Paul Lussier & Karl Lee Ann Lussier
14	V-BE-S-109	8	Benson	Perennial	4	SC-39	2.5	At Culvert Splice	0	0	10	40	14	35	0	0	32	80	61	175	84, 85, 86	Vermont Agency of Transportation, Henry & Joan Daley, Trustees, Henry & Joan Daley, Trustees
16	V-WH-S-4	9	West Haven	Perennial	5	SC-71	2.5	Open Trench Excavate	0	0	13	65	0	0	1	5	0	0	19	95	84, 96	Vermont Agency of Transportation, The Nature Conservancy
19	V-WH-S-5	9	West Haven	Intermittent	3	-	-	Open Trench Excavate	0	0	11	33	0	0	7	21	0	0	23	69	84, 96, 99	Vermont Agency of Transportation, The Nature Conservancy, The Nature Conservancy
22	V-WH-S-3	10	West Haven	Ephemeral	2	-	-	Open Trench Excavate	0	0	0	0	0	0	4	8	0	0	9	18	84, 108	Vermont Agency of Transportation, Heman W. Stannard

12/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Stream Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015*

Impact Exhibit #	Stream ID	Natural Resource Map Series Sheet #	Town	Flow Regime[2]	Average Ordinary High Water (OHW) Width (Ft)[3]	Unique Associated Stream Culvert ID	Associated Stream Culvert Diameter (Ft) (TRC)	Stream Culvert Activity[3]	Proposed Stream Impacts[4,5]										TOTAL IMPACTS[6]		Abutter[10]	
									Permanent Impact		Temporary Impact											
											Trenching/Earthwork (Stream)		Culvert Work[8]		Dewatering (Stream)[7]		Dewatering (Culvert)[8]					
									Impact (Linear Feet)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	IMPACT (LF)	IMPACT AREA (SQ FT)	LLN #	Last Name of Abutting Property Owner
23	V-WH-S-2	10	West Haven	Perennial	4.5	SC-89	2	At Culvert Splice	0	0	0	0	50	100	0	0	81	162	136	285	84, 108, 112	Vermont Agency of Transportation, Heman W. Stannard, Christopher Neubert
24	V-WH-S-1	10	West Haven	Intermittent	2	-	-	Open Trench Excavate	0	0	0	0	0	0	11	22	0	0	16	32	84, 108	Vermont Agency of Transportation, Heman W. Stannard
25	V-FH-S-24	11	Fair Haven	Intermittent	2	SC-99	1.5	At Culvert Splice	0	0	0	0	47	71	0	0	98	147	150	228	84, 114, 115	Vermont Agency of Transportation, Earl & Sally Corey, Steven & Lonna Farrar
26	V-FH-S-22	11	Fair Haven	Ephemeral	2	SC-104	2	At Culvert Splice	0	0	10	20	18	36	0	0	59	118	92	184	84, 115, 118, 120	Vermont Agency of Transportation, Steven & Lonna Farrar, Kathleen Knapp, Roderic Holzworth II & Jacqueline Holzworth
28	V-FH-S-18	11	Fair Haven	Intermittent	2	-	-	Open Trench Excavate	0	0	62	124	0	0	147	294	0	0	214	428	84, 122	Vermont Agency of Transportation, Phillip Stannard, Sr. & Kathleen Knapp
29	V-FH-S-17	12	Fair Haven	Perennial	3	SC-110	4	At Culvert Splice	0	0	0	0	61	244	0	0	108	432	174	691	84, 121, 124	Vermont Agency of Transportation, Roderic Holzworth II & Jacqueline Holzworth, Kevin & Aileen Durkee
31	V-FH-S-16	12	Fair Haven	Ephemeral	2	-	-	Open Trench Excavate	0	0	0	0	0	0	9	18	0	0	14	28	84, 124	Vermont Agency of Transportation, Kevin & Aileen Durkee
33	V-FH-S-3	12	Fair Haven	Intermittent	1.5	SC-122	3	Open Trench Excavate	0	0	12	18	0	0	36	54	0	0	53	80	135, 252	William Bischoff, Vermont Agency of Transportation
34	V-FH-S-4	13	Fair Haven	Ephemeral	1.5	SC-125	4	At Culvert Splice	0	0	0	0	69	276	0	0	96	384	170	668	252	Vermont Agency of Transportation
35	V-FH-S-5	13	Fair Haven	Perennial	4	SC-128	4	At Culvert Splice	0	0	0	0	76	304	0	0	85	340	166	664	252	Vermont Agency of Transportation
39	V-FH-S-26	13	Fair Haven	Ephemeral	2	SC-131	2.5	At Culvert Splice	0	0	0	0	19	48	0	0	43	108	67	166	252	Vermont Agency of Transportation
40	V-FH-S-6	13	Fair Haven	Intermittent	2	SC-137	4	At Culvert Splice	0	0	0	0	74	296	0	0	494	1976	573	2282	145, 252	Joyce Roberts, Vermont Agency of Transportation
41	V-FH-S-10	14	Fair Haven	Perennial	2	SC-139	4	At Culvert Splice	0	0	0	0	169	676	0	0	425	1700	599	2386	252	Vermont Agency of Transportation

13/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Stream Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

Impact Exhibit #	Stream ID	Natural Resource Map Series Sheet #	Town	Flow Regime	Average Ordinary High Water (OHW) Width (Ft)[1]	Unique Associated Stream Culvert ID	Associated Stream Culvert Diameter (Ft) (TRC)	Stream Culvert Activity[2]	Proposed Stream Impacts[4,5]												Abutter[10]	
									Permanent Impact		Temporary Impact								TOTAL IMPACTS[9]			
									Impact (Linear Feet)	Impact Area (Sq Ft)	Trenching/Earthwork (Stream)		Culvert Work[6]		Dewatering (Stream)[7]		Dewatering (Culvert)[8]		IMPACT (LF)	IMPACT AREA (SQ FT)	LLN #	Last Name of Abutting Property Owner
											Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)				
42	V-FH-S-7	14	Fair Haven	Ephemeral	1	-	-	Open Trench Excavate	0	0	27	27	0	0	21	21	0	0	53	53	252	Vermont Agency of Transportation
43	V-FH-S-8	14	Castleton	Intermittent	3	SC-153, SC-154	3	At Culvert Splice	0	0	0	0	24	72	3	9	61	183	93	279	252	Vermont Agency of Transportation
44	V-CN-S-101	15	Castleton	Perennial	3.5	SC-161	5	Open Trench Excavate	0	0	13	46	0	0	29	102	0	0	47	165	252, 172	Vermont Agency of Transportation, JAMAC Corp.
50	V-CN-S-11	17	Castleton	Intermittent	1	SC-184	3	Open Trench Excavate	0	0	12	12	0	0	14	14	0	0	31	31	195, 252	Wayne Doane, Vermont Agency of Transportation
53	V-CN-S-13	17	Castleton	Intermittent	1	-	-	Open Trench Excavate	0	0	20	20	0	0	53	53	0	0	78	78	201, 202, 252	James Dodge, James Dodge, Vermont Agency of Transportation
55	V-CN-S-5	18	Castleton	Ephemeral	2	SC-198	3	At Culvert Splice	0	0	0	0	64	192	0	0	130	390	199	592	252, 222, 223	Vermont Agency of Transportation, Breton Brook Properties, Inc., State of Vermont
56	V-CN-S-7	19	Castleton	Ephemeral	1	SC-202	2	At Culvert Splice	0	0	0	0	30	60	13	13	100	200	148	278	252	Vermont Agency of Transportation
57	V-CN-S-6	19	Castleton	Intermittent	3	SC-206	2.5	At Culvert Splice	0	0	5	15	40	100	19	57	109	273	178	460	252	Vermont Agency of Transportation
58	V-CN-S-4	19	Castleton	Perennial	5	SC-209	4	At Culvert Splice	0	0	0	0	40	160	3	15	84	336	132	536	252	Vermont Agency of Transportation
59	V-CN-S-3	19	Castleton	Intermittent	0.5	SC-213	2	At Culvert Splice	0	0	7	4	40	80	25	13	70	140	147	239	252	Vermont Agency of Transportation
60	V-CN-S-2	20	Castleton	Intermittent	2.5	SC-214, SC-215	2.25	At Culvert Splice	0	0	6	15	63	142	19	48	126	284	219	501	252	Vermont Agency of Transportation
61	V-CN-S-1	20	Castleton	Intermittent	2	SC-220	2	At Culvert Splice	0	0	0	0	24	48	0	0	243	486	272	544	252, 256	Vermont Agency of Transportation, Canadian Pacific Railway
62	T-IR-S4	21	Ira	Perennial	5	SC-228	4	At Culvert Splice	0	0	0	0	51	204	33	165	262	1048	351	1442	252, 256	Vermont Agency of Transportation, Canadian Pacific Railway

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Stream Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

Impact Exhibit #	Stream ID	Natural Resource Map Series Sheet #	Town	Flow Regime[1]	Average Ordinary High Water (OHW) Width (Ft)[2]	Unique Associated Stream Culvert ID	Associated Stream Culvert Diameter (Ft) (TRC)	Stream Culvert Activity[3]	Proposed Stream Impacts[4,5]										TOTAL IMPACTS[5]		Abutter[10]	
									Permanent Impact		Temporary Impact											
											Trenching/Earthwork (Stream)		Culvert Work[6]		Dewatering (Stream)[7]		Dewatering (Culvert)[8]					
									Impact (Linear Feet)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	IMPACT (LF)[9]	IMPACT AREA (SQ FT)	LLN #	Last Name of Abutting Property Owner
63	T-IR-S3	21	Ira	Intermittent	5	SC-235	3	At Culvert Splice	0	0	13	65	30	90	22	110	166	498	236	788	250, 252	Frank Grabowski, Vermont Agency of Transportation
64	T-IR-S2	21	Ira	Intermittent	2	SC-239	3	At Culvert Splice	0	0	39	78	23	69	66	132	56	168	189	457	252	Vermont Agency of Transportation
65	T-IR-S1	21	Ira	Intermittent	4	SC-241	4.5	At Culvert Splice	0	0	0	0	30	135	12	48	137	617	184	820	252	Vermont Agency of Transportation
66	T-WR-S35	21	West Rutland	Intermittent	1	-	-	Open Trench Excavate	0	0	0	0	0	0	3	3	0	0	8	8	252	Vermont Agency of Transportation
67	T-WR-S31	22	West Rutland	Intermittent	1	-	-	Open Trench Excavate	0	0	12	12	0	0	46	46	0	0	63	63	252, 261	Vermont Agency of Transportation, Vermont Earth Resources, Inc.
68	T-WR-S30	22	West Rutland	Intermittent	5	SC-246	2	At Culvert Splice	0	0	0	0	42	84	167	835	117	234	331	1178	252, 261	Vermont Agency of Transportation, Vermont Earth Resources, Inc.
69	T-WR-S34	22	West Rutland	Perennial	3	SC-249	3	At Culvert Splice	0	0	0	0	64	192	0	0	305	915	374	1122	252, 261	Vermont Agency of Transportation, Vermont Earth Resources, Inc.
70	T-WR-S19	23	West Rutland	Intermittent	3	SC-262	3	Open Trench Excavate	0	0	9	27	15	45	19	57	60	180	108	324	252	Vermont Agency of Transportation
71	T-WR-S20	23	West Rutland	Intermittent	5	SC-264	1.5	At Culvert Splice	0	0	4	20	21	32	20	100	60	90	110	267	252	Vermont Agency of Transportation
72	T-WR-S23	24	West Rutland	Intermittent	4	SC-269	2.5	Open Trench Excavate	0	0	39	156	0	0	56	224	0	0	100	400	252	Vermont Agency of Transportation
73	T-WR-S24	24	West Rutland	Intermittent	3	-	-	Open Trench Excavate	0	0	15	45	0	0	95	285	0	0	115	345	252, 304	Vermont Agency of Transportation, Philip J. Gawet
74, 75	T-WR-S17	24	West Rutland	Intermittent	2	SC-276	4	At Culvert Splice	0	0	0	0	32	128	155	310	7	28	199	476	252, 328	Vermont Agency of Transportation, Town of West Rutland
76	T-WR-S11	25	West Rutland	Intermittent	3	SC-288	4	At Culvert Splice	0	0	0	0	17	68	1	3	165	660	188	746	252	Vermont Agency of Transportation

15/31

TDI – New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Stream Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

Impact Exhibit #	Stream ID	Natural Resource Map Series Sheet #	Town	Flow Regime[1]	Average Ordinary High Water (OHW) Width (Ft)[2]	Unique Associated Stream Culvert ID	Associated Stream Culvert Diameter (Ft) (TRC)	Stream Culvert Activity[3]	Proposed Stream Impacts[4,5]										TOTAL IMPACTS[9]		Abutter[10]	
									Permanent Impact		Temporary Impact											
											Trenching/Earthwork (Stream)		Culvert Work[6]		Dewatering (Stream)[7]		Dewatering (Culvert)[8]					
									Impact (Linear Feet)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	IMPACT (LF)	IMPACT AREA (SQ FT)	LLN #	Last Name of Abutting Property Owner
77	T-WR-S12	25	West Rutland	Intermittent	4	SC-292	4.5	At Culvert Splice	0	0	0	0	50	225	0	0	332	1494	387	1739	252, 345	Vermont Agency of Transportation, Mortimer Brown & Laura Whitehead
78	T-WR-S14	25	West Rutland	Intermittent	1	SC-295	4	At Culvert Splice	0	0	0	0	50	200	0	0	330	1320	385	1525	252, 345	Vermont Agency of Transportation, Mortimer Brown & Laura Whitehead
79	T-WR-S6	25	West Rutland	Intermittent	3	-	-	Open Trench Excavate	0	0	0	0	0	0	7	21	0	0	12	36	252	Vermont Agency of Transportation
79	T-WR-S7	25	West Rutland	Intermittent	2	-	-	Open Trench Excavate	0	0	0	0	0	0	3	6	0	0	8	16	252	Vermont Agency of Transportation
79	T-WR-S5	25	West Rutland	Intermittent	5	SC-294	3	At Culvert Splice	0	0	0	0	35	105	149	745	190	570	379	1445	252, 345	Vermont Agency of Transportation, Mortimer Brown & Laura Whitehead
80	T-WR-S8	25	West Rutland	Ephemeral	2	SC-303	2.5	At Culvert Splice	0	0	0	0	19	48	0	0	207	518	231	576	252	Vermont Agency of Transportation
81	T-RU-S10	25	Rutland	Ephemeral	3	SC-306	2	At Culvert Splice	0	0	0	0	34	68	0	0	34	68	73	151	252	Vermont Agency of Transportation
82, 83	T-RU-S5	25	Rutland	Intermittent	2	-	-	Open Trench Excavate	0	0	96	192	0	0	267	534	0	0	368	736	252	Vermont Agency of Transportation
82, 83	T-RU-S6	25	Rutland	Ephemeral	2	-	-	Open Trench Excavate	0	0	0	0	0	0	28	56	0	0	33	66	252	Vermont Agency of Transportation
83	T-RU-S7	25	Rutland	Intermittent	5	SC-309	2.5	At Culvert Splice	0	0	0	0	45	113	17	85	121	303	188	526	252	Vermont Agency of Transportation
85	T-WR-S1	26	Rutland	Intermittent	4	SC-312	5	At Culvert Splice	0	0	0	0	79	395	8	32	125	625	217	1072	252, 356	Vermont Agency of Transportation, Paul Grabowski
86, 87, 88, 89, 90	T-RU-S4	26	Rutland	Intermittent	2	SC-322	4	Open Trench Excavate	0	0	575	1150	2	8	406	812	103	412	1091	2382	252, 367, 373	Vermont Agency of Transportation, Laura J. Whitehead, PETEL Properties, Inc.
95	T-CL-S4	29	Clarendon	Perennial	15	SC-348	4	Open Trench Excavate	0	0	12	180	0	0	37	555	0	0	54	810	388, 410	Vermont Agency of Transportation, John and Barbara Pratt

10/21

TD1 - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Stream Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

Impact Exhibit #	Stream ID	Natural Resource Map Series Sheet #	Town	Flow Regime[1]	Average Ordinary High Water (OHW) Width (Ft)[2]	Unique Associated Stream Culvert ID	Associated Stream Culvert Diameter (Ft) (TRC)	Stream Culvert Activity[3]	Proposed Stream Impacts[4,5]												Abutter[10]	
									Permanent Impact		Temporary Impact								TOTAL IMPACTS[9]			
											Trenching/Earthwork (Stream)		Culvert Work[6]		Dewatering (Stream)[7]		Dewatering (Culvert)[8]					
									Impact (Linear Feet)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	IMPACT (LF)	IMPACT AREA (SQ FT)	LLN #	Last Name of Abutting Property Owner
96	T-CL-AS-S4	29	Clarendon	Perennial	5	-	-	Open Trench Excavate	0	0	3	15	0	0	5	25	0	0	13	65	388, 410	Vermont Agency of Transportation, John and Barbara Pratt
100	T-CL-S1	30	Clarendon	Intermittent	2	-	-	Open Trench Excavate	0	0	0	0	0	0	10	20	0	0	15	30	388, 420	Vermont Agency of Transportation, Caroll Adams
103	T-WR-S9	30	West Rutland	Ephemeral	1	SC-372	6	At Culvert Splice	0	0	0	0	46	276	0	0	53	318	104	599	432, 433, 469	David & Mary Dransfield, J P Carrara & Sons, Vermont Agency of Transportation
103	T-WR-AS-9	31	West Rutland	Ephemeral	1	-	-	Open Trench Excavate	0	0	0	0	0	0	2	2	0	0	7	7	459, 432, 433	Vermont Agency of Transportation, David & Mary Dransfield, J P Carrara & Sons
109	V-SH-S-16	31	Shrewsbury	Perennial	3	SC-385	3	At Culvert Splice	0	0	0	0	36	108	12	36	76	228	129	387	459, 461, 469	Jason & Laurie Teal, Uwe and Josefa Behrendt, Vermont Agency of Transportation
109	V-SH-S-17	32	Shrewsbury	Intermittent	2	SC-384	3	At Culvert Splice	0	0	0	0	20	60	7	14	54	162	86	246	458, 459, 469	Rosemarie Pluss Dobler, Jasen & Laurie Teal, Vermont Agency of Transportation
110	V-SH-S-14	33	Shrewsbury	Perennial	25	SC-395	12	At Culvert Splice	0	0	0	0	48	576	0	0	179	2148	232	2849	469, 473, 470	Vermont Agency of Transportation, Joseph & Linda Lapre, Thomas Kelley
110	V-SH-S-13	33	Shrewsbury	Ephemeral	1	-	-	Open Trench Excavate	0	0	0	0	0	0	19	19	0	0	24	24	469, 468	Vermont Agency of Transportation, Todd and Deirdre Filmore
111, 112	V-SH-S-11	34	Shrewsbury	Intermittent	4	SC-403	1.25	Open Trench Excavate	0	0	2	8	85	106	245	980	0	0	337	1114	469, 481, 482, 520	Vermont Agency of Transportation, Donna & Richard Swartz, Trustees, Theodora & Jonathan Kingsbury, Co-Trustees, Vermont Agency of Transportation Rail Program
113	T-SH-S1	34	Shrewsbury	Intermittent	5	SC-405	3	Open Trench Excavate	0	0	14	70	0	0	3	15	0	0	22	110	486, 491, 520	Matthew & Sabrina McDonough, Robert & Judith Landon, Vermont Agency of Transportation Rail Program
115	T-SH-S4	34	Shrewsbury	Intermittent	5	SC-410	8	At Culvert Splice	0	0	27	135	30	240	119	595	38	304	219	1299	490, 491, 492, 520	Susan Ransom-Kelley, Robert & Judith Landon, Paul & Karen Stewart, Vermont Agency of Transportation Rail Program
116	T-SH-S3	34	Shrewsbury	Perennial	20	SC-412	14	Open Trench Excavate	0	0	0	168	0	0	0	287	0	0	0	455	501, 520	Timothy & Kathi Faulkner, Vermont Agency of Transportation Rail Program
117	T-SH-S5	35	Shrewsbury	Intermittent	3	SC-414	3	At Culvert Splice	0	0	7	21	24	72	0	0	37	111	73	219	503, 504, 520	Grace and Richard Brigham, Alan Ridlon Sr., Alan Ridlon Jr., & Ann Ridlon, Vermont Agency of Transportation Rail Program

17/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Stream Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

Impact Exhibit #	Stream ID	Natural Resource Map Series Sheet #	Town	Flow Regime[2]	Average Ordinary High Water (OHW) Width (Ft)[3]	Unique Associated Stream Culvert ID	Associated Stream Culvert Diameter (Ft) (TRC)	Stream Culvert Activity[7]	Proposed Stream Impacts[4,5]												Abutter[10]	
									Permanent Impact		Temporary Impact								TOTAL IMPACTS[6]			
									Impact (Linear Feet)	Impact Area (Sq Ft)	Trenching/Earthwork (Stream)		Culvert Work[8]		Dewatering (Stream)[9]		Dewatering (Culvert)[9]		IMPACT (LF)	IMPACT AREA (SQ FT)	LLN #	Last Name of Abutting Property Owner
											Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)				
119	T-SH-S6	36	Shrewsbury	Intermittent	2.5	SC-416	3	At Culvert Splice	0	0	15	38	25	75	96	240	61	183	202	548	507, 514, 520	Lois & Donald Butler, Ryan Wood-Beauchamp & Kara Fitzgerald, Vermont Agency of Transportation Rail Program
120	T-SH-S7	36	Shrewsbury	Perennial	3	SC-418	3	Open Trench Excavate	0	0	0	37	0	0	0	101	0	0	0	138	514, 520	Ryan Wood-Beauchamp & Kara Fitzgerald, Vermont Agency of Transportation Rail Program
122	T-SH-S9	36	Shrewsbury	Ephemeral	1	-	-	Open Trench Excavate	0	0	12	12	0	0	26	26	0	0	43	43	514, 520	Ryan Wood-Beauchamp & Kara Fitzgerald, Vermont Agency of Transportation Rail Program
122	T-SH-S10	36	Shrewsbury	Intermittent	3	-	-	Open Trench Excavate	0	0	0	184	0	0	0	529	0	0	0	713	514, 520	Ryan Wood-Beauchamp & Kara Fitzgerald, Vermont Agency of Transportation Rail Program
123	T-SH-S11	36	Shrewsbury	Ephemeral	2	-	-	Open Trench Excavate	0	0	9	18	0	0	8	16	0	0	22	44	515, 517, 520	Lawrence Allen Jr. & Carol Lee Allen, David Parker & Patricia Moriel, Vermont Agency of Transportation Rail Program
126	T-WA-S2	36	Wallingford	Intermittent	1	SC-427	3.3	Open Trench Excavate	0	0	12	12	0	0	7	7	0	0	24	24	520, 530	Vermont Agency of Transportation Rail Program,
126, 127	V-WA-JD-1	37	Wallingford	Ephemeral	3	-	-	Open Trench Excavate	0	0	9	27	0	0	359	1077	0	0	373	1119	520, 530, 536	Vermont Agency of Transportation Rail Program, Walter F. Semrow, Daniel Gram
128	T-WA-S3	37	Wallingford	Intermittent	6	SC-429	4.5	Open Trench Excavate	0	0	34	204	31	140	0	0	75	338	145	712	520, 536, 537	Vermont Agency of Transportation Rail Program, Daniel Gram, Daniel Gram
128, 129	T-WA-S4	37	Wallingford	Intermittent	6	-	-	Open Trench Excavate	0	0	37	222	0	0	0	0	0	0	42	252	520, 536	Vermont Agency of Transportation Rail Program, Daniel Gram
131	T-WA-S6	37	Wallingford	Intermittent	4	-	-	HDD	0	0	12	48	0	0	54	216	0	0	71	284	520, 542	Vermont Agency of Transportation Rail Program, Phillip & Florence Carroll
132	V-WA-S-106	37	Wallingford	Perennial	3.5	SC-438	2	Open Trench Excavate	0	0	8	28	16	32	0	0	36	72	65	150	543, 545, 546	Vermont Agency of Transportation, Carolyn & Bjorn Behrendt, Raymond Agostinelli & Nancy Kelly
133	V-WA-S-105	37	Wallingford	Perennial	3	SC-442	2.5	At Culvert Splice	0	0	0	0	12	30	0	0	45	113	62	158	543, 545, 546	Vermont Agency of Transportation, Carolyn & Bjorn Behrendt, Raymond Agostinelli & Nancy Kelly
134	V-WA-AS-104	37	Wallingford	Intermittent	5	SC-444	2	At Culvert Splice	0	0	0	0	10	20	0	0	30	60	45	105	543, 545, 546, 547	Vermont Agency of Transportation, Carolyn & Bjorn Behrendt, Raymond Agostinelli & Nancy Kelly, Raymond Agostinelli

18/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Stream Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

Impact Exhibit #	Stream ID	Natural Resource Map Series Sheet #	Town	Flow Regime[1]	Average Ordinary High Water (OHW) Width (Ft)[2]	Unique Associated Stream Culvert ID	Associated Stream Culvert Diameter (Ft) (TRC)	Stream Culvert Activity[3]	Proposed Stream Impacts[4,5]												Abutter[10]	
									Permanent Impact		Temporary Impact								TOTAL IMPACTS[9]			
											Trenching/Earthwork (Stream)		Culvert Work[6]		Dewatering (Stream)[7]		Dewatering (Culvert)[8]					
									Impact (Linear Feet)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	IMPACT (LF)	IMPACT AREA (SQ FT)	LLN #	Last Name of Abutting Property Owner
136, 138	V-WA-S-100	38	Wallingford	Intermittent	1.5	SC-447	2	At Culvert Splice	0	0	43	65	24	48	11	17	54	108	137	245	543, 555, 556, 557	Vermont Agency of Transportation, Doris Roach, Alfred and Iona Bumps, Doris Roach
140	V-MH-AS-101	38	Mount Holly	Intermittent	2	SC-455	4	Jack and Bore	0	0	0	0	8	32	0	0	31	124	44	166	543, 559, 565, 566	Vermont Agency of Transportation, Daniel & Diane Gray, Daniel Susce, Al Gates & Kathy Swift
141	T-MH-DITCH18	38	Mount Holly	Intermittent	2	SC-458	2	At Culvert Splice	0	0	92	184	20	40	0	0	74	148	191	382	543, 562, 563, 569	Vermont Agency of Transportation, Jonathan & Tina Cohen, Roger & Diana Garrow, Geoffroy Stone
142	T-MH-S38	38	Mount Holly	Ephemeral	1	SC-460	3	At Culvert Splice	0	0	0	0	34	102	2	2	54	162	95	271	543, 562, 569, 570	Vermont Agency of Transportation, Jonathan & Tina Cohen, Geoffroy Stone, William & Ruth Johnson
143, 144, 145	T-MH-DITCH17	38	Mount Holly	Intermittent	1	-	-	At Culvert Splice	0	0	488	488	0	0	31	31	0	0	524	524	543, 570	Vermont Agency of Transportation, William & Ruth Johnson
150, 151	T-MH-DITCH16	39	Mount Holly	Ephemeral	1	-	-	Open Trench Excavate	0	0	271	271	0	0	0	0	0	0	276	276	543, 582, 583	Vermont Agency of Transportation, Randy Hawkins, Charles Ripchick
152	T-MH-S32	39	Mount Holly	Intermittent	1	SC-480	2	At Culvert Splice	0	0	0	0	27	54	0	0	56	112	88	171	543, 589, 590, 592, 593	Vermont Agency of Transportation, Rachel Miller Estate of Administrators Nicholas & Richard Delong, Jon Spaulding, Michael & Maria Blais, David Johnson
153	T-MH-DITCH13	39	Mount Holly	Intermittent	1	CU-481	1	At Culvert Splice	0	0	9	9	60	60	0	0	0	0	74	74	543, 597	Vermont Agency of Transportation, Brian Buffum
153	T-MH-S30	39	Mount Holly	Intermittent	1	SC-482	4	At Culvert Splice	0	0	108	108	20	80	0	0	51	204	184	397	543, 597, 599	Vermont Agency of Transportation, Brian Buffum, Randy Hawkins
159	T-MH-S28	39	Mount Holly	Perennial	25	-	-	Open Trench Excavate	0	0	0	184	0	0	0	294	0	0	0	478	543, 598, 599, 600, 604	Vermont Agency of Transportation, Randy Hawkins, Randy Hawkins, Johnathan & Christina Turin, Rodney Cole
160	T-MH-DITCH12	39	Mount Holly	Intermittent	1	SC-488	4	At Culvert Splice	0	0	104	104	16	64	0	0	46	184	171	357	543, 600, 604, 605	Vermont Agency of Transportation, Johnathan & Christina Turin, Rodney Cole, Johnny & Sally Butler
160	T-MH-AS-11	39	Mount Holly	Intermittent	3	SC-492	2.5	At Culvert Splice	0	0	0	0	23	58	0	0	58	145	86	218	543, 600, 605	Vermont Agency of Transportation, Johnathan & Christina Turin, Johnny & Sally Butler
160, 161	T-MH-DITCH11	39	Mount Holly	Intermittent	3	SC-491	1.5	At Culvert Splice	0	0	197	591	25	38	0	0	0	0	227	644	543, 605, 606	Vermont Agency of Transportation, Johnny & Sally Butler, Bernard Wheeler Sr.

19/61

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Stream Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

Impact Exhibit #	Stream ID	Natural Resource Map Series Sheet #	Town	Flow Regime[2]	Average Ordinary High Water (OHW) Width (Ft)[2]	Unique Associated Stream Culvert ID	Associated Stream Culvert Diameter (Ft) (TRC)	Stream Culvert Activity[3]	Proposed Stream Impacts[4,5]										TOTAL IMPACTS[5]		Abutter[10]	
									Permanent Impact		Temporary Impact											
									Impact (Linear Feet)	Impact Area (Sq Ft)	Trenching/Earthwork (Stream)		Culvert Work[6]		Dewatering (Stream)[7]		Dewatering (Culvert)[8]		IMPACT (LF)	IMPACT AREA (SQ FT)	LLN #	Last Name of Abutting Property Owner
											Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)				
162	T-MH-S27	39	Mount Holly	Ephemeral	1.5	SC-490	3	At Culvert Splice	0	0	4	6	22	66	3	5	68	204	102	288	543, 600, 606	Vermont Agency of Transportation, Johnathan & Christina Turin, Bernard Wheeler Sr.
164	T-MH-DITCH10	39	Mount Holly	Intermittent	1	SC-497	1.5	At Culvert Splice	0	0	183	183	56	84	0	0	0	0	244	272	543, 604, 607	Vermont Agency of Transportation, Rodney Cole, Mary and Walter Surething
166	T-MH-S26	40	Mount Holly	Ephemeral	1	-	-	Open Trench Excavate	0	0	12	12	0	0	2	2	0	0	19	19	543, 609	Vermont Agency of Transportation, Joseph Fitzgerald
166	T-MH-DITCH9	40	Mount Holly	Intermittent	3	-	-	Open Trench Excavate	0	0	69	207	0	0	0	0	0	0	74	222	543, 608, 609	Vermont Agency of Transportation, Charleen Cole, Joseph Fitzgerald
167	T-MH-S25	40	Mount Holly	Intermittent	1	SC-505	4	At Culvert Splice	0	0	7	7	28	112	5	5	67	268	112	397	543, 611,614.01	Vermont Agency of Transportation, Philip & Marilyn Dunwoody, Vermont Agency of Transportation Rail Program
169	T-MH-S24	40	Mount Holly	Intermittent	3	SC-509	2.5	At Culvert Splice	0	0	6	18	23	58	0	0	62	155	96	246	543, 613, 614.01	Vermont Agency of Transportation, Philip & Marilyn Dunwoody, Vermont Agency of Transportation Rail Program
171	T-MH-AS-23	40	Mount Holly	Perennial	4	SC-515	5.5	At Culvert Splice	0	0	0	0	19	105	0	0	74	407	98	532	543, 614.01, 620, 621	Vermont Agency of Transportation Rail Program, Neil Pelsue Jr. Trustee
172	T-MH-S22	40	Mount Holly	Intermittent	2	SC-518	2	At Culvert Splice	0	0	0	0	14	28	0	0	78	156	97	194	543, 614.01, 620, 621	Vermont Agency of Transportation, Vermont Agency of Transportation Rail Program, Neil Pelsue Jr. Trustee, Neil Pelsue Jr. Trustee
174	T-MH-S21	41	Mount Holly	Intermittent	3	SC-525	4.5	At Culvert Splice	0	0	0	0	18	81	12	36	54	243	89	375	543, 614.01, 625, 627, 629	Vermont Agency of Transportation, Vermont Agency of Transportation Rail Program, , Maria Howard, Maria Rae Howard C/O Mary Nortunen
178	T-MH-AS-20	41	Mount Holly	Perennial	4	SC-533	5	At Culvert Splice	0	0	0	0	33	165	0	0	89	445	127	630	543, 634, 635, 637	Vermont Agency of Transportation, Stanley Bussino, Vermont Agency of Transportation, Kevin MacDougal & Margaret Combatti
179	T-MH-AS-46	41	Mount Holly	Intermittent	3	CU-535	3	At Culvert Splice	0	0	0	0	27	81	0	0	203	609	235	705	543, 647, 650, 655	Vermont Agency of Transportation, Patricia Santoro & Richard Lawson, Thurlow Burnett, State of Vermont
180	T-MH-AS-45	42	Mount Holly	Perennial	5	SC-537	5	At Culvert Splice	0	0	0	0	31	155	0	0	80	400	116	580	543, 650, 654, 655	Vermont Agency of Transportation, Thurlow Burnett, State of Vermont, State of Vermont
181	T-MH-AS-42	42	Mount Holly	Intermittent	3	SC-544	2	At Culvert Splice	0	0	0	0	26	52	0	0	100	200	131	267	543, 657, 659	Vermont Agency of Transportation, Ronald & Madaeja Priest, Susan Losa & Sandra Higaboom

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Stream Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

Impact Exhibit #	Stream ID	Natural Resource Map Series Sheet #	Town	Flow Regime[1]	Average Ordinary High Water (OHW) Width (Ft)[2]	Unique Associated Stream Culvert ID	Associated Stream Culvert Diameter (Ft) (TRC)	Stream Culvert Activity[3]	Proposed Stream Impacts[4,5]												Abutter[10]	
									Permanent Impact		Temporary Impact								TOTAL IMPACTS[9]			
											Trenching/Earthwork (Stream)		Culvert Work[6]		Dewatering (Stream)[7]		Dewatering (Culvert)[8]		IMPACT (LF)	IMPACT AREA (SQ FT)	LLN #	Last Name of Abutting Property Owner
									Impact (Linear Feet)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)				
184, 185	T-MH-DITCH6	43	Mount Holly	Ephemeral	1	-	-	At Culvert Splice	0	0	203	203	0	0	418	418	0	0	626	626	543, 670, 671, 672	Vermont Agency of Transportation, Burtco, Inc., Paul & Melissa McNeely, Keith Demers
186	T-MH-S19	43	Mount Holly	Ephemeral	1	-	-	Open Trench Excavate	0	0	0	0	0	0	21	21	0	0	26	26	543, 673	Vermont Agency of Transportation, Hull Trustee Iva, Hull-Nolan Turstee Marian
187	T-MH-S17	43	Mount Holly	Ephemeral	2	-	-	Open Trench Excavate	0	0	0	0	0	0	8	16	0	0	13	26	543, 677	Vermont Agency of Transportation, Andrew Landman
188	T-MH-S16	43	Mount Holly	Intermittent	1	-	-	Open Trench Excavate	0	0	0	0	0	0	1	1	0	0	6	6	677, 678	Stanton Wyman, Andrew Landman, Vermont Agency of Transportation
189	T-MH-S14	43	Mount Holly	Perennial	12	SC-559	10	Over Culvert	0	0	0	0	34	340	0	0	65	650	104	1050	543, 694, 696, 697	Vermont Agency of Transportation, Pearce Harrison Hamlin, Nicholas Turco, David & Toni Avery
191, 192	T-MH-S4	44	Mount Holly	Intermittent	6	SC-570	1	At Culvert Splice	0	0	191	1145	71	71	239	1434	1	1	507	2682	543, 714, 715, 715.01	Vermont Agency of Transportation, , Steven & Liane Heller, Vermont Agency of Transportation Rail Program
192	T-MH-AS-4	43	Mount Holly	Intermittent	3	SC-569	2	At Culvert Splice	0	0	0	0	24	48	0	0	73	146	102	209	543, 715, 715.01, 722	Vermont Agency of Transportation, Steven & Liane Heller, Vermont Agency of Transportation Rail Program, Steven & Liane Heller
193	T-MH-S5	44	Mount Holly	Intermittent	1.5	SC-576	2	At Culvert Splice	0	0	0	0	24	48	0	0	73	146	102	202	543, 715.01, 722, 725	Vermont Agency of Transportation, Vermont Agency of Transportation Rail Program, Steven & Liane Heller,
195	T-MH-DITCH1	45	Mount Holly	Ephemeral	5	-	-	Open Trench Excavate	0	0	0	0	0	0	92	460	0	0	97	485	543, 715.01, 725	Vermont Agency of Transportation, Vermont Agency of Transportation Rail Program,
194	T-MH-S3	45	Mount Holly	Ephemeral	2	SC-578	2	At Culvert Splice	0	0	0	0	23	46	14	28	59	118	101	202	543, 715.01, 722, 725	Vermont Agency of Transportation, Vermont Agency of Transportation Rail Program, Steven & Liane Heller,
195	T-MH-S2	45	Mount Holly	Ephemeral	4	SC-580	2.5	At Culvert Splice	0	0	0	0	28	70	6	24	63	158	102	272	543, 715.01, 723, 725	Vermont Agency of Transportation, Vermont Agency of Transportation Rail Program, ,
197	T-MH-S1	45	Mount Holly	Perennial	7	SC-584	6	At Culvert Splice	0	0	0	0	21	126	0	0	56	336	82	497	543, 715.01, 724, 725	Vermont Agency of Transportation, Vermont Agency of Transportation Rail Program, ,
198	T-LU-S32	45	Ludlow	Intermittent	3	SC-589	3	At Culvert Splice	0	0	0	0	25	75	13	39	72	216	115	345	543, 715.01	Vermont Agency of Transportation, Vermont Agency of Transportation Rail Program

Impact Exhibit #	Stream ID	Natural Resource Map Series Sheet #	Town	Flow Regime[2]	Average Ordinary High Water (OHW) Width (Ft)[3]	Unique Associated Stream Culvert ID	Associated Stream Culvert Diameter (Ft) (TRC)	Stream Culvert Activity[4]	Proposed Stream Impacts[4,5]										TOTAL IMPACTS[9]		Abutter[10]	
									Permanent Impact		Temporary Impact											
									Impact (Linear Feet)	Impact Area (Sq Ft)	Trenching/Earthwork (Stream)		Culvert Work[6]		Dewatering (Stream)[7]		Dewatering (Culvert)[8]		IMPACT (LF)	IMPACT AREA (SQ FT)	LLN #	Last Name of Abutting Property Owner
											Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)				
199	T-LU-S31	45	Ludlow	Ephemeral	4	SC-594	3	At Culvert Splice	0	0	0	0	23	69	28	112	91	273	147	474	543, 715.01, 732	Vermont Agency of Transportation, Vermont Agency of Transportation Rail Program, Diana Blythe
201	T-LU-S5	45	Ludlow	Perennial	3	SC-627	3.5	Duct Bank	0	0	0	0	30	105	11	33	7	25	53	178	730.01, 766, 768, 769, 773	Vermont Agency of Transportation, Peter Cloudas, Village of Ludlow, Almos Revesz & Jessica Pike, Stephen & Patricia Kriss
202	T-LU-S28	48	Ludlow	Ephemeral	1.5	SC-633	1.5	At Culvert Splice	0	0	0	0	29	44	0	0	26	39	60	91	730, 806	Town of Ludlow, Mary and Debra Karvonen
203	T-LU-S27	48	Ludlow	Ephemeral	1	SC-641	1.5	At Culvert Splice	0	0	0	0	23	35	0	0	13	20	41	60	730, 827, 829	Town of Ludlow, Vermont Electric Power Company Inc, Vermont Electric Power Company, Inc.
204	T-LU-S26	48	Ludlow	Ephemeral	2	SC-644	1.5	At Culvert Splice	0	0	0	0	37	56	0	0	4	6	46	72	730, 828, 830	Town of Ludlow, 400 East Lake Road Realty Trust, Patrick & Emily McGovern
205	T-LU-S24	48	Ludlow	Ephemeral	1	SC-648	1.5	At Culvert Splice	0	0	0	0	48	72	0	0	16	24	69	101	730, 833, 835	Town of Ludlow, Richard & Marjorie Killian, Michael & Mabel Goonan
206	T-LU-S23	48	Ludlow	Ephemeral	3	SC-654	2	At Culvert Splice	0	0	2	6	30	60	0	0	19	38	56	119	730, 840, 841, 842	Town of Ludlow, Thompson Page & Molly Jager, Barbara Silver & Harry Holt, Dinah Schell
207	T-LU-S22	48	Ludlow	Intermittent	3	SC-655	2	At Culvert Splice	0	0	5	15	27	54	0	0	19	38	56	122	730, 840, 845, 846	Town of Ludlow, Thompson Page & Molly Jager, Richard & Marjorie Killian, John & Tracy Lowry, John & Trish Lowry
208	T-LU-S21	49	Ludlow	Perennial	2	SC-661	2.7	At Culvert Splice	0	0	0	0	22	59	0	0	18	49	45	118	730, 840, 851, 852	Town of Ludlow, Thompson Page & Molly Jager, Neil Mahoney, Trustee, Meredith Gutner Rubin
209	T-LU-S20	49	Ludlow	Perennial	10	SC-663	7	Aerial	0	0	0	0	52	364	0	0	20	140	77	554	730, 840, 854	Town of Ludlow, Thompson Page & Molly Jager, Alan & Michelle Grant
210	T-LU-AS-19	49	Ludlow	Intermittent	1	SC-666	1.5	At Culvert Splice	0	0	0	0	27	41	0	0	27	41	59	87	730, 856, 858	Town of Ludlow, William and Ruth Combes, William and Ruth Combes
211	T-LU-S17	49	Ludlow	Intermittent	1	SC-669	1.5	At Culvert Splice	0	0	0	0	25	38	0	0	16	24	46	67	730, 863, 864, 865	Town of Ludlow, Betty Ada Green, Lois & Elizabeth Krefski, Daniel & Erica Brinton
212	T-LU-S16	49	Ludlow	Ephemeral	1	SC-672	1.5	At Culvert Splice	0	0	0	0	28	42	0	0	8	12	41	59	730, 864, 865	Town of Ludlow, Lois & Elizabeth Krefski, Daniel & Erica Brinton

22/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, VT
404/401 Stream Impact Analysis
Prepared by VHB/TRC
March 31, 2015
Revised: July 9, 2015

Impact Exhibit #	Stream ID	Natural Resource Map Series Sheet #	Town	Flow Regime[1]	Average Ordinary High Water (OHW) Width (Ft)[2]	Unique Associated Stream Culvert ID	Associated Stream Culvert Diameter (Ft) (TRC)	Stream Culvert Activity[3]	Proposed Stream Impacts[4,5]										Abutter[10]	
									Permanent Impact		Temporary Impact								TOTAL IMPACTS[9]			
											Trenching/Earthwork (Stream)		Culvert Work[6]		Dewatering (Stream)[7]		Dewatering (Culvert)[8]					
									Impact (Linear Feet)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	Impact (LF)	Impact Area (Sq Ft)	IMPACT (LF)	IMPACT AREA (SQ FT)	LLN #	Last Name of Abutting Property Owner
213	T-LU-S14	49	Ludlow	Intermittent	2	SC-675	2	At Culvert Splice	0	0	0	0	21	42	0	0	15	30	41	82	730, 865, 856	Town of Ludlow, Daniel & Erica Brinton, Alan & Marsha Wayler
213	T-LU-S15	49	Ludlow	Perennial	6	SC-676	3.3	At Culvert Splice	0	0	0	0	15	50	0	0	29	96	49	176	730, 865, 866	Town of Ludlow, Daniel & Erica Brinton, Alan & Marsha Wayler
214	T-LU-S12	49	Ludlow	Perennial	4	SC-680	2	At Culvert Splice	0	0	0	0	23	46	0	0	28	56	56	122	730, 865, 868	Town of Ludlow, Daniel & Erica Brinton, Daniel & Erica Brinton
214	T-LU-S13	49	Ludlow	Intermittent	2	SC-679	1.5	At Culvert Splice	0	0	0	0	25	38	0	0	30	45	60	93	730, 865, 867	Town of Ludlow, Daniel & Erica Brinton, Salvatore & Jean Fanciullo
215	T-LU-S10	50	Ludlow	Intermittent	4	SC-688	2	At Culvert Splice	0	0	0	0	22	44	0	0	12	24	39	88	730, 880, 881	Town of Ludlow, Gregory & Susan Riveiro, Michael & Rosemary Gaings
								Total Stream Impacts (Linear Feet)	0		3,344		3,438		3,820		8,275	15,692			
											Total Temp Impacts (LF):											
											18,977											
								Total Stream Impacts (Square Feet)	0		7,657		11,006		13,280		29,027	63,160			
											Total Temp Impacts (SQ FT):											
											60,970											
								Total Stream Impacts (Acres)	0.00		0.18		0.25		0.30		0.67	1.45			
											Total Temp Impacts (Acres):											
											1.40											

Note: GIS impact analysis conducted using Limits of Disturbance created by TRC-engineering- Drafted 06/05/2015

[1]Flow regime is based on qualitative observations of instream hydrology indicators and geomorphic characteristic and is subject to professional judgment.

[2]Ordinary High Water (OHW) Width is determined from measurements taken in the field at the time of the delineation in accordance with guidance provided in the U.S. Army Corps of Engineers (USACE). 2005. "Regulatory Guidance Letter. Subject: Ordinary High Water Mark Identification." No. 05-05. Accessed online at: http://www.usace.army.mil/cw/cecwo/reg/rgisindx.htm.

[3]Culvert activity provided by TRC Engineering based on initial design plans that may be revised with design detail completed for project construction. A value of " - " indicates that the impacted stream does not cross the proposed cable alignment, but is still impacted by the 12-ft Permanent Project Corridor or temporary workspace.

[4]Linear stream and/or culvert impacts are calculated by multiplying average OHW width by linear length of stream impact, or culvert diameter by linear length of culvert impact. Impact areas for the following streams are calculated as areas and have no associated linear impacts: V-BE-S-8, T-SH-S10, T-SH-S7, T-SH-S3, and T-MH-S28.

[5]Trenching/earthwork stream impacts are those for a 4'-wide trench that would occur within a maximum of 12-feet wide corridor that may be subject to bed/bank impacts during construction

[6]Culvert work relates to activities such as culvert cut/splice, removal/replacement or new culvert within existing culvert footprint. Impacts are conservatively estimated to occur within the Limit of Disturbance of the Project

[7]Temporary dewatering of non-culverted stream channel reaches associated with trenching, temporary workspace, or culvert work.

[8]Temporary dewatering of culverted stream reaches where the entire length of the culvert not associated with culvert work is included. Dewatering assumed to stop at the downstream culvert invert where diversion water to be returned according to project typicals.

[9]Five linear feet has been added to all impacted streams, except V-BE-S-8, T-SH-S10, T-SH-S7, T-SH-S3, and T-MH-S28, to conservatively account for any temporary dewatering/diversion structures needed

[10]Abutter information, including mailing addresses and Line List Numbers are found in the Adjoining Property Owners table in the 404 Permit Application.

23/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, and Lake Champlain VT
Lake Champlain Section 404/Section 10 Impacts
Prepared by VHB/TRC
March 31, 2015
Revised: June 10, 2015

Impact Exhibit #	Plan Reference (Exhibit/Typical)	EPSC Sheet #	Approximate Milepost	Proposed Lake Champlain 404 Impacts			
				Permanent Impact (Sq Ft)[1]	Temporary Impacts (Sq Ft)		*TOTAL IMPACTS (SQ FT)*
					Causeway (FWD Access Area)	Receiver Casing/Coffer Dam[2]	
1	Alburgh HDD	Overland Route - Alburgh - TR-1	0.5	0	0	0	*0*
2	Impact Exhibit - Fish & Wildlife Department (FWD) Access Area	Overland/Lake Route Transition Option 2 - Causeway L-TR-4	1.1	0	0	-	0
3	Existing Utility Crossing	Typical Details L-TD-1	1	320	-	-	320
3	Existing Utility Crossing	Typical Details L-TD-1	2	320	-	-	320
3	Articulated Concrete Mat	Typical Details L-TD-1	8	34,560	-	-	34,560
3	Existing Utility Crossing	Typical Details L-TD-1	8	320	-	-	320
3	Articulated Concrete Mat	Typical Details L-TD-1	9	7,040	-	-	7,040
3	Articulated Concrete Mat	Typical Details L-TD-1	10	8,400	-	-	8,400
3	Articulated Concrete Mat	Typical Details L-TD-1	11	7,200	-	-	7,200
3	Articulated Concrete Mat	Typical Details L-TD-1	15	12,000	-	-	12,000
3	Articulated Concrete Mat	Typical Details L-TD-1	21	7,200	-	-	7,200
3	Articulated Concrete Mat	Typical Details L-TD-1	21	27,680	-	-	27,680
3	Existing Utility Crossing	Typical Details L-TD-1	24	320	-	-	320
3	Existing Utility Crossing	Typical Details L-TD-1	24	320	-	-	320

24/31

TDI - New England Clean Power Link (NECPL)
Grand Isle, Rutland, and Windsor Counties, and Lake Champlain VT
Lake Champlain Section 404/Section 10 Impacts
Prepared by VHB/TRC
March 31, 2015
Revised: June 10, 2015

Impact Exhibit #	Plan Reference (Exhibit/Typical)	EPSC Sheet #	Approximate Milepost	Proposed Lake Champlain 404 Impacts			
				Permanent Impact (Sq Ft)[1]	Temporary Impacts (Sq Ft)		TOTAL IMPACTS (SQ FT)
					Causeway (PWD Access Area)	Receiver Casing/Coffer Dam[2]	
3	Existing Utility Crossing	Typical Details L-TD-1	24	320	-	-	320
3	Existing Utility Crossing	Typical Details L-TD-1	24	320	-	-	320
3	Existing Utility Crossing	Typical Details L-TD-1	25	320	-	-	320
3	Existing Utility Crossing	Typical Details L-TD-1	41	320	-	-	320
3	Existing Utility Crossing	Typical Details L-TD-1	42	320	-	-	320
3	Existing Utility Crossing	Typical Details L-TD-1	88	320	-	-	320
3	Existing Utility Crossing	Typical Details L-TD-1	88	320	-	-	320
3	Existing Utility Crossing	Typical Details L-TD-1	90	320	-	-	320
3	Existing Utility Crossing	Typical Details L-TD-1	92	320	-	-	320
-	HDD Coffer Dam Installation	Typical Details L-TD-1	TBD	0	0	960	960
-	Shoreline Bank Stabilization	Lake/Overland Route Transition - Benson - TR-5	97.7	TBD			
4	Benson HDD Landing	Lake/Overland Route Transition - Benson - TR-5	97.8	0	0	0	0
			Impact Subtotal (Sq Ft)	108,560	0	960	109,520
					960		
			Impact Subtotal (Acres)	2.49	0.00	0.02	2.51
					0.02		

Note: GIS impact area analysis conducted using Limits of Disturbance created by TRC-Engineering- Drafted 03/18/2015 and referenced on Lake Champlain Segment EPSC Plans

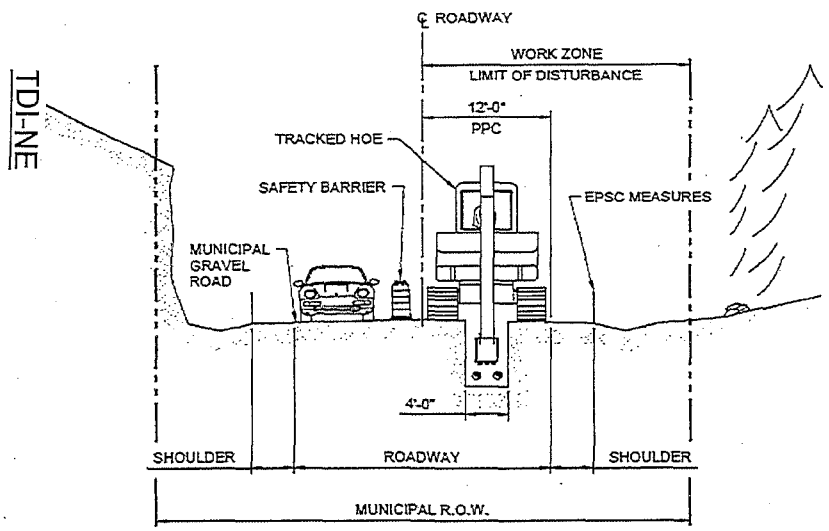
[1]Permanent impact to lake bottom is from concrete mattresses as necessary for utility crossings on exposed bedrock. The exact location and area is unknown, but 40x8 feet mattresses at 14 locations are assumed.

[2]Locations of temporary lake impacts from use of HDD cofferdam or receiver casing use at Alburgh and Benson landings are not yet final, but will consist of a) an approximately 16-foot by 30 foot area in the case of a cofferdam or b) 48 inch steel pipe in the case of the receiver casing. The conservative estimate of 480 square feet per site is used here.

25/31

March 31, 2015
Revised: June 10, 2015

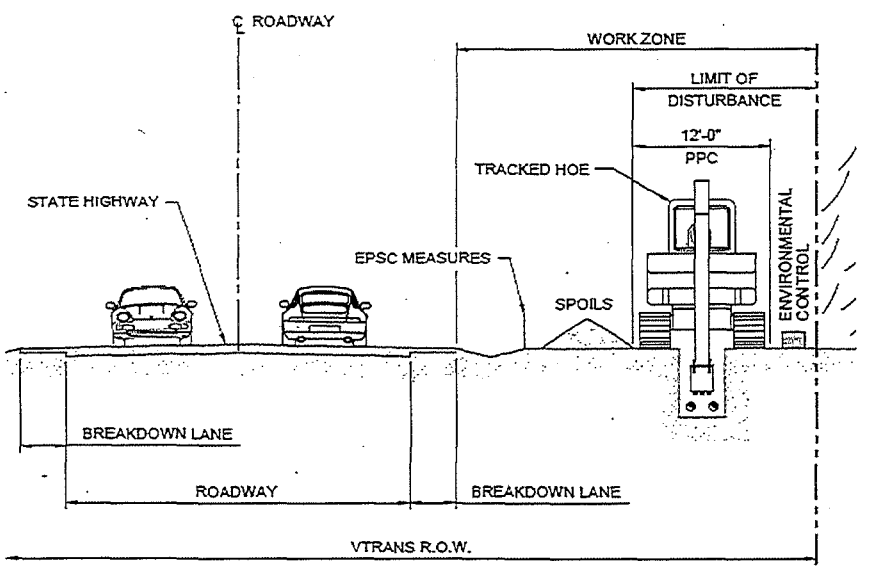
TDI-NE



NOTES

1. CONSTRUCTION METHOD 1D IS SIMILAR TO METHOD 1C EXCEPT THE WIDER ROADWAY PERMITS ONE-WAY TRAFFIC TO BE MAINTAINED.
2. CONSTRUCTION METHOD 1D ASSUMES CONSTRUCTION WILL BE CONDUCTED USING LINEAR OR IN-LINE CONSTRUCTION OPERATIONS.
3. TOPOGRAPHY, R.O.W. WIDTH AND/OR PROTECTED NATURAL RESOURCES PREVENT CONSTRUCTION USE OF ADJACENT TURFED AREAS.
4. ROADWAY WIDTH VARIES FROM 18-24 FEET, OR MORE.
5. WITH PROPER EPSC MEASURES SPOILS MAY BE STOCKPILED WITHIN R.O.W. AS SPACE PERMITS OR REMOVED AND STOCKPILED AT AN APPROVED OFF-SITE LOCATION.
6. PROVIDE DEMARKATION OF APPROVED LIMIT OF DISTURBANCE (LOD). SEE EPSC PLAN NOTES AND DETAILS FOR ADDITIONAL REQUIREMENTS.
7. SAFETY BARRIERS, TRAFFIC CONTROL AND SIGNAGE TO BE PROVIDED IN ACCORDANCE WITH THE APPROVED TRAFFIC CONTROL PLANS.
8. THE WORK ZONE IS RESTRICTED TO 1/2 OF THE ROADWAY AND ADJACENT PROPERTY TO EDGE OF THE R.O.W.
9. INSTALL PERIMETER CONTROLS (E.G. SILTFENCE) ON DOWNSLOPE SIDE OF EARTH DISTURBANCE WHERE POTENTIAL FOR EROSION EXISTS. SEE EPSC PLAN NOTES AND DETAILS FOR ADDITIONAL REQUIREMENTS.
10. SENSITIVE HABITAT MAY FURTHER RESTRICT AVAILABLE WORK ZONE/R.O.W. FOR CONSTRUCTION OPERATIONS.

MUNICIPAL GRAVEL ROAD
CONSTRUCTION METHOD 1D
SCALE: 1" = 10'



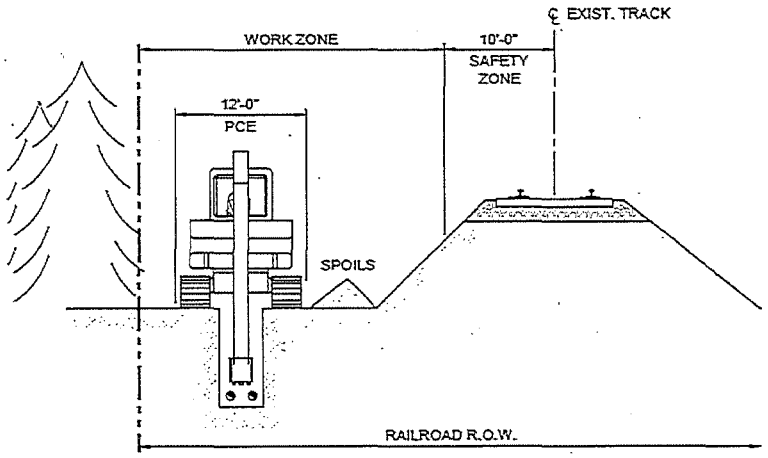
NOTES

1. CONSTRUCTION METHOD 3B WILL BE USED WHERE SUFFICIENT R.O.W. WIDTH EXISTS TO ALLOW INSTALLATION COMPLETELY OFF THE PAVED ROADWAY. THIS METHOD INCLUDES THOSE AREAS WHERE CABLE INSTALLATION MAY BE OVER THE TOP OF ROCK OUTCROPS ADJACENT TO THE VTRANS R.O.W.
2. CONSTRUCTION METHOD 3B PERMITS TWO-WAY TRAFFIC ADJACENT TO THE WORK ZONE.
3. CONSTRUCTION METHOD 3B ASSUMES CONSTRUCTION WILL BE CONDUCTED USING LINEAR OR IN-LINE CONSTRUCTION OPERATIONS TO MINIMIZE IMPACT TO NATURAL ENVIRONMENT IN SENSITIVE OR CHALLENGING CONSTRUCTION LOCATIONS.
4. WITH PROPER EPSC MEASURES SPOILS MAY BE STOCKPILED WITHIN R.O.W. AS SPACE PERMITS OR REMOVED AND STOCKPILED AT AN APPROVED OFF-SITE LOCATION.
5. SAFETY BARRIERS, TRAFFIC CONTROL AND SIGNAGE TO BE PROVIDED IN ACCORDANCE WITH THE APPROVED TRAFFIC CONTROL PLANS.
6. CABLE INSTALLATION LOCATION WILL BE RESTORED TO NATURAL VEGETATED R.O.W. EXCEPT WETLANDS AND OTHER NATURAL ENVIRONMENTS SPECIFIED TO BE RESTORED TO THEIR ORIGINAL CONDITION.
7. REFER TO GENERAL WORK REQUIREMENTS ON SHEET G-2.
8. PROVIDE DEMARKATION OF APPROVED LIMIT OF DISTURBANCE (LOD). SEE EPSC PLAN NOTES AND DETAILS FOR ADDITIONAL REQUIREMENTS.
9. INSTALL PERIMETER CONTROLS (E.G. SILTFENCE) ON DOWNSLOPE SIDE OF EARTH DISTURBANCE WHERE POTENTIAL FOR EROSION EXISTS. SEE EPSC PLAN NOTES AND DETAILS FOR ADDITIONAL REQUIREMENTS.
10. SENSITIVE HABITAT MAY FURTHER RESTRICT AVAILABLE WORK ZONE/R.O.W. FOR CONSTRUCTION OPERATIONS.

STATE HIGHWAY
CONSTRUCTION METHOD 3B
SCALE: 1" = 10'

TDI-NE

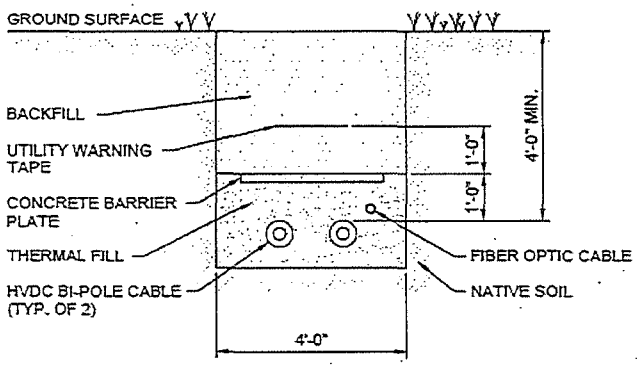
March 31, 2015
Revised: June 10, 2015



NOTES

1. CONSTRUCTION METHOD 5D WILL BE USED IN AREAS WHERE THE CONSTRUCTION OPERATION TAKES PLACE SIGNIFICANTLY BELOW THE RAILROAD BED ELEVATION.
2. CONSTRUCTION METHOD 5D WILL BE USED IN AREAS WITH SUFFICIENT R.O.W. WIDTH AT THE BASE OF THE RAILROAD BED OR ADDITIONAL EASEMENT HAS BEEN OBTAINED.
3. THE WORK ZONE WILL EXTEND FROM THE EDGE OF THE SAFETY ZONE TO THE EDGE OF THE R.O.W.
4. CONSTRUCTION METHOD 5D UTILIZES IN-LINE CONSTRUCTION METHODS. ACCESS TO THE WORK AREA IS ALONG THE PLANNED TRENCH ALIGNMENT. SPOILS MAY BE STOCKPILED WITHIN THE WORK ZONE AS SPACE PERMITS.
5. TREE CLEARING SHALL BE LIMITED TO THE AREA BETWEEN THE TRACK CENTERLINE AND THE EDGE OF THE R.O.W. UNLESS ADDITIONAL EASEMENT HAS BEEN OBTAINED. CLEARING SHALL BE LIMITED TO THE MINIMUM NECESSARY TO PERFORM THE WORK.
6. PROVIDE EROSION CONTROL MEASURES PER THE APPROVED PERMITS AND/OR AS DIRECTED.

RAILROAD ADJACENT
CONSTRUCTION METHOD 5D
SCALE: 1" = 10'



NOTES

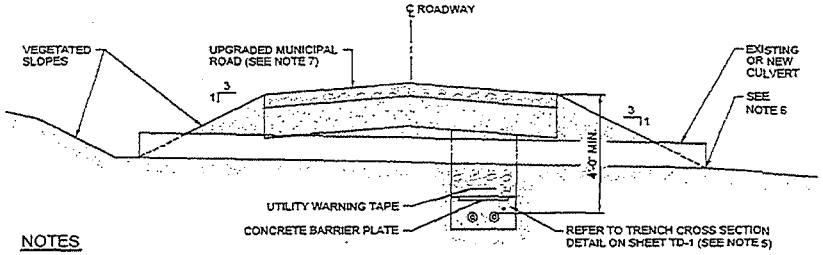
1. CABLE SPACING MAY VARY BASED UPON CONTRACTOR INSTALLATION PREFERENCE AND LOCATION. A TYPICAL SPACING OF UP TO 3 FEET IS ANTICIPATED.
2. CABLES SHALL BE BEDDED IN SCREENED SAND, NATIVE SOIL OR THERMAL FILL. THERMAL FILL SHALL BE USED WHERE NATIVE MATERIAL OR SCREENED SAND DO NOT MEET MINIMUM THERMAL PROPERTIES (100°C-CM/WATT). DEPTH OF THERMAL SAND OVER CABLE SHALL BE FIELD DETERMINED FOLLOWING TESTING OF NATIVE SOILS.
3. CONCRETE PROTECTIVE PLATES SHALL BE PROVIDED OVER CABLES.
4. EXCAVATION MAY BE VERTICAL SHORED OR SLOPED BACK PER OSHA REQUIREMENTS WHERE NECESSARY.
5. PRIOR TO EXCAVATION INSTALL EPSC MEASURES PER THE EPSC PLAN. AT THE COMPLETION OF THE WORK, CONDUCT STABILIZATION AND REMOVE EPSC MEASURES PER THE EPSC PLAN.
6. ABOVE SKETCH IS TO PRESENT CONCEPTS. MORE RESTRICTIVE REQUIREMENTS OF THE RAILROAD, STATE OR OTHER AUTHORITY WILL BE REFLECTED IN THE DETAILED DESIGN.

TYPICAL TRENCH CROSS SECTION
SCALE: N.T.S.

27/31

TDI-NE

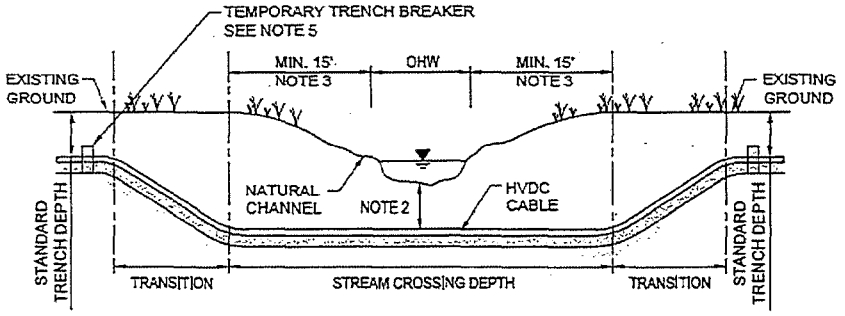
March 31, 2015
Revised: June 10, 2015



NOTES

1. DIMENSIONS AND DETAILS ARE CONCEPT ONLY AND SUBJECT TO MODIFICATION TO MEET MUNICIPAL, STATE AND FEDERAL REQUIREMENTS.
2. CULVERTS ALONG THE ROUTE MAY BE DISASSEMBLED OR TEMPORARILY REMOVED TO FACILITATE CABLE INSTALLATION.
3. CULVERTS DETERMINED TO BE UNDERSIZED OR DETERIORATED MAY BE REPLACED.
4. CULVERT BEDDING AND BACKFILL SHALL BE CONSTRUCTED IN ACCORDANCE WITH APPLICABLE MUNICIPAL ROAD SPECIFICATIONS.
5. CABLE TRENCH DESIGN SHALL BE COORDINATED WITH CULVERT INSTALLATION TO ENSURE NOT LESS THAN 1'-0" OF SEPARATION BETWEEN CULVERT AND HVDC CABLES.
6. UNLESS DETERMINED NECESSARY TO COMPLY WITH THE STREAM ALTERATION PERMIT, CULVERT INVERTS SHALL MATCH EXISTING.
7. EXISTING MUNICIPAL DIRT ROADS SHALL BE UPGRADED TO MEET CURRENT MUNICIPAL ROAD STANDARDS. ROAD WIDENING TO CURRENT MUNICIPAL STANDARDS SHALL BE PROVIDED WHERE PRACTICAL.
8. REFER TO DETAIL PERENNIAL STREAM AT CULVERT CROSSING FOR SEPARATION REQUIREMENTS AT CULVERTS THAT CARRY PERENNIAL STREAMS.

TYPICAL MUNICIPAL CULVERT CROSSING
SCALE: N.T.S.



NOTES:

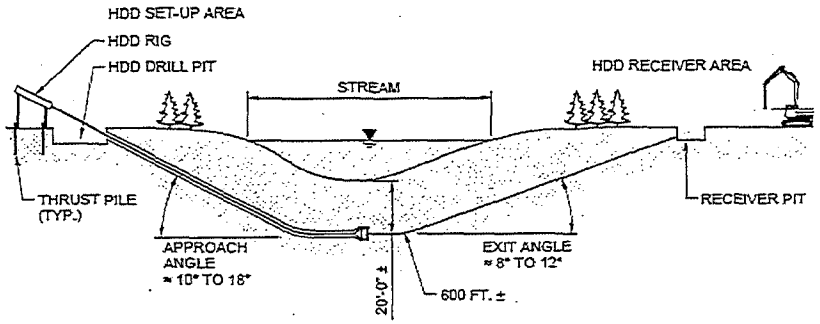
1. OPEN TRENCH EXCAVATION OF PERENNIAL STREAMS SHALL BE PERFORMED AFTER ESTABLISHING APPROPRIATE ENVIRONMENTAL CONTROLS AS SPECIFIED AND/OR DIRECTED.
2. CABLE SHALL BE INSTALLED NOT LESS THAN 5 FEET BELOW THE EXISTING NATURAL STREAM CHANNEL BOTTOM UNLESS OTHERWISE SPECIFIED OR DIRECTED.
3. THE DEPTH OF INSTALLATION SHALL CONTINUE FOR A DISTANCE OF 15 FEET BEYOND THE EDGE OF THE ORDINARY HIGH WATER (OHW) EMBANKMENT.
4. STREAM BANKS AND BOTTOM SHALL BE RESTORED TO MATCH PRE-CONSTRUCTION CONDITION UNLESS OTHERWISE DIRECTED.
5. SEGREGATE AND STOCKPILE STREAM BED AND BANK MATERIALS SEPARATELY FROM SUBSURFACE MATERIAL SOILS. RESTORE SOIL HORIZONS TO THE EXTENT PRACTICABLE WHEN BACKFILLING DISTURBED SECTIONS OF BED AND BANK.
6. TEMPORARY TRENCH BREAKER SHALL BE INSTALLED UPGRADIENT FROM THE TRANSITION ZONE ON EACH SIDE OF THE CHANNEL AND REMOVED AS WORK PROGRESSES.

PERENNIAL STREAM AT OPEN TRENCH CROSSING
SCALE: N.T.S.

28/31

March 31, 2015
Revised: June 10, 2015

TDI-NE

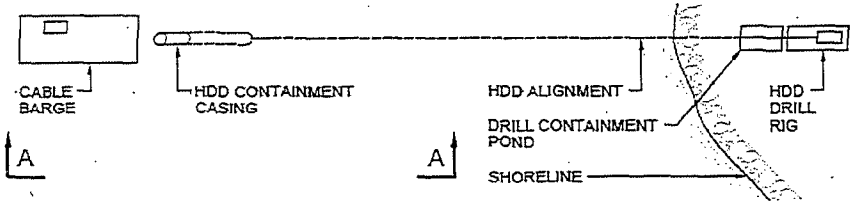


NOTES

1. HDD SET-UP AREA IS APPROXIMATELY 50 FT. x 250 FT. FOR LARGE HDD OPERATIONS. THIS STAGING AREA MAY BE REDUCED FOR SMALLER BORING OPERATIONS OR SOME EQUIPMENT ASSOCIATED WITH LARGE HDD OPERATIONS MAY BE STAGED AT OTHER LOCATIONS.
2. DRILL PIT MAY BE ELIMINATED IN TOTAL IF ALTERNATE MEANS FOR DRILL MUD CONTAINMENT IS PROVIDED. TYPICAL DRILL PIT FOR LARGE HDD OPERATIONS IS 6 FT. DEEP x 8 FT. x 20 FT.
3. HDD SHALL PASS NOT LESS THAN 20 FT. UNDER STREAMS NOR LESS THAN 15 FT. BELOW ROADWAYS AND OTHER GROUND SURFACES.
4. RECEIVER PIT MAY BE ELIMINATED IF ALTERNATE DRILL MUD CONTROL METHOD IS PROVIDED. RECEIVER PIT IS TYPICALLY 5 FT. DEEP x 10 FT. x 10 FT. FOR LARGE DRILL OPERATIONS.
5. FOR CASING AND CABLE PULL-BACK, CASING MAY BE SUSPENDED ABOVE R.O.W. TO FACILITATE INSTALLATION.
6. TWO BORE HOLES PER CROSSING ARE REQUIRED. FOR PLANNING PURPOSES, BORE HOLE SPACING SHALL BE 15-25 FEET. LESSER SPACING MAY BE USED IN CERTAIN SOIL CONDITIONS AND/OR BORE OPERATIONS.

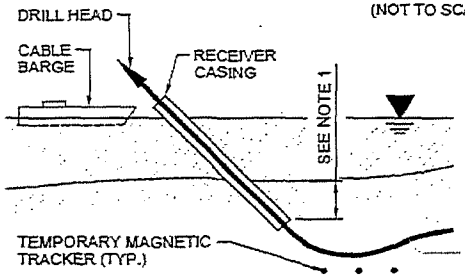
TYPICAL HDD STREAM CROSSING

SCALE: N.T.S.



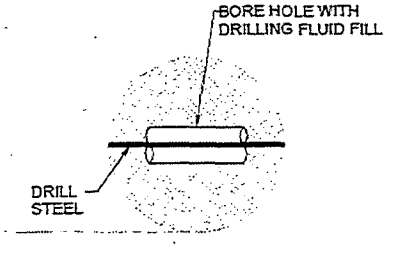
SHORE TO BARGE HDD

(NOT TO SCALE)



ELEVATION A-A

(NOT TO SCALE)



BORE SHAFT DETAIL

(NOT TO SCALE)

NOTES

1. RECEIVER CASING SHALL BE DRIVEN INTO THE LAKE BOTTOM AT SUFFICIENT DEPTH TO ENSURE ADEQUATE EARTH COVER TO CONTAIN DRILL FLUID.
2. RECEIVER CASING SHALL BE 48 INCH OR LARGER STEEL PIPE DRIVEN INTO THE LAKE BOTTOM AND USED TO CONTAIN DRILL CUTTINGS AND DRILLING FLUID AT BREAK-OUT.
3. SUITABLE MAGNETIC TRACKING DEVICES OR SIMILAR SHALL BE USED TO GUIDE THE DRILL LEAD INTO THE RECEIVER CASING.
4. RECEIVER CASING AND TRACKING DEVICES SHALL BE REMOVED AT THE COMPLETION OF THE HDD OPERATION.
5. CABLE BARGE WILL BE USED FOR HDD TOOL INSTALLATION/REMOVAL, CASING PULL-IN, AND CABLE PULLING.
6. COFFER DAM MAY BE USED IN LIEU OF RECEIVER CASING SHOULD BOTTOM CONDITIONS OR OTHER FACTORS NOT BE CONDUCIVE TO RECEIVER INSTALLATION OR USE. REFER TO COFFERDAM DETAIL.
7. DRILLING FLUID IS TYPICALLY BENTONITE DRILLING MUD. WATER MAY BE USED UNDER SOME CIRCUMSTANCES.

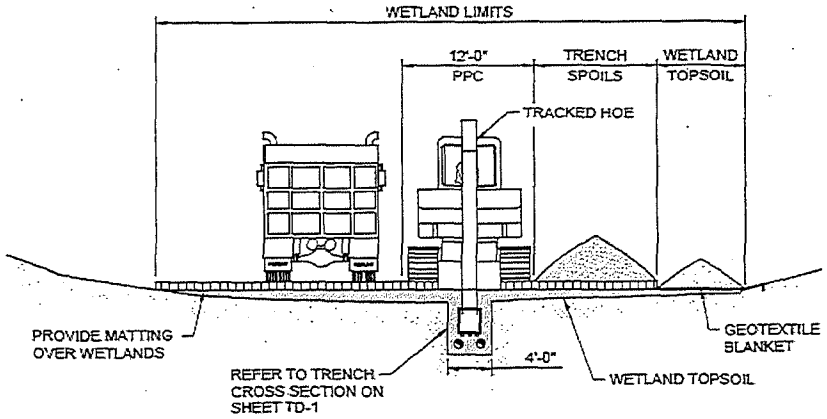
HDD RECEIVER CASING

SCALE: N.T.S.

29/31

TDI-NE

March 31, 2015
Revised: June 10, 2015

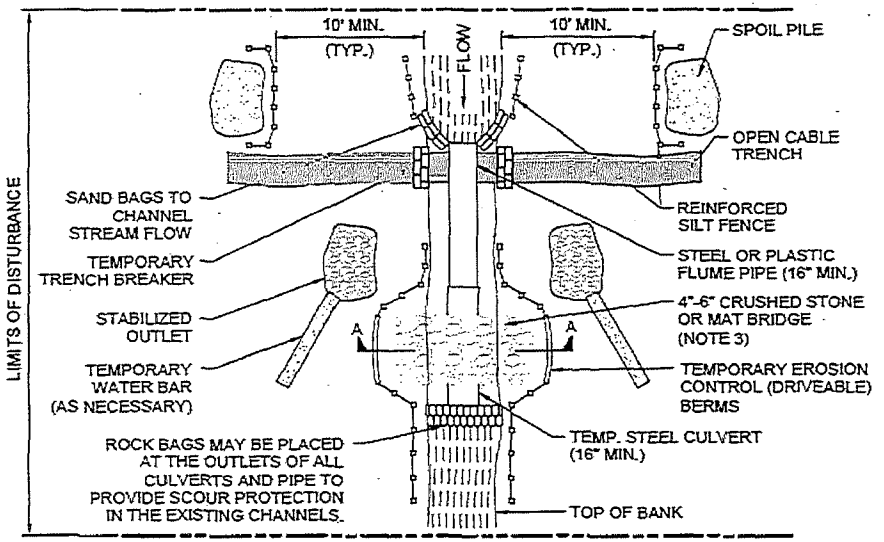


NOTES

1. EQUIPMENT ACCESS SHALL BE UNDER DRY OR FROZEN CONDITIONS, OR BY USE OF CONSTRUCTION MATS.
2. PROVIDE TEMPORARY TRENCH BREAKER AT EACH EDGE OF STREAM AND WETLAND EXCAVATION.
3. TOPSOIL AND TRENCH SPOILS SHALL BE SEGREGATED AND STOCKPILED ON CONSTRUCTION MATS OR GEOTEXTILE FABRIC WITHIN WETLAND AREAS.
4. TRENCH SHALL BE BACKFILLED WITH SOILS PLACED IN REVERSE ORDER OF HOW THEY WERE REMOVED. UPPER LAYER FILL SHALL BE WETLAND TOPSOIL PLACED TO A DEPTH EQUAL TO THAT OF THE ADJACENT IN-SITU NATIVE TOPSOIL.
5. AT COMPLETION OF THE WORK REMOVE GEOTEXTILE AND CONSTRUCTION MATTING. CONSTRUCTION MATS SHALL BE THOROUGHLY CLEANED IN ACCORDANCE WITH THE EPSC PLAN AND PROJECT PERMITS PRIOR TO USE AT OTHER LOCATIONS.
6. IMPLEMENT EPSC MEASURES IN ACCORDANCE WITH THE EPSC PLAN.

TYPICAL WETLAND CONSTRUCTION

SCALE: 1" = 10'



PLAN VIEW

SECTION A-A

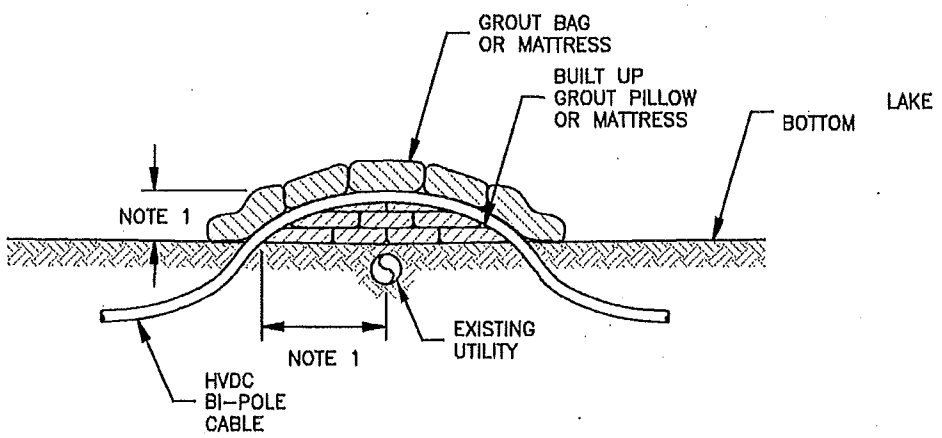
NOTES

1. DIMENSIONS ARE CONCEPT ONLY AND SUBJECT TO MODIFICATION TO MEET MUNICIPAL, STATE AND FEDERAL REQUIREMENTS.
2. CULVERT PIPE SIZE AND NUMBER SHALL BE INCREASED TO ACCOMMODATE ANTICIPATED STREAM FLOW.
3. AGGREGATE FILL CROSSING SHOWN IN THE DETAIL. CONSTRUCTION MAT BRIDGE SHALL BE USED WHERE FEASIBLE.
4. INSTALL EPSC MEASURES IN ACCORDANCE WITH ISSUED PERMITS AND VT STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION AND SEDIMENT CONTROL.
5. FOR MINOR WATERBODIES (< 10 FT. WIDE) TRENCHING AND BACKFILL IN THE WATERBODY SHALL BE COMPLETED WITHIN 24 CONTINUOUS HOURS AFTER INITIATING THE EXCAVATION. IF AUTHORIZED BY THE OSPC OR EPSC SPECIALIST, WORK IN INTERMEDIATE WATERBODIES (10 FT. TO 100 FT. WIDE) SHALL BE COMPLETED WITHIN 48 HOURS.

TYPICAL STREAM FLUME CROSSING

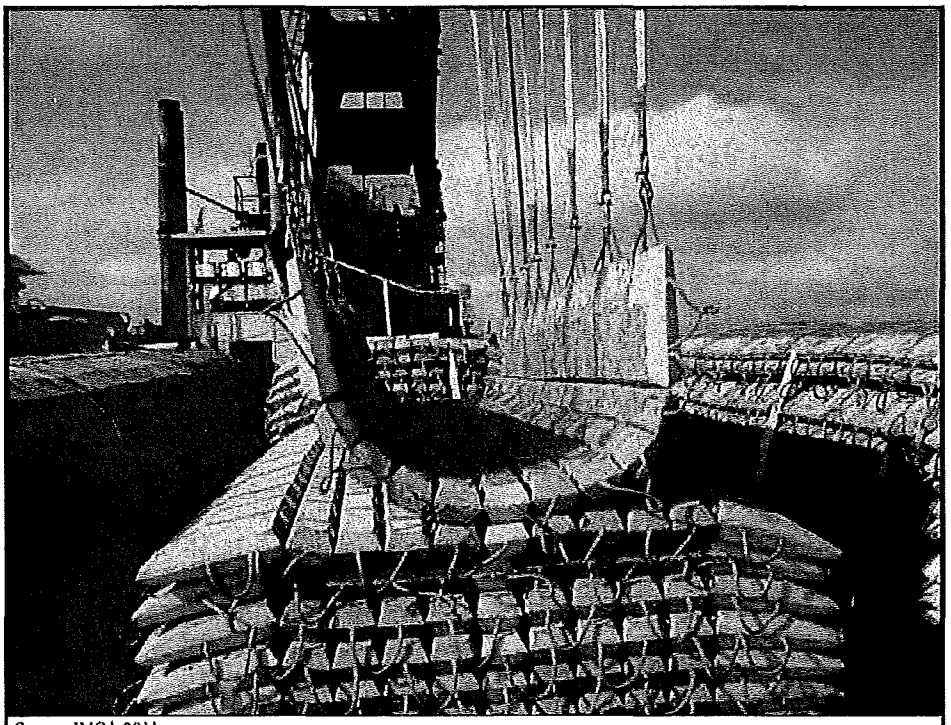
SCALE: N.T.S.

REPRESENTATIVE SCHEMATIC OF PROTECTION MEASURES FOR AQUATIC TRANSMISSION CABLES



NOTE:
1. VARIES BASED ON STABILITY OF EXISTING BOTTOM SEDIMENT, UTILITY DIAMETER AND BEND RADIUS OF CABLE.

TYPICAL ARTICULATED CONCRETE MATS



Source: IMCA 2011

This Page Intentionally Left Blank

APPENDIX F VERMONT 248 APPLICATION COVER LETTER

December 8, 2014 – incorporate by reference to
http://necplink.com/docs/Champlain_VT_electronic/01%20Cover%20Materials/TDI-NE%20Letter%20to%20Public%20Service%20Board.pdf

This Page Intentionally Left Blank

Dunkiel Saunders
ELLIOTT | RAUBVOGEL | HAND

91 College Street, PO Box 545
Burlington, VT 05402-0545
tel 802.860.1003 | fax 802.860.1208
www.dunkielsaunders.com

Elizabeth H. Catlin
Brian S. Dunkiel *
Eileen I. Elliott
Geoffrey H. Hand
Drew Kervick *
Kelly D. H. Lowry *
Justin W. McCabe ^
Erik G. Nielsen °
Andrew N. Raubvogel
Mark A. Saunders
Karen L. Tyler

December 8, 2014

By Hand Delivery

Mrs. Susan Hudson, Clerk
Vermont Public Service Board
112 State Street, Drawer 20
Montpelier, VT 05620-2701

Re: Petition of Champlain VT, LLC d/b/a TDI New England for a Certificate of Public Good, pursuant to 30 V.S.A. §248, authorizing the installation and operation of a high voltage direct current (HVDC) underwater and underground electric transmission line with a capacity of 1,000 MW, a converter station, and other associated facilities, to be located in Lake Champlain and in the Counties of Grand Isle, Chittenden, Addison, Rutland, and Windsor, Vermont, and to be known as the New England Clean Power Link Project ("NECPL")

Dear Mrs. Hudson:

On behalf of Champlain VT, LLC, d/b/a TDI-New England ("TDI-NE"), we are pleased to enclose for filing in the above-captioned matter the original and six copies of a Section 248 Petition and supporting materials requesting issuance of a Certificate of Public Good.

TDI-NE is requesting Board approval for the installation and operation of a high voltage direct current (HVDC) electric transmission line with a capacity of 1,000 MW that will provide electricity generated by low carbon, renewable energy sources in Canada to the New England electric grid. The line, to be known as the New England Clean Power Link ("NECPL"), will run from the Canadian border at Alburgh, Vermont to Ludlow, Vermont along underwater and underground routes. In Ludlow, the HVDC line will terminate at a converter station that will convert the electrical power to alternating current (AC), and then run to VELCO's existing 345 kV Coolidge Substation in Cavendish, Vermont, located approximately 0.3 miles to the south along a town road.

The NECPL is an important project for the State of Vermont, and will provide significant environmental, electrical, and economic benefits. As the Petition and supporting materials explain in detail, these benefits include lower electricity costs, diversifying the fuel supply in the region, reduced greenhouse gas emissions, the creation of in-state jobs and millions of dollars in new state and local taxes, and increasing the region's gross domestic product during construction and operation. At the same time, the NECPL will respect Vermont's natural beauty by installing the line underground in existing public rights-of-way, and underwater. In addition, the NECPL will aid Vermont and the New England region in meeting future load growth, and achieving renewable energy and climate change objectives. Finally, the NECPL will support Lake Champlain clean-up efforts, in-state renewable energy programs, and Vermont electric ratepayer relief through the creation of several public good benefit funds.

Service on Entities Listed in 30 V.S.A. § 248(a)(4)(C)

Please be advised of the following with respect to service on certain statutory interested parties entitled to receive a copy of the Petition under § 248(a)(4)(C). In order to avoid waste and reduce cost, and given the voluminous size of the Petition, TDI-NE is serving a paper copy of the Petition and an *electronic-only* copy of all supporting materials, including prefiled testimony and exhibits, on the following entities or persons who, in the experience of the undersigned, rarely participate in § 248 cases involving energy projects: the Office of the Attorney General, the Vermont Department of Health, and the Vermont Scenery Preservation Council. If any of these entities wish to receive a complete paper copy of any of the materials filed herewith, upon request to the undersigned, a copy will be sent. All other persons or entities identified in § 248(a)(4)(C) are receiving a paper copy and electronic copy of the Petition and supporting materials.

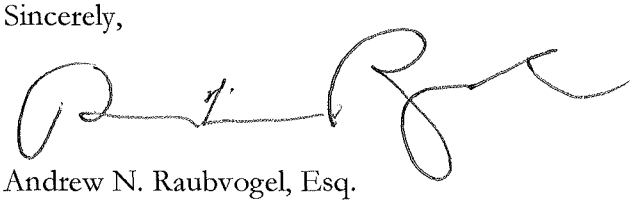
Notice to Adjoining Landowners

Pursuant to PSB Rule 5.402(B), TDI-NE is providing a paper copy of this letter, a project overview map, and the Petition (without supporting materials) to adjoining landowners.

TDI-NE is pleased to file this Petition and looks forward to commencement of the Board's review of the Project as soon as feasible, in order to be in a position to a Board decision by the end of 2015 to meet TDI-NE's target of commencing operations in April 2019.

Thank you in advance for your consideration, and please do not hesitate to contact us if you need any further information.

Sincerely,



Andrew N. Raubvogel, Esq.
Geoffrey H. Hand, Esq.
Brian S. Dunkiel, Esq.
Victoria M. Westgate, Esq.

cc: Service List

Enclosures

1. Certificate of Service
2. Notice of Appearance
3. Petition for a Section 248 Certificate of Public Good
4. Notice to Adjoining Landowners
5. Statement of Compliance re Notice to Adjoining Landowners
6. Index of Section 248 Criteria and Corresponding Evidence
7. List of Prefiled Testimony and Exhibits
8. Prefiled Direct Testimony and Exhibits of the following witnesses:
    a. Jessome-Martin-Bagnato
    b. Wironen
    c. Eng
    d. Singer
    e. Parker
    f. Kavet
    g. Nelson
    h. Guerrero-Murphy
    i. Kaliski
    j. Buscher
    k. Heitert
    l. Olausen
    m. Murphy
    n. Bailey
    o. Thuman
    p. Sabick

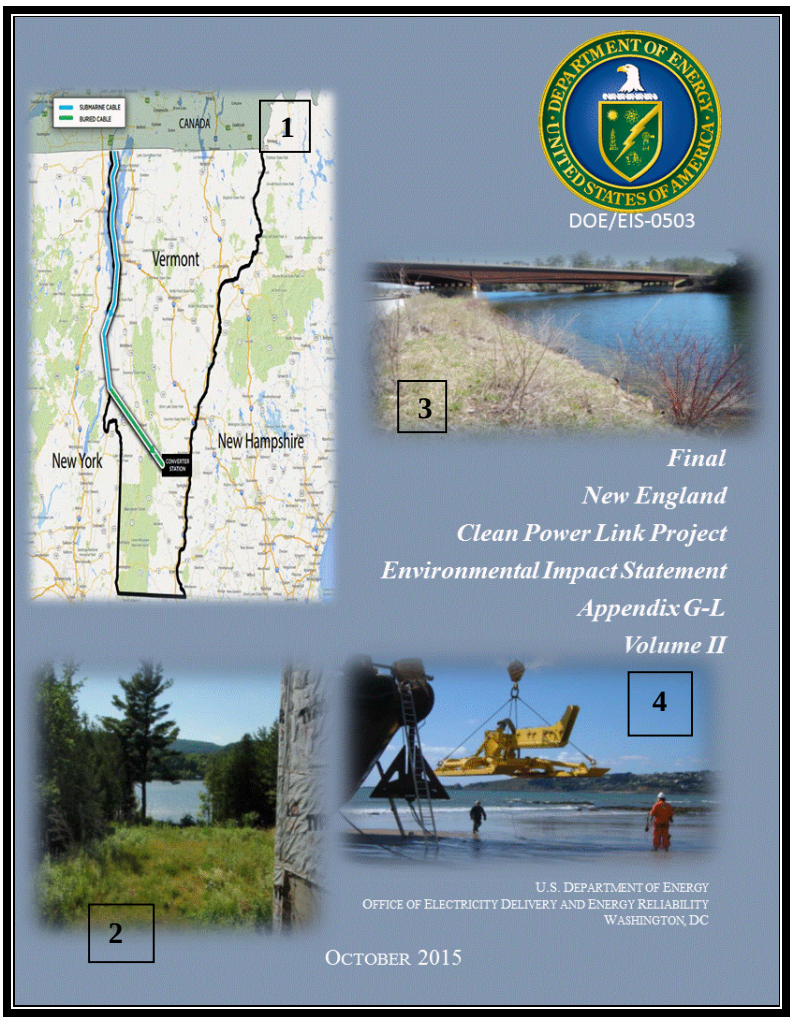
This Page Intentionally Left Blank

DOE/EIS-0503

Final New England Clean Power Link Project Environmental Impact Statement Appendix G-L Volume II

U.S. DEPARTMENT OF ENERGY
OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY
WASHINGTON, DC

OCTOBER 2015



Cover Photo Credits

1. TDI-NE (*http://wamc/files/styles/default/public/201410/new-england-clean-power-link-map-ctsy-tdi-new-england.jpg" alt="">)*
2. NECPL exit from Lake Champlain (Benson, Vermont) courtesy of TDI-NE
3. Lake Bomoseen, Fair Haven, Vermont courtesy of TDI-NE
4. TDI-NE 2014a

FINAL

NEW ENGLAND CLEAN POWER LINK PROJECT
ENVIRONMENTAL IMPACT STATEMENT

DOE/EIS-0503

VOLUME II: APPENDICES

U.S. DEPARTMENT OF ENERGY
OFFICE OF ELECTRICITY DELIVERY
AND ENERGY RELIABILITY

COOPERATING AGENCIES

U.S. ENVIRONMENTAL PROTECTION AGENCY
U.S. ARMY CORPS OF ENGINEERS
U.S. COAST GUARD

OCTOBER 2015

This Page Intentionally Left Blank

Table of Contents

This Page Intentionally Left Blank

APPENDIX G TDI-NE GENERAL MITIGATION STRATEGIES

This Page Intentionally Left Blank

Docket No. _____
Exh. TDI-JMB-14

NECPL MITIGATION SUMMARY TABLE
Steps Taken to Avoid, Minimize and/or Mitigate Potential Impacts

General Mitigation Strategies

- Establishing as a fundamental design criterion that the transmission line would be installed underwater and underground -- even though the cost will be significantly higher -- to avoid/reduce visual impacts, fragmentation, and other environmental impacts associated with overhead lines.
- Using environmentally sensitive lake installation measures to install approximately 2/3 of the transmission line route in Lake Champlain, which will reduce overall construction time and lessen overland construction impacts on Vermonters.
- Locating the overland cable route almost exclusively within existing public rights-of-way (ROW) (other than TDI-NE's property). The ROWs are heavily used, easily accessible during construction, are generally cleared of trees, undergo regular vegetation management and contain existing utilities.
- Selecting the proposed Converter Station site from several possible locations by a multidisciplinary team, to significantly reduce potential visual and noise impacts. In addition, the station is sited in close proximity to compatible land uses, including multiple overhead lines and a VELCO substation.
- Establishing a conservative overall noise objective at any residence near the Converter Station, and taking measures during siting and design of the Project to ensure that objective is met.

Specific Environmental Mitigation Strategies for Project Installation

Lake:

- Shorelines - Using horizontal directional drilling (HDD) for land/water transitions in Alburgh and Benson entirely avoid impacts to the Lake Champlain shoreline, nearshore environments, and shallow water habitats.
- Commitment to restore an existing degraded shoreline on TDI-NE controlled parcel in Benson.
- Utilizing installation techniques in the Lake to minimize resuspension of sediments and to avoid specific aquatic archaeological sites.
- Timing the installation to avoid sensitive periods of fish life cycles.
- Fisheries – In consultation with state regulators, certain known fisheries habitats have been avoided.
- Invasive plants - Developing an Aquatic Invasive Species Management Plan to prevent the introduction and spread of invasive species.
- Turbidity - Real-time monitoring of turbidity during construction, and utilizing controls such as changing the rate of installation in order to reduce suspension of sediments if appropriate.

- Utilizing environmental inspectors on the installation vessels to monitor compliance with Lake-related regulatory requirements.

- Siting the cable route in conjunction with the Lake Champlain Maritime Museum ("LCMM") to avoid archaeological resources wherever possible, and committing to LCMM best management practices.

Overland

- Streams - Minimizing buried crossings of streams, and avoiding any permanent stream channel or riparian habitat impacts. Utilizing HDD in over 20 locations, spanning almost 5 miles, to avoid any impacts to significant waterbodies such as Otter Creek, Cold River, Castleton River, and Lake Bomoseen.

- Tree clearing - Reducing and minimizing tree clearing within the ROW during project design.

- Routing the project away from or under RTE species and potential significant natural communities to the extent practical to avoid undue adverse impacts. Any tree removal in potentially significant communities will be limited to areas immediately adjacent to the ROW and promptly restored and re-vegetated to preconstruction conditions to the extent practical.

- Identifying potential Indiana Bat roosting trees and designing the route to avoid them.

- A long-term Vegetative Management Plan will be implemented to address the introduction of invasive species and mitigate impacts to RTE plants.

- Due to the project design and the nature of trench construction permanent fill to wetlands will be avoided.

- TDI-NE has, and will, continue to coordinate with VTrans and VTANR to ensure that crossing culverted streams will not interfere with potential future culvert replacement or stream enhancements. In addition, certain Town and/or State culverts could be replaced and hydrology would be improved during project construction.

- Riparian buffers have been identified in accordance with ANR Buffer Guidelines, and ground contours will be restored following construction to avoid any permanent alterations to waterways, flood elevations, or the ability of land to hold water.

- In certain areas the cable is proposed in roadside stormwater ditches. These ditches will likely be improved as part of construction.

Public Health and Safety Mitigation Measures

- The project will use solid-state High Voltage Direct Current (HVDC) cables that eliminate the potential for leaks, and which contain protective layers designed to provide superior mechanical and corrosion protection thereby reducing the need for repairs over the lifetime of the project. HVDC cable technology has a proven track record of safety and reliability.

- DC technology, by its nature, significantly reduces electric and magnetic fields in comparison to AC.

By burying the DC line the magnetic impacts are reduced further.

- The line will generally be installed in roadway cleared or safety zones to provide a buffer from traffic. Traffic controls will be implemented per Town, State, and Federal standards.

- Limitations will be placed on construction hours and seasonal restrictions on work along certain ROWs will be imposed.

- The HVDC technology immediately terminates the flow of electricity in the event the cable is compromised. Warning tape and protective material will be placed over the cables in the trench to reduce the chance for the cable to be compromised.

- If blasting is required, pre and post blast surveys will be offered to residents in the vicinity of the blast area.

- Fiber communication may be made available to VTrans for their broadband program.

- The project route within the lake will avoid public water supplies, and owner/operators of public water supplies will be notified at least three weeks prior to cable installation.

- Owners and operators of infrastructure that will be crossed by the project, including existing electric, gas, telecommunications, water and waste water facilities, will be consulted prior to installation. This infrastructure will be protected by the use of mats.

- Risk of snagging from anchors is minimized due to the burial and concrete protection of the line.

- Communications and response plans will be developed and adopted, including an Aquatic Safety and Communications Plan for coordination with US Coast Guard and maritime users and an Emergency Repair and Response Plan to facilitate an efficient response in the event of an unanticipated breakage of the line.

- The overland and in water cables will be regularly inspected to confirm system integrity.

- Commercial operators in the lake have been briefed on the Project and installation will be coordinated with them, so as to not adversely impact their businesses.

- The Converter Station will be fenced and locked to control access.

- Installation, operation, and maintenance of the project will not require significant use of municipal water or wastewater facilities.

- The project route within the lake will avoid private water supplies.

- The Town of Ludlow who is expected to host the Converter Station, has indicated that the project will not impact their municipal services.

This Page Intentionally Left Blank

APPENDIX H ESA SECTION 7 DOCUMENTATION

This Page Intentionally Left Blank

Department of Energy
Washington, DC 20585

January 12, 2015

Tom Chapman
US Fish and Wildlife Service
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087

Dear Mr. Chapman,

This letter is to initiate informal consultation under Section 7(a)(2) of the Endangered Species Act (ESA) for the proposed New England Clean Power Link Transmission Line Project (NECPL Project).

TDI New England (TDI-NE) applied to the U.S. Department of Energy (DOE) for a Presidential permit to construct, operate, maintain, and connect an electric transmission line across the United States border with Canada. TDI-NE filed its Presidential permit application on May 20, 2014.

In response to the Presidential permit application, on August 26, 2014, the DOE published the Notice of Intent to Prepare an Environmental Impact Statement and to Conduct Public Scoping Meetings, and Notice of Floodplains and Wetlands Involvement (the NOI) in the Federal Register. In the NOI DOE announced its intention to prepare an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act of 1969 (NEPA) to assess the potential environmental impacts of issuing a Presidential permit, the federal action, to TDI-NE to construct, operate, maintain, and connect a new electric transmission line across the U.S.-Canada border in northern Vermont (VT).

A detailed description of the proposed transmission line is located on the EIS website at http://necplinkeis.com

The following is a list of threatened and endangered species under the USFWS jurisdiction, which are potentially located in the project area:

- Indiana bat (*Myotis sodalis*)
- Bald eagle (*Haliaeetus leucocephalu*s) – delisted but remains under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668C)
- Northern long-eared bat (*Myotis septentrionalis*) – Candidate for listing

We ask that you review and approve the above list of potentially affected species, or provide a list of additional species that might be affected and any concerns relative to impacts of the Proposed Action on federally listed species.

Please feel free to contact me directly at any time at Brian.Mills@hq.DOE.gov, by phone at (202) 586-8267, or by fax at (202) 586-8008. We look forward to working with your office on this project.

Sincerely,

Brian Mills
NEPA Document Manager
Office of National Electricity Delivery, OE-20
Office of Electricity Delivery and Energy Reliability

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

REF: Initiation of informal section 7 consultation-
Northern Pass Transmission Line Project, New Hampshire

June 12, 2015

Mr. Brian Mills
U.S. Department of Energy
Office of Electricity Delivery and Energy Reliability
1000 Independence Avenue, SW
Washington, DC 20585-0800

Dear Mr. Mills:

This letter responds to your request, dated December 9, 2014, for review of a list of federally threatened and endangered species, and notification of other concerns relative to the proposed action that the U.S. Fish and Wildlife Service (Service) may have in relation to the Northern Pass Transmission Line Project (Project) proposed to be constructed through northern and central New Hampshire. The proposed Project will transmit electrical power from Hydro-Quebec to the New England Electrical System.

Northern Pass Transmission LLC (Northern Pass) has applied to the Department of Energy (DOE) for a Presidential permit to construct, operate, maintain, and connect an electric transmission line across the U.S. border with Canada in New Hampshire. In order to assess the potential environmental impacts from this proposed Federal action, DOE is preparing an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA) of 1969. Our comments are provided pursuant to the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531, *et seq.*), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (FWCA) (16 U.S.C. 662, *et seq.*). These comments are being provided to assist DOE in assessing the potential impacts of issuing a Presidential permit and the Federal action.

On March 10, 2010, this office provided information to Ed Bowers of Burns and McDonnell on the presence of resources or property under the jurisdiction of the Service within a project study area that included portions of Coos, Grafton, Belknap, Merrimack, Rockingham, and Strafford Counties. On August 24, 2011, the Service provided an updated response to Mrs. Lee Carbonneau of Normandeau Associates, Inc., based upon a review of spatial data depicting preferred and alternative transmission line routes. On July 1, 2013, Northern Pass filed an amended application with DOE which reflected several changes, including a modified northern section for the proposed project route. Your most recent request to the Service asks for our

review of the amended proposed transmission line and alternatives being analyzed in the EIS as described in the Northern Pass Scoping Report,[1] Alternatives Addendum, dated May 2014.

Proposed Action

According to the information provided in the aforementioned Scoping Report, the Proposed Action is the construction of a single circuit 300 kilovolt (kV) High Voltage Direct Current (HVDC) transmission line running approximately 153 miles from the U.S. border crossing with Canada near the Town of Clarksville, New Hampshire, south to a new converter station located in Franklin, New Hampshire, where the HVDC power will be transformed to Alternating Current (AC). From Franklin, New Hampshire, a 345-kV overhead transmission line is proposed that will convey power along a 34-mile segment to the existing Deerfield Substation located in Deerfield, New Hampshire. The total length of the proposed Project would be approximately 187 miles. Several alternatives are being evaluated in the EIS, including variations in the route of the transmission line and the possible burial of certain segments.

Federally Listed Endangered and Threatened Species

Federal agencies have an obligation under section 7 (a) 2 of the ESA to consult with the Service on any action they fund, permit or carry out, to ensure that the action does not jeopardize the continued existence of listed threatened and endangered species. There are five federally listed species known to occur in the vicinity of the Project. Those species include the federally threatened Canada lynx (*Lynx canadensis*), the federally endangered Karner blue butterfly (*Lycaeides melissa samuelis*), the federally threatened northern long-eared bat (*Myotis septentrionalis*), the federally threatened small whorled pogonia (*Isotria medeoloides*), and the federally endangered dwarf wedgemussel (*Alasmidonta heterodon*). No other federally listed or proposed, threatened or endangered species or critical habitats under the jurisdiction of the Service are known to occur in the Project area.

Indiana bat

In your request for review, you listed the Indiana bat (*Myotis sodalis*) as potentially located in the Project area. We are not aware of any confirmed specimens documenting the current or historical presence of the species within New Hampshire. The closest known documented occurrence of the species is from the Lake Champlain region of Vermont, at a location exceeding 40 miles distance to the west. Consequently, we do not consider the Indiana bat to be potentially present. We recognize that acoustic surveys conducted by Ecology and Environment, DOE's consultant for the Project, resulted in the identification acoustic signatures indicative of *Myotis sodalis.* However, considering the close resemblance and potentially indistinguishable acoustic signatures of *Myotis sodalis*, *M. septentrionalis* and *M. lucifugus* (the little brown bat), with the latter two species known to be present in New Hampshire, it is highly probable that the Indiana bat calls were misidentified. This interpretation is supported by the observation that all acoustic software analysis programs are known to provide some false identifications of the presence of *Myotis sodalis.*[2] Given the known misidentification of *Myotis sodalis* resulting from acoustic

1 Available at http://media.northernpasseis.us/media/The%20Northern%20Pass%20EIS%20Scoping%20Report%20Alternatives% 20Addendum_05_01_2014_final.pdf, accessed May 28, 2015.

2 From M. Ford, unpublished report, dated September 15, 2014. Available at http://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/USGSTestReport1_201409015.pdf, accessed June 8, 2015.

analysis software and the lack of a physical specimen corroborating the presence of the Indiana bat within the State, we conclude that the Indiana bat is not present.

Canada lynx

As indicated above, the Canada lynx (lynx) is known to occur in northern New Hampshire. Intensive surveys have been conducted from the White Mountain region of New Hampshire north to the international border. These surveys reveal that in the extreme northern portion of the State (north of the Village of Pittsburg), lynx are regularly detected and we conclude that they are resident in the area. From the Village of Pittsburg south through the White Mountain region, including the portions of the proposed Project area, lynx are detected only infrequently and at scattered locations, which suggests that the observations are of transient individuals that are wandering through the area. Consequently, we conclude that the lynx is transient throughout the area evaluated for this Project. We are not aware of potential activities on existing cleared rights-of-way (ROWs) that may result in direct adverse effects to lynx.

Expansion of existing ROW and new ROW alignments require further analysis because habitat used by lynx may be altered. To assess these impacts, a description of the vegetation in areas where new alignment will be constructed is needed so that we can assess potential impacts to lynx and their habitat. Specifically, we are interested in identifying potential denning habitats that may be present in landscapes containing other lynx habitat types, such as young coniferous forests that are occupied by snowshoe hares (*Lepus americanus*), the primary prey species for the lynx throughout its range.

While direct impacts to lynx resulting from activities on existing ROWs are not expected, indirect impacts are anticipated because maintenance activities may influence snowshoe hare abundance. To ensure that impacts to lynx are minimized, we recommend further coordination with this office regarding the development and implementation of vegetation maintenance practices that maintain suitable shrub and young coniferous cover for snowshoe hare.

Karner blue butterfly

The Karner blue butterfly is known to occupy an existing ROW in Concord, New Hampshire that is proposed to be traversed by the Project. The Karner blue butterfly relies upon wild lupine (*Lupinus perennis*) as its only larval host plant. Because of this, adults deposit their eggs on and in close proximity to lupine where, upon hatching, the larvae are provided access to lupine. The larvae consume this lupine and eventually pupate, usually in close proximity to the host plant. Since lupine is present in the existing ROW, Karner blue butterflies will be present within the Project throughout the year.

In addition to the use of wild lupine for mating, adult Karner blue butterflies generally require tall grass for late afternoon basking and overnight roosting, some shading vegetation to prevent overheating, a source of water, and nectar sources for the adults. A variety of understory plants serve as nectar sources for the adults. Consequently, impacts to habitats within the vicinity of occupied lupine patches may affect the Karner blue butterfly by impacting their ability to feed, breed, and shelter.

ROW construction and maintenance activities can result in adverse effects to the Karner blue butterfly and its habitat. Therefore, further coordination with this office is required, in the event that this portion of the ROW is selected as the preferred alternative. It may be possible to develop conservation measures that avoid or reduce adverse effects to the Karner blue butterfly, while allowing construction in, and maintenance of the ROW. Incorporation of these measures into the Project is advisable, and we are available to assist you in the development of these measures.

Northern long-eared bat

Formerly, the northern long-eared bat was common throughout New Hampshire. However, following the detection of white-nose syndrome (a fungal infection resulting in high mortality of bats) in hibernating bats during the winter of 2008-2009, the abundance of northern long-eared bats in New Hampshire has declined dramatically. Several hibernacula are known to occur in close proximity to the Project and include: (1) a mine in the Town of Woodstock, located approximately 1.0 mile west; (2) a mine in the Town of Campton, located approximately 0.30 mile to the east; and (3) a mine in the Town of Bristol, located approximately 2.8 miles to the west. We are aware of no known occupied roost trees within the Project area.

The Service developed an interim rule specific to the northern long-eared bat under section 4(d) of the ESA.[3] Under this interim rule, incidental take is not prohibited when it is associated with the maintenance and minimal expansion of existing ROWs and transmission corridors, when carried out in accordance with the conservation measures provided in the 4(d) rule. Based on our current understanding of the Project, compliance with the conservation measures may not be possible. For example, we are aware that expansion of the ROW may exceed the 100-foot threshold specified in the interim rule.

To complete the effects determination for the northern long-eared bat, we recommend comprehensive surveys be performed that will allow us to determine the current distribution of the species along the Project route. Surveys should be performed in accordance with current Indiana bat summer survey guidelines.[4] This occurrence information would allow us to assess the Project for take, as defined in section 3(19) of the ESA and 50 CFR §17.3, which could occur by killing or injuring bats during the summer active season, when trees are used for daytime roosting and rearing of pups. Additionally, we have identified the potential for take to occur as a consequence of significant habitat modification or degradation occurring through vegetation management that may significantly impair essential behavioral patterns, such as breeding, feeding or sheltering.

Also, please note that this interim rule under section 4(d) of the ESA does not remove, or alter in any way, the consultation requirements under section 7 of the ESA.

---

3 80 FR 17974, April 2, 2015. Available at http://www.gpo.gov/fdsys/pkg/FR-2015-04-02/pdf/2015-07069.pdf, accessed May 29, 2015.

4 Available at http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html, accessed May 29, 2015).

Dwarf wedgemussel

The dwarf wedgemussel is known to occur within several segments of the Connecticut River that are in close proximity to several of the Project alternatives, including within the segment extending from the vicinity of the Village of Groveton downstream to the upper reaches of Moore Reservoir and in the reach extending from the vicinity of the Village of Woodville downstream through the Town of Haverhill. Since Alternatives 2.4a, 2.4b, 2.6a, 2.6b, and 2.7 involve the placement of underground transmission lines in or adjacent to existing road or railroad ROWs in close proximity to occupied segments of the Connecticut River, further evaluation of these alternatives is needed to determine if dwarf wedgemussels are within the action area impacted by the Project.[5]

Small whorled pogonia

Although there are no records of the small whorled pogonia within the Project area, the species is known to occur in several towns located along the proposed and alternative ROWs. Consequently, we recommend surveys be completed by a qualified botanist to determine the status of the small whorled pogonia along those portions of the Project located within the Towns of Holderness, Ashland, New Hampton, Bridgewater, Concord, Pembroke, Allenstown and Deerfield.

This orchid occurs both in fairly young forests and in maturing stands of mixed-deciduous or mixed-deciduous/coniferous forests. In New Hampshire, many sites that support the small whorled pogonia have "older" canopy trees estimated to be about 75 years of age. The majority of sites share several common characteristics. These include sparse-to-moderate ground cover (except when among ferns), a relatively open understory, and proximity to long persisting breaks in the forest canopy, such as logging roads and streams. For example, the small whorled pogonia has been found growing in and adjacent to recently abandoned, above-ground telephone transmission lines.

The highly-acidic, nutrient-poor soil in which this orchid grows is usually covered with leaf litter. The substrate tends to be variable in texture and ranges from extremely stony glacial till, to stone-free sandy loams, to sterile duff.

Species of Special Interest

Bicknell's thrush

Although not currently listed as a threatened or endangered species, the Bicknell's thrush (*Catharus bicknelli*) may also occur in the vicinity of the Project area. The Service is in receipt of a petition, dated August 24, 2010, to list the Bicknell's thrush as a threatened or endangered species and designate critical habitat. On August 15, 2012, the Service published a determination that there exists substantial information indicating that the petitioned listing may be warranted. On March 19, 2013, the Center for Biological Diversity filed a Notice of Intent to Sue under the ESA, alleging the Service's failure to issue a required finding on the Bicknell's thrush in accordance with the timeframes identified in section 4 of the ESA. Through a court-

5 Action area is defined at 50 CFR§402.02 as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."

approved settlement agreement, the Service committed to publishing a final listing determination for the Bicknell's thrush by September 2017. Consequently, although the Service has yet to make a final listing determination for the species, we recommend the Project be evaluated for impacts to the Bicknell's thrush so that impacts can be addressed and the potential for future Project delays can be minimized or avoided.

The Bicknell's thrush is a rare, range-restricted songbird that breeds in the northeastern U.S. and southeastern Canada, and winters in the Greater Antilles. In the New Hampshire portion of the species range, the Bicknell's thrush breeding activities occur exclusively within high elevation forests dominated by balsam fir (*Abies balsamea*). The degree to which ROW construction and maintenance activities impact Bicknell's thrush habitat is not clear. However, coordination with the Service, the New Hampshire Department of Fish and Game, and New Hampshire Audubon may provide insights that may allow you to avoid adversely affecting the Bicknell's thrush or its habitat.

Migratory Bird Treaty Act

The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. Neither the MBTA nor its implementing regulations at 50 CFR Part 21 provide for permitting of "incidental take" of migratory birds. While take of migratory birds does not include habitat destruction or alteration, direct taking of birds, nests, eggs, or parts thereof is likely to occur if clearing or other ground disturbance occurs within migratory bird nesting habitat during the nesting season, when eggs or young are likely to be present. Vegetation removal activities should not occur during these periods.

A Memorandum of Understanding (MOU) between DOE and the Service regarding Implementation of Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," was signed in 2006. Section F(e) of the MOU obligates DOE to ensure that migratory bird protection and conservation is considered in NEPA project reviews.

Overhead utility lines may cause mortality to birds through electrocution or collision. Any new lines should be installed according to the Avian Power Line Interaction Committee (http://www.aplic.org/) (accessed June 2015) standards.

This Project occurs within the Atlantic Northern Forest Bird Conservation Region (BCR) 14. BCRs are ecologically based units for planning, implementing, and evaluating cooperative bird conservation efforts across North America. Activities associated with this Project, particularly the creation of new and the expansion of existing ROWs, may result in direct and secondary impacts to forest-interior breeding birds and their natural habitats. There will be an increase in disturbance of birds from habitat fragmentation, increased populations of some predators due to edge effect, and possibly an increase in the spread of invasive species. These are important issues to consider when developing avoidance, minimization and mitigation measures.

Bald and Golden Eagle Protection Act

The bald eagle (*Haliaeetus leucocephalus*) is known to frequent several lakes and rivers located throughout the Project area, including the Connecticut, Pemigewasset and Merrimack Rivers. Although delisted from the ESA on August 8, 2007, protection of the bald eagle continues under the MBTA and the Bald and Golden Eagle Protection Act (BGEPA). To facilitate compliance with these laws, the Service developed and distributed the "National Bald Eagle Management Guidelines" that provide recommendations for avoiding deleterious impacts to these birds (http://www.fws.gov/northeast/ecologicalservices/pdf/NationalBaldEagleManagementGuidelines.pdf) (accessed June 2015). Several measures that are specific to transmission lines were included among the recommendations in these guidelines, including avoidance of important eagle use areas, such as nesting, foraging and wintering habitats. In instances where avoidance may not be possible, implementation of best management practices to prevent collision or electrocution of eagles is recommended. To address these issues, we advise that you contact the New Hampshire Department of Fish and Game and New Hampshire Audubon to identify important eagle use areas and, where appropriate, eagle protective measures should be implemented. If best management practices to prevent collision or electrocution in important eagle use areas cannot be implemented, we recommend that you coordinate with the Service's Regional Bald and Golden Eagle Coordinator at (413) 253-8592 to determine if an eagle conservation plan and a permit under BGEPA is needed.

U.S. Fish and Wildlife Service Properties

According to the spatial data you provided, the Preliminary Preferred Route for this Project includes the use of an existing transmission line ROW through a portion of the Pondicherry Division of the Silvio O. Conte National Wildlife Refuge, located in Whitefield, New Hampshire. As such, construction and future management of this portion of the line should be closely coordinated with Mr. Andrew French, Project Leader of the Silvio O. Conte National Fish and Wildlife Refuge, at (413) 548-8002.

Thank you for your coordination. Please contact either Anthony Tur or Maria Tur of this office at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

cc: EPA – Tim Timmerman
EPA – Mark Kern
NHFGD
USFWS – Andrew French
ACOE – David Keddell
Normandeau – Carbonneau
SE Group – Travis Beck
P.O. Box 2729
323 West Main St., Suite 201
Frisco, CO 80443
Daniel Belin, AICP
Ecology and Environment, Inc.
368 Pleasantview Drive
Lancaster, NY 14086
Reading file
ES: ATur/MTur:6-12-15:603-223-2541

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

REF: New England Clean Power Link Transmission Line
Alburgh to Ludlow, VT

July 13, 2015

Mr. Brian Mills
Office of Electricity Delivery and Energy Reliability
OE-20
U.S. Department of Energy
1000 Independence Avenue Southwest
Washington, DC 20585

Dear Mr. Mills:

This responds to your correspondence, dated January 12, 2015, requesting information on the presence of federally listed and/or proposed endangered or threatened species, as well as other ecological resources, in relation to the New England Clean Power Link Project (Project). The proposed Project involves the installation of a 1,000-megawatt high-voltage direct current electric power transmission system. The transmission line would run through Vermont, originating in Alburgh, and continuing under the waters of Lake Champlain to Benson. The transmission line would then continue overland to Ludlow, where a proposed converter station would be built.

Pursuant to section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1533), Federal agencies, including the U. S. Department of Energy (DOE), have a responsibility to consult with the U. S. Fish and Wildlife Service (Service) when projects they fund, authorize, or carry out result in effects to federally listed or proposed species. Our comments are provided in accordance with section 7 of the ESA, as well as the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755) and the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d).

Endangered Species Comments

You identified the federally endangered Indiana bat (*Myotis sodalis*) and the threatened northern long-eared bat (*Myotis septentrionalis*) (NLEB) as occurring within the Project area. No other federally listed or proposed species or critical habitat occurs within the Project area.

Indiana Bat

The Indiana bat is known to occur where terrestrial portions of the Project are proposed to be located in the towns of Benson, West Haven and Fair Haven. The Indiana bat is a migratory bat that hibernates colonially in caves and mines in the winter. In the spring, reproductive females migrate and form maternity colonies where they bear and raise their young in wooded areas. Males and non-reproductive females typically do not roost in colonies and may stay close to their hibernaculum or migrate to summer habitat. Summer roosts are typically behind exfoliating bark of large, live or dead trees that are ≥5 inches dbh. Primary roosts usually receive direct sunlight for more than half the day. Roost trees are typically within canopy gaps in a forest, in a fence line, or along a wooded edge. Habitats in which maternity roosts occur include riparian zones, bottomland and floodplain habitats, wooded wetlands, and upland communities.

Based on recommendations from Susi von Oettingen of this office and Scott Darling of the Vermont Fish and Wildlife Department, you conducted a habitat assessment for Indiana bat in August and September of 2014. The habitat assessment documented 116 potential roost trees within the study area. In order to avoid adverse effects to the Indiana bat, you have proposed to avoid cutting these potential roost trees during construction and operation of the Project. If removal of a potential roost tree is necessary, you have proposed to conduct visual and/or acoustic bat exit surveys of such trees. If bats emerge, those trees should not be cut, and further consultation with this office may be necessary.

Northern Long-Eared Bat

Formerly, the NLEB bat was common throughout Vermont. However, following the detection of white-nose syndrome (a fungal infection resulting in high mortality of bats) in hibernating bats during the winter of 2008-2009, the abundance of NLEBs in Vermont has declined dramatically.

The Service developed an interim rule specific to the NLEB under section 4(d) of the ESA.[1] Under this interim rule, incidental take is not prohibited when it is associated with the maintenance and minimal expansion of transportation and utility rights-of-way, when carried out in accordance with the conservation measures provided in the 4(d) rule. Based on our understanding of the Project, the activities associated with this Project would not be considered maintenance and minimal expansion of transportation and utility rights-of-way. For example, construction of the new converter station would result in the clearing of approximately 10 acres of forest.

In order to avoid the killing or injuring of bats during the summer active season, when trees are used for daytime roosting and rearing of pups, tree clearing (≥3 inches dbh) should not occur during the period of April 15 to August 31. If you cannot adhere to this time-of-year restriction, we recommend that comprehensive surveys be performed that will allow us to determine the current distribution of the species along the Project route. Surveys should be performed in

1 80 FR 17974, April 2, 2015. Available at http://www.gpo.gov/fdsys/pkg/FR-2015-04-02/pdf/2015-07069.pdf, accessed May 29, 2015.

accordance with current Indiana bat summer survey guidelines.[2] This occurrence information would allow us to assess the Project for take, as defined in section 3(19) of the ESA and 50 CFR §17.3, which could occur by killing or injuring bats during the summer active season, when trees are used for daytime roosting and rearing of pups.

Also, please note that this interim rule under section 4(d) of the ESA does not remove, or alter in any way, the consultation requirements under section 7 of the ESA.

Migratory Bird Treaty Act

The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. Neither the MBTA nor its implementing regulations at 50 CFR Part 21 provide for permitting of "incidental take" of migratory birds. While take of migratory birds does not include habitat destruction or alteration, direct taking of birds, nests, eggs, or parts thereof is likely to occur if clearing or other ground disturbance occurs within migratory bird nesting habitat during the nesting season, when eggs or young are likely to be present. Vegetation removal activities should not occur during these periods.

This Project occurs within the Lower Great Lakes/St. Lawrence Plain Bird Conservation Region (BCR) 13. BCRs are ecologically based units for planning, implementing, and evaluating cooperative bird conservation efforts across North America. Activities associated with this Project, particularly within the forested area where the converter station is proposed to be built, may result in direct and secondary impacts to forest-interior breeding birds and their natural habitats. In this area, there may be an increase in disturbance of birds due to habitat fragmentation, increased populations of some predators due to edge effect, and possibly an increase in the spread of invasive species. These are important issues that we encourage you to consider when developing avoidance, minimization and mitigation measures.

A Memorandum of Understanding (MOU) between DOE and the Service regarding Implementation of Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," was signed in 2006. Section F of the MOU lists DOE's obligations under the MOU, which include identifying and evaluating the effects of proposed projects on migratory birds and minimizing adverse impacts on migratory birds by evaluating all reasonable alternatives. We are available to provide assistance regarding avoidance, minimization and mitigation measures.

Bald and Golden Eagle Protection Act

Although protection of the bald eagle (*Haliaeetus leucocephalus*) pursuant to the ESA was removed in 2007 when the species was delisted, the species remains federally protected under the MBTA and the BGEPA. The BGEPA prohibits unpermitted take of bald eagles, with "take" defined as to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest

2 Available at http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html, accessed May 29, 2015).

or disturb" (16 U.S.C. 668c; 50 CFR 22.3. The regulations (50 CFR 22.3) also define "disturb" as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause: (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." If eagle nests are currently found in the vicinity of the Project, or if activities are proposed that may disturb bald eagles, (i.e., blasting within 0.5 mile of a known nest), a BGEPA permit may be required.

To ensure compliance with the BGEPA, we recommend that you contact the Vermont Fish and Wildlife Department annually to obtain updated information on bald eagles within your Project area. Upon receipt of this occurrence information, we recommend that you review the Service's National Bald Eagle Management Guidelines (http://www.fws.gov/northeast/ecologicalservices/pdf/NationalBaldEagleManagementGuidelines.pdf) (accessed April 2015). This information may allow you to plan the Project in a way that minimizes disturbance to bald eagles.

Thank you for your cooperation, and please contact Maria Tur of this office at 603-223-2541 for further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

cc: Mike Adams – Corps of Engineers
Scott Darling – Vermont Fish and Wildlife
Reading file
ES: MTur:7-13-15:603-223-2541

This Page Intentionally Left Blank

Indiana Bat Conditions from TDI-NE / VT ANR Stipulation
Signed: July 17, 2015

1. TDI-NE shall flag the 116 previously-identified potential Indiana Bat roost trees within the Towns of Benson, West Haven and Fair Haven prior to construction. These flags will indicate that these trees are not to be cut by TDI-NE or its contractors.

2. As part of environmental training during construction orientation, TDI-NE shall advise construction workers of the flag color for the previously identified potential Indiana Bat roosting trees and that such trees may not be cut by TDI-NE or its contractors.

3. If Project changes are proposed that would impact potential Indiana Bat roost trees, then TDINE shall conduct bat exit surveys of the impacted trees prior to construction within 100 feet of such trees, utilizing the following exit survey protocol:

a. The surveys shall be performed during the months of June and July in order to determine the presence of, or likely absence of use by, roosting Indiana bats.

b. For each potential roost tree proposed to be impacted, there shall be five detector nights of acoustic surveys aimed at the tree.

c. A minimum of one acoustic detector shall be placed so that the detection cone covers the bole of the tree from 10 feet high to canopy height. Typically this requires placing the detector 50-60 feet from the base of the tree with the microphone pointed at the proper angle.

d. At least four of the detector nights must consist of temperatures above 50 degrees Fahrenheit, winds less than 9 mph, and no sustained rainfall.

e. Acoustic survey results must be presented upon completion of each tree surveyed to the Vermont Fish and Wildlife Department for consultation prior to cutting any trees. As guidance, any potential roost trees meeting the following conditions for all of the acoustic survey nights will be determined to not have bats present:

i. No bat calls recorded; or
ii. No *Myotis* bat calls recorded during the dusk period (up to 2 hours after sunset) and dawn period (after 2 hours before sunrise).

f. The presence of roosting bats will be presumed for every tree for which *Myotis* bat calls have been recorded during the dusk or dawn periods. In order to overcome this presumption, TDI-NE shall perform emergence surveys consisting of three continuous nights of emergence surveys to establish the absence of roosting bats. The emergence surveys shall be conducted in accordance with the following:

i. The specific methodology for conducting emergence surveys is provided in the US Fish & Wildlife Service ("USFWS") 2015 Range-wide Indiana Bat Summer Survey Guidelines, Appendix E Phase 4 Emergence Surveys – Emergence Surveys for Potential Roost Trees.
ii. The emergence surveys shall be conducted by at least one person, and shall begin

at least one-half hour before sunset and not end earlier than one hour after sunset.
iii. Data shall be recorded on the USFWS Bat Emergence Survey Datasheet provided in the Appendix.

g. All survey work and acoustic data analysis shall be conducted by individuals trained in bat monitoring and acoustic identification, who shall be pre-approved by DFW. TDINE shall provide DFW with the identity of the proposed surveyors, and their qualifications, at least thirty days in advance of when approval is sought. Approval of qualified surveyors for which documentation of qualifications has been provided will not be unreasonably withheld.

4. Any potential roost tree for which the surveys indicate no bat use may be removed by TDI-NE at any time of year, provided such tree is less than 16 inches diameter at breast height. For any tree which is greater than 16 inches diameter at breast height and for which surveys indicate no bat use, TDI-NE may cut the tree within 10 days of the last emergence count or acoustic survey night, or during the winter period of October 1 to March 31.

5. No cutting of roost trees containing Indiana Bats shall occur unless DFW reviews the exit survey data and determines that the tree can be cut from October 1 to March 31

APPENDIX I NHPA SECTION 106 DOCUMENTATION

This Page Intentionally Left Blank

Department of Energy
Washington, DC 20585

February 6, 2015

Ms. Laura Trieschmann
State Historic Preservation Officer
Vermont Division of Historic Preservation
1 National Life Drive
Davis Building, 6th Floor
Montpelier, VT 05620-0501

SUBJECT: Initiation Request for Section 106 Consultation under the National Historic Preservation Act (NHPA) for the proposed *New England Clean Power Link* (DOE/EIS-0503)

Dear Ms. Trieschmann:

The U.S. Department of Energy (DOE or the Department) is in the process of preparing its draft Environmental Impact Statement (EIS) for the proposed New England Clean Power Link (NECPL) project in the state of Vermont. DOE is preparing its draft EIS pursuant to its obligations under the National Environmental Policy Act (NEPA) to evaluate environmental impacts of providing a Presidential permit to TDI-New England (TDI-NE) for the construction, operation, maintenance, and connection of the portion of the transmission line within the United States. The proposed DOE federal action is the potential grant of a Presidential permit for the international border crossing requested by TDI-NE as part of its proposal. This action has been determined by DOE to be an undertaking that has potential to cause adverse effects on historic properties per the Advisory Council on Historic Preservation's (ACHP's) NHPA implementing regulations at 36 CFR §800.3(a).

The Department is coordinating its compliance with Section 106 of the NHPA with its review under NEPA according to the process set out in 36 CFR §800.3(b). Per standing policy, DOE will explicitly solicit information from the public (via the NEPA process) regarding cultural and historic resources through its Notice of Availability of its draft EIS when published in the *Federal Register*. DOE will also make cultural resources reports and information publicly available, as appropriate, on the NECPL project EIS website at http://necplinkeis.com.

In this letter DOE provides you with a summary of the actions that the Department is taking to comply with Section 106 of the NHPA, including project background, efforts to identify historic properties potentially affected by the proposed NECPL project to date, a preliminary list of potentially affected historic properties listed or eligible for listing on the National Register of Historic Properties (NRHP), and a list of potential Section 106 consulting parties for the proposed NECPL project. This letter also discusses DOE's initial proposal for direct Areas of Potential Effect to be used in the Department's proposed phased approach to identification and evaluation of historic resources under Section 106. Furthermore, DOE is

sending this letter as its official request for initiation of Section 106 consultation under NHPA with the Vermont State Historic Preservation Office (SHPO) located within the Vermont Division of Historic Preservation, and would appreciate your written reply within 30-days from the date of this letter or as soon as possible.

Background

On May 20, 2014, Champlain VT, LLC, d/b/a Transmission Developers Inc., New England (TDI-NE) applied to DOE for a Presidential permit [1] for a new approximately 154.1 mile-long, high voltage direct current (HVDC) electric transmission line that would cross the international border between the United States and the Canadian Province of Quebec, near the village of Alburgh, Vermont, and terminate at the existing Coolidge Substation in the towns of Ludlow and Cavendish, Vermont. The project would have an operating voltage of +/- 300 to 320 kilovolts (kV) with an expected power transfer rating of 1000 megawatts (MW). The transmission line would be a bipole line that consists of two solid (no fluids) dielectric, cross-linked polyethylene transmission cables, one positively charges and the other negatively charges.

The proposed NECPL project would be constructed in both aquatic (underwater) and terrestrial (underground) environments. From the Canadian border, the proposed transmission line would be located underground in Alburgh, Vermont, for approximately 0.5 miles and would enter Lake Champlain via a horizontal directional drill (HDD). The cables would then be buried in the bed of Lake Champlain to a target depth of 3-4 feet except at depths of greater than 150 feet where cables would be laid on the lake bottom. Installation of the cables in Lake Champlain would occur within the jurisdictional waters of Vermont for 97.6 miles. The cables would emerge from Lake Champlain in the town of Benson, Vermont and would be buried along town roads and state highway rights-of-way for approximately 55.7 miles until terminating at a proposed converter station in Ludlow, Vermont. The total direct current portion of the project is approximately 153.8 miles. From the converter station, the proposed NECPL project would involve underground installation of a single circuit 345-kV high voltage alternating current (HVAC) transmission system (i.e., two underground HVAC lines) which would run approximately 0.3 miles to the existing Coolidge Substation in Cavendish, Vermont owned by the Vermont Electric Power Company (VELCO) (*see enclosed NECPL Project Overview map)*.

DOE is the lead federal agency in the preparation of the subject EIS. The U.S. Army Corps of Engineers, New England District (USACE), U.S. Coast Guard (USCG), and the U.S. Environmental Protection Agency, Region 1, will be cooperating agencies to DOE in the preparation of this EIS. DOE is also the lead federal agency for purposes of compliance with Section 106, in accordance with 36 CFR § 800.2(a)(2), and will address the potential effects of the NEPA cooperating agencies' proposed actions on historic and archaeological resources.

DOE documented a Notice of Intent (NOI) to prepare an EIS in the *Federal Register* on August 26, 2014 (79 FR 50901), with an open public scoping period which ended on October 10, 2014 *(see enclosed NECPL NOI).* The NOI specifically indicated that cultural and

[1] In accordance with Executive Order (EO) 10485, as amended by EO 12038, and the regulations at 10 Code of Federal Regulations (CFR) 205.320 et seq. (2000), "Application for Presidential Permit Authorizing the Construction, Connection, Operation, and Maintenance of Facilities for Transmission of Electric Energy at International Boundaries."

historic resources are being analyzed as part of the federal environmental review. While the proposed federal action (and undertaking) is the potential grant of a Presidential permit by DOE for the international border crossing, the proposed construction, operation, maintenance, and connection of the portion of the transmission line within the United States is a connected action to DOE's proposed action under NEPA. DOE is therefore analyzing the potential environmental impacts from the proposed federal action and the connected action in the EIS. For the purposes of compliance with Section 106 of the NHPA, DOE is considering the potential for adverse effects to cultural and historic properties for the proposed border crossing and entire length of the proposed transmission line.

Consulting Parties

In accordance with 36 CFR §800.2, DOE has identified potential consulting parties, including ACHP, SHPO, THPOs, the Applicant, local government representatives, other Native American entities, local historical societies, heritage preservation commissions, state agencies, sites and museums, state-wide groups, national groups, and private individuals with a for the purposes of Section 106 consultation under NHPA. A list of consulting parties identified by DOE is enclosed with this letter for your review and input (*see enclosed Draft List of NECPL Section 106 Consulting Parties)*. DOE requests that you and your staff provide the Department with feedback regarding any other potential Section 106 consulting parties for the NECPL project that may not have yet been identified or that should be included in this list of potential consulting parties. Any assistance your office may provide in this matter at this time is greatly appreciated.

As proposed, the NECPL project does not directly involve tribal reservation lands or require a right-of-way grant or special use grant from tribes, however, the proposal is located in an area that was inhabited by numerous American Indians before Euro-American settlement. As a result the proposal has the potential to impact tribes with current or historic interest in the project area.

In accordance with its responsibilities under Section 106, NEPA, the American Indian Religious Freedom Act (16 U.S.C. 1996), the Archeological Resources Protection Act of 1979 (16 U.S.C. 470aa-mm), the Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001, et. seq.), Executive Order 13175 *Consultation and Coordination with Indian Tribal Governments*, (November 6, 2000), and DOE's "American Indian and Alaska Native Tribal Government Policy," as set forth in DOE Order 1230.2 (October 2000), DOE is initiating government-to-government consultation with the Tribal Historic Preservation Officer (THPO) for the Stockbridge-Munsee Community, Band of Mohican Indians. DOE understands that this Federally-recognized Tribe has an historic interest in resources of traditional or cultural importance in wetlands areas potentially affected by the proposed NECPL project, and will initiate its government-to-government consultation effort directly with this THPO and Tribe.

Identification Efforts to Date

The proposed undertaking has the potential to affect historic properties either listed in, or eligible for, inclusion in the National Register of Historic Places. An initial cultural resources survey (i.e., desktop literature review) was performed by TDI-NE as part of the NECPL project Presidential permit application to DOE. This survey considered a geographic area within which the Project may directly or indirectly cause alterations in the character or use of historic properties, and includes all areas along the proposed transmission line construction corridor where ground-disturbing activities would be conducted. It also included those areas outside the

proposed transmission corridor, including the Ludlow HVDC Converter Station site, laydown areas, access roads, and other locations that may be affected by the Project construction and operations.

An initial study of the NHRP listed or eligible properties by TDI-NE found the following list within proximity to the proposed NECPL project, a provided in Appendix D to TDI-NE's Presidential permit application:

Site Name	Distance from Proposed Project Route
Benson Village	0.25 miles
Cold River Bridge	0.25 miles
East Clarendon Railroad Station	50'
Laurel Glen Mausoleum--Laurel Hall	0.25 miles
Mountain View Stock Farm	50'
Smith, Simeon, House	0.25 miles

The NECPL Presidential permit application, including associated maps, drawings, and initial cultural resources study, can also be viewed or downloaded in its entirety from the DOE Office of Electricity Delivery and Energy Reliability (OE) program Web site at: http://energy.gov/oe/downloads/application-presidential-permit-oe-docket-no-pp-400-tdi-new-england-new-england-clean.

As a part of this effort, TDI-NE met with representatives from Vermont Historic Preservation Office to provide NECPL project briefings on December 9, 2013, and January 14, 2014. TDI-NE also met with your staff to discuss archaeological, cultural and historic resources specific to the Lake Champlain segment of the proposed NECPL project on February 13, 2014, which also included Lake Champlain Maritime Museum (LCMM) staff. Staff from your office also responded to requests by TDI-NE for periodic discussions about proposed Phase 1A assessment work plans for the proposed NECPL project during April 2014 – November 2014.

In addition to efforts by TDI-NE to identify historic resources potentially affected by the proposed NECPL project, DOE held two NEPA public scoping meetings in Burlington, Vermont, on September 16, 2014 and in Rutland, Vermont, on September 17, 2014, during a 45-day public scoping comment period. The meetings held in the towns of Burlington and Rutland, Vermont. DOE received two comments related to the overall consideration of potential effects to historic and archaeological resources and traditional cultural properties. No specific historic, archaeological or cultural resources were identified during the scoping period for the proposed NECPL project. DOE's *New England Clean Power Link Project Scoping Summary Report* (November 2014) is attached to this letter for your information and review.

Cultural Resource Studies

At this time, DOE understands that Vermont Office of Historic Preservation has been provided with the following cultural resource reports completed by TDI-NE for the proposed NECPL project:

- *Phase IA Archaeological Reconnaissance Survey, New England Clean Power Line Project – Overland Portion: Windsor, Rutland, and Grand Isle Counties in Vermont* (November 2014);
- *Historical Reconnaissance Survey, New England Clean Power Line Project – Overland Portion: Windsor, Rutland, and Grand Isle Counties in Vermont* (November 2014); and
- *Phase IA Archaeological Assessment in Support of the New England Clean Power Link Project- Lake Portion: Grans Isle County, Chittenden County, Addison County and Rutland County, Vermont* (November 2014).

DOE is also aware that NE-TDI filed for a Vermont Certificate of Public Good with the Vermont Public Service Board (PSB) on 12/8/2014, with information relevant to historic and archaeological sites in the "Environmental Considerations" section of that filing (per 30 VSA §248(b)(5)). At this time, DOE is not including hardcopies of the above mentioned three reports or historic and archaeological evidentiary information from the Vermont PSB filing with this Section 106 initiation request unless otherwise requested by your office. Please let DOE know as soon as possible if your office needs copies of these resources.

Scope of Future Identification Efforts under Section 106

In order to begin your consideration of DOE's scope of future identification and evaluation efforts, the Department typically defines an Area of Potential Effect (APE) for this type of undertaking that includes the geographic area or areas within which the Project may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE includes all areas along the transmission cable corridor where ground-disturbing activities will be conducted. The APE would also include areas outside the transmission cable corridor, including the converter station site, the HVAC cable alignment, transmission interconnection sites, laydown areas, access roads, and other locations that may be affected by Project construction and operations. Additionally, the APE would take into account standing historic properties (i.e., buildings, structures, individual objects, and districts) that may be indirectly affected by the use of heavy equipment, particularly along the overland sections of the Project's proposed route.

The width of the construction corridor varies based on installation techniques and environment. The excavation of the cable trench, installation of erosion and sediment control measures, installation of the cables, and stockpiling of excavated materials are expected to occur within a 50-foot-wide corridor, or 25 feet on either side of the Project's centerline. To accommodate additional areas beyond the footprint of the trench that may be necessary for laydown/staging areas, and to accommodate indirect effects of Project construction activities, the APE for this undertaking has been defined to include an area encompassing 25 feet on either side of the Project's centerline. DOE looks forward to future discussions with you and other consulting parties about the APE for the NECPL project, and understands that no final APE determinations may be made at this time.

Finally, the Department wants to take this opportunity to inform you early on of its intent to develop a PA pursuant to 36 CFR § 800.14(b) to resolve the proposed Project's potential effects on historic properties at this time. The PA would be developed in consultation with SHPO, THPO, Consulting Parties, the public, and other interested parties, as appropriate. The PA would

require TDI-NE to develop a Cultural Resources Management Plan (CRMP) for the proposed NECPL project in consultation with your office and the Consulting Parties prior to initiation of construction activities.

In close, DOE currently seeks your concurrence on initiating its Section 106 consultation process for the proposed New England Clean Power Link project. DOE also seeks any information or suggestions that your office may have with regard to potential consulting parties or tribes that are included in the attached consulting parties list, or if you have additional information that should considered at this time. Please provide your Section 106 initiation concurrence and any material information that you may have in writing so that it may be added to the administrative record to evidence DOE's compliance with Section 106 consultation responsibilities.

At this time, we also wish to clarify the name and contact information for the Department's representative for purposes of consultation pursuant to Section 106. In accordance with 36 CFR Part 800.2(a)(3), the DOE has authorized Kleinschmidt Group to prepare DOE's subject EIS, which will include an analysis of the proposed NECPL Project's potential for adverse effects on cultural resources, including historic properties as defined by Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800. Coordination of consultation activities under the Section 106 process will be completed by Ms. Kelly Schaeffer, Senior Regulatory Advisor at Kleinschmidt Group. Ms. Schaeffer can be contacted at (703) 753-9772 or by e-mail at Kelly.Schaeffer@KleinschmidtGroup.com. DOE remains legally responsible for findings and determinations and for the DOE's government-to-government relationships with Indian tribes.

DOE very much looks forward to working with you and your staff in the near future and appreciates your assistance in this effort. If you have any questions or comments regarding the proposed NECPL project, please contact me directly at any time at Brian.Mills@hq.doe.gov or (202) 586-8267.

Yours very truly,

Brian Mills
National Electricity Delivery Division (OE-20)
Office of Electricity Delivery and
Energy Reliability
U.S. Department of Energy

Enclosed:

- NECPL Project Overview Map
- DOE's NECPL Notice of Intent (NOI) (August 2014)
- Draft List NECPL Section 106 Consulting Parties
- NECPL Scoping Summary report (November 2014)

Cc: Charlene Dwin Vaughn, Advisory Council on Historic Preservation

Department of Energy
Washington, DC 20585

April 16, 2015

Ms. Laura Trieschmann
State Historic Preservation Officer
Vermont Division of Historic Preservation
1 National Life Drive
Davis Building, 6th Floor
Montpelier, VT 05620-0501

Subject: APE Determination

Dear Ms. Trieschmann:

As you are aware, the U.S. Department of Energy (DOE) is considering whether or not to grant a Presidential permit to Champlain VT, LLC, d/b/a Transmission Developers, Inc.-New England (TDI-NE) for its proposed transmission facility, the New England Clean Power Link (NECPL) Transmission Line Project crossing at the U.S.-Canada border in northern Vermont.

Our letter of February 6, 2015 for Initiation of Section 106 Consultation under the National Historic Preservation Act (NHPA) at 36 CFR Part 800 for the proposed NECPL project is attached.

This letter presents the DOE's proposed Area of Potential Effects (APE) for the proposed NECPL project.

The proposed direct APE includes the geographic area or areas within which the Project may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE includes all areas along the transmission cable corridor where ground-disturbing activities will be conducted. The APE will also include areas outside the transmission cable corridor, including the converter station site, the HVAC cable alignment, transmission interconnection sites, laydown areas, access roads, and other locations that may be affected by Project construction and operations. Additionally, the APE will take into account standing historic properties (i.e., buildings, structures, individual objects, and districts) that may be indirectly affected by the use of heavy equipment, particularly along the overland sections of the Project's proposed route.

The width of the construction corridor varies based on installation techniques and environment. The excavation of the cable trench, installation of erosion and sediment control measures, installation of the cables, and stockpiling of excavated materials are expected to occur within a

25-foot-wide corridor, or 12.5 feet on either side of the Project's centerline. To accommodate additional areas beyond the footprint of the trench that may be necessary for laydown/staging areas, and to accommodate indirect effects of Project construction activities, the APE for this undertaking has been defined to include an area encompassing 25 feet on either side of the Project's centerline. The APE may be further refined through additional engineering analyses.

The proposed indirect APE is defined as a one mile wide area surrounding the converter station site. This is the area within which indirect impacts and effects of project components on cultural resources and/or historic properties would be considered.

Presently, DOE requests your concurrence on the proposed direct and indirect APEs for this project as outlined above.

If you have any questions or concerns, you may contact me at Brian.Mills@hq.doe.gov or (202)586-8267. Please accept my thanks for your continued assistance with and participation in the Section 106 consultation process.

Sincerely,

Mr. Brian Mills
Office of Electricity Delivery and Energy Reliability
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Attachments:
February 06, 2015 Letter

Stockbridge-Munsee Tribal Historic Preservation

Main Office
W13447 Camp 14 Rd
Bowler, WI 54416

New York Office
P.O. Box 718
Troy, NY 12181

Mr. Brian Mills
National Environmental Policy Act (NEPA) Document Manager Office of Electricity Delivery and Energy Reliability, OE-20
U.S. Department of Energy Washington, DC 20585
Via email only

June 30, 2015

RE: New England Clean Power Link Project
Grand Isle, Chittenden, Addison, Rutland, and Windsor Counties, Vermont Comment from Stockbridge-Munsee Mohican Tribe on Draft EIS

Dear Mr. Mills:

By a CD received this month, we have received from Kleinschmidt Associates a copy of the Draft Environmental Impact Statement for the New England Clean Power Link Project. We have reviewed the materials per our cultural resource responsibilities for Section 106 of the National Historic Preservation Act.

On behalf of the Stockbridge-Munsee Community Band of Mohican Indians, I offer the following comments:

- We confirm that the project is within our cultural area of interest. Our tribe wishes to serve as a consulting party for areas that fall within Addison, Rutland, and Windsor Counties of Vermont.
- We note that there is a reference to a Phase 1A cultural resource study that was undertaken for three archeological sites that are underwater. If the sites are Native American, we ask to be furnished with a copy for review and comment.

Thank you & Kind regards,

B Hartley

Bonney Hartley
Tribal Historic Preservation Officer New York Office

Cc: Kelly Schaeffer, Kleinschmidt Group, *via email only*

(518) 326-8870 *Email: bonney.hartley@mohican-nsn.gov*

VERMONT

Vermont Division for Historic Preservation
Agency of Commerce and Community Development
One National Life Drive
[phone] 802-828-3211
Davis Building, 6th Floor
[fax] 802-828-3206
Montpelier, VT 05620
http://accd.vermont.gov/strong_communities/preservation/

August 11, 2015 Brian Mills
Office of Electricity Delivery and Energy Reliability (OE-20)
U.S. Department of Energy 1000 Independence Avenue
SW Washington, DC 20585

Re: VT SHPO Comments on the New England Clean Power Link (NECPL) Transmission Line Project Draft Environmental Impact Statement (DEIS), Grand Isle, Chittenden, Addison, Rutland, and Windsor Counties, Vermont. U.S. Department of Energy DOE/EIS-0503.

Dear Mr. Mills:

Thank you for the opportunity to comment on the above referenced project. The following comments will assist the U.S. Department of Energy (DOE) in their review responsibilities under Section 106 of the National Historic Preservation Act.

The Vermont Division for Historic Preservation (VDHP) is providing the DOE with the following comments pursuant to 36 CFR 800.4, regulations established by the Advisory Council on Historic Preservation to implement Section 106 of the National Historic Preservation Act (NHPA). Project review consists of identifying the project's potential impacts to historic buildings, structures, historic districts, historic landscapes and settings, and known or potential archeological resources.

The VDHP generally concurs with cultural resource summaries presented in the NECPL DEIS and subsequent actions referenced to comply with Section 106 of the NHPA. By way of this letter, the Vermont SHPO is also formally acknowledging initiation of Section 106 consultation on the NECPL project as indicated in the your letter of February 6, 2015, and continued during a consultation meeting held in Montpelier, Vermont on July 16, 2015 with you, Ms. Kelly Schaeffer from the Kleinschmidt Group, and VDHP staff.

As you know, the VDHP has been working closely with Champlain VT, LLC doing business as TDI-New England (TDI-NE) since December 2013 under Section 248, a state regulatory review process administered by the Vermont Public Service Board. The VDHP has reviewed and concurred with the following cultural resource reports: *Phase IA Archaeological Assessment in Support of the New England Clean Power Link Project-Lake Portion: Grand Isle County, Chittenden County, Addison County, and Rutland County (November 2014)* produced by the Lake Champlain Maritime Museum; *Phase IA Archaeological Resource Survey, New England Clean Power Link Project-Overland Portion: Windsor, Rutland, and Grand Isle Counties in Vermont (November 2014)*, and *Historical Reconnaissance Survey, New England Clean Power Link Project-Overland Portion: Windsor, Rutland, and Grand Isle Counties in Vermont (November 2014)*, produced by the Public Archaeology Laboratory, Inc. These reports form the basis of testimony provided to the PSB under the Section 248 process and serve a similar function underpinning the cultural resource sections of the NECPL DEIS.

The VDHP is continuing to work with TDI-NE under the Section 248 process and signed a stipulation between TDI-NE, Vermont Public Service Department, and the Vermont Agency of Natural Resources on July 17, 201 which will essentially function as an agreement document under any Certificate of Public Good granted by the

August 11, 2015
Vermont SHPO Comments on
NECPL DEIS Page 2 of 2

PSB. Attachment III of the stipulation contains six general conditions and seven conditions specific to underwater or terrestrial historic resources dictating treatment of known or potential historic properties that could be affected by the NECPL project. The VDHP understands that similar conditions will be developed between the consulting parties for the Section 106 process and presented in the agreement documents such as the Programmatic Agreement (PA) and Cultural Resource Management Plan referenced in the DEIS.

Several minor points regarding the Area of Potential Effect (APE) definition presented in your April 16, 2015 letter and the DEIS, as well as the identification and expected mitigation of adverse effects bear mention. The definition of a 50 ft. corridor centered on the transmission line as the APE for both direct and indirect effects along the terrestrial segment does not seem to be sufficient in all cases. Current engineering documents indicate that laydown/staging areas exceeding this width do occur along the alignment. In addition, the VDHP has asked TDI-NE for a blasting plan so that potential direct/indirect effects to standing historic properties at greater distances from the corridor can be adequately addressed. For the underwater segment, TDI-NE has agreed to provide any additional mapping or remote sensing data derived from engineering and design work along the corridor to its underwater consultant to maximize site identification beyond the currently defined underwater resources. Finally, any direct adverse effects through use, modification, or sale of the National Register eligible Fullam and Mott residential structures under TDI-NE ownership in Alburgh and Ludlow will need to be addressed.

The VDHP notes that DEIS contains multiple references for additional consultation to resolve issues such as the above and present more detailed analysis in the final EIS. We look forward to continued interaction on developing appropriate Section 106 agreement documents with the consulting parties, including comments on the draft PA later this month. Thank you for your cooperation in protecting Vermont's irreplaceable historic and archeological heritage. R. Scott Dillon reviewed this project and prepared this letter. I concur with the findings and conclusions described above.

Sincerely:
VERMONT DIVISION FOR HISTORIC PRESERVATION
E-SIGNED by
Laura Trieschmann
on 2015-08-12
01:03:18 GMT
Laura V. Trieschmann
State Historic Preservation Officer

Cc: Kelly Schaeffer, Kleinschmidt Group

VERMONT

State of Vermont
Division for Historic Preservation
One National Life Drive, Floor 6
Montpelier, VT 05620-0501
www.HistoricVermont.org

[phone] 802-828-3211
[division fax] 802-828-3206

Agency of Commerce and Community Development

August 31, 2015

Brian Mills
Office of Electricity Delivery and Energy Reliability (OE-20)
U.S. Department of Energy
1000 Independence Avenue SW
Washington, DC 20585

Re: VT SHPO Comments on the New England Clean Power Link (NECPL) Transmission Line Project Draft Programmatic Agreement. U.S. Department of Energy.

Dear Mr. Mills:

Thank you for the opportunity to comment on the above referenced project. The following comments will assist the U.S. Department of Energy (DOE) in their review responsibilities under Section 106 of the National Historic Preservation Act.

The Vermont Division for Historic Preservation (VDHP) is providing the DOE with the following comments pursuant to 36 CFR 800.4, regulations established by the Advisory Council on Historic Preservation to implement Section 106 of the National Historic Preservation Act (NHPA). Project review consists of identifying the project's potential impacts to historic buildings, structures, historic districts, historic landscapes and settings, and known or potential archeological resources.

The VDHP has only two minor suggested revisions to the draft Programmatic Agreement (PA):

1) Addition of a reference to the Guidelines for Conducting Archaeological Studies in Vermont (Revised) as Section II.C. 6.

2) Insertion of the phrase "including 18 V.S.A. § 5212b (f)" following the word "laws" in Section II. D. 13.

These changes provide specific reference to most applicable State guidelines and statutes which dictate cultural resource review and unanticipated human remains discovery in Vermont. In overall terms, the VDHP concurs with the timelines for reviewing and completing the Cultural Resource Management Plan (CRMP) which will be one of the more important guiding documents for the NECPL Project historic properties review. As noted in our August 11, 2015 comment letter concerning the DEIS, the VDHP looks forward to additional consultation to work out the more detailed framework of historic properties review and analysis that will be presented in the CRMP. Thank you for your cooperation in protecting Vermont's irreplaceable historic and archeological heritage. R. Scott Dillon reviewed this project and prepared this letter. I concur with the findings and conclusions described above.

Sincerely:
VERMONT DIVISION FOR HISTORIC PRESERVATION

E-SIGNED by Laura Trieschmann
on 2015-08-31 20:22:20 GMT
Laura V. Trieschmann
State Historic Preservation Officer

Cc: Kelly Schaeffer, Kleinschmidt Group

ATTACHMENT 1

AGREEMENT WITH VERMONT DEPARTMENT OF HISTORIC PRESERVATION

Docket No. 8400 – Stipulation Between TDI-NE, DPS, ANR and DHP
Attachment III – Conditions Regarding Historic Resources

I. General Conditions

1. All historic sites studies and assessments must be conducted by qualified consultants meeting the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation - Professional Qualifications Standards.*

2. All archaeological studies, including but not limited to Phase I site identification, Phase II site evaluation, and Phase III data recovery investigations, or other mitigation proposals must follow the VDHP *Guidelines for Conducting Archaeological studies in Vermont (2002)* and any subsequent timely guideline revision, which include direct reference to applicable Secretary of Interior archaeological standards. TDI-NE's archaeological consultant must submit any archaeological scope of work to the VDHP for review and approval prior to initiation.

3. Any proposed change of use, repairs, alterations, or other treatments to any extant historic site, building, landscape and/or district must meet the Secretary of Interior's *Standards for Rehabilitation.*

4. Any sale, transfer of property or other conveyance of historic sites owned by TDI-NE within the Project area must be reviewed by VDHP and have the appropriate deed restrictions in place prior to disposition of a property. Please refer to "Historic Preservation Covenants – rev. 7/14/2014"

5. No known historic site or archaeologically sensitive area shall be subject to any project related disturbance prior to the completion of all required studies and the implementation of any necessary mitigation measures. Mitigation may include but is not limited to further site evaluation, data recovery, redesign of one or more proposed project components, or the implementation of specific conditions that may be imposed during construction.

6. TDI-NE shall conduct all appropriate studies in accordance with the above stipulations for any project component or project modification not currently within the Project area that result from Project design changes.

II. Underwater Resources

1. Subject to Section II.2, TDI-NE shall maintain a 40 meter (131ft) buffer or exclusion zone around known or suspected cultural resources that are found to be near the NECPL installation corridor.

2. TDI-NE shall prepare and implement one or more scopes-of-work in accordance with the above general conditions to address potential impacts to the three currently defined underwater historic sites that cannot be avoided by the NECPL underwater corridor. These sites are :

    - The Rouses Point Train Trestle
    - The Larrabees Point-Willow Point Train Trestle (VT-AD-1344) and its associated features
    - The Great Bridge between Fort Ticonderoga, NY and Mount Independence, VT (VT-AD-731).

    a. At minimum, these three historic sites and associated structures shall be carefully documented before installation begins to record their current state of preservation and to pinpoint their locations in order to provide recommendations for the final design of the Project to avoid any significant impacts. The pre-construction work may include recommendations for additional documentation to mitigate unavoidable impacts. The historic sites shall be inspected after construction of the Project is complete to document the Project effects.

    b. In the case of the Revolutionary War Great Bridge crossing between Ticonderoga New York and Mount Independence, Vermont, in addition to the pre-construction documentation, subsurface testing shall be carried out to identify, evaluate, and recover any significant cultural deposits located within the Project corridor.

3. TDI-NE shall attempt to adjust the Project corridor to avoid the three unverified sonar targets that have been found to lie within 40m of the installation corridor. In the event that avoidance is not feasible, TDI-NE's qualified underwater archaeological consultant shall conduct all necessary studies to evaluate and mitigate impacts to any significant underwater resource.

4. TDI-NE's underwater consultant will be granted access to any additional survey data recorded during the continuing design and engineering process for the

NECPL. This data will be examined for evidence of the presence of cultural resources not currently identified within or immediately adjacent to the Project corridor. This effort will include review of data from engineering level surveys of the corridor as well as that recorded during installation of the cable itself. Any identified or potential underwater resource documented shall be subject to all appropriate investigation protocols.

III. Overland Archaeological and Historic Resources

1. The VDHP has concurred with the Phase IA Archaeological Reconnaissance Survey New England Clean Power Link Project –Overland Portion (November 2014) prepared by the Public Archeological Laboratory, Inc. (PAL). The Phase IA study identified four known archaeological sites, four previously undocumented sites, and archaeologically sensitive areas within approximately 11.6 linear miles of the Project's overland corridor and within four of the five work parcels. TDI-NE's archaeological consultant shall conduct all necessary archaeological studies in these areas, and any subsequently identified archaeologically sensitive area, in accordance with the general conditions stipulated above. All archaeological work will be undertaken by TDI-NE in consultation with VDHP, and will be conducted in compliance with all applicable state and federal regulations.

2. Prior to commencement of construction of the Project, TDI-NE shall provide supplemental information to VDHP regarding the locations and intensity of proposed blasting near identified historic resources along the overland route. In the event that blasting will result in potential adverse effects on any historic resource, TDI-NE will consult with the VDHP to seek ways to avoid, minimize, or mitigate the effect.

3. TDI-NE will maintain the buildings and grounds of two State Register-listed properties it owns, the Fullam House and the Mott House, in an appropriate state of repair in order to prevent any deterioration from their present condition. In the event that any major physical changes are proposed, they will be done in accordance with the Secretary of the Interior's Standards for Rehabilitation. If TDI-NE elects in the future to sell or otherwise transfer ownership of one or both properties, TDI-NE shall consult with VDHP in advance of any such sale or transfer.

APPENDIX J ENVIRONMENTAL JUSTICE ANALYSIS BACKGROUND

This Page Intentionally Left Blank

Environmental Justice Background: Lake Champlain and Overland Segment Census Tract Data

Geographies[2]	County	Population	Percent Minority	Percent White[3]	Median Income[4]	Percent Below Poverty Level[5]
State of Vermont	***N/A***	*601,245*	*2.8*	*95.2*	*$54,267*	*11.8*
Grand Isle County	**N/A**	6,984	1.3	95.3	$59,509	6.9
Census Tract 201	Grand Isle	3,159	.9	95.7	$56,212	6.6
Census Tract 202	Grand Isle	3,825	1.7	95.0	$61,304	7.2
Chittenden County	**N/A**	157,637	5.5	92.3	$63,989	11.2
Census Tract 23.02	Chittenden	6,486	.5	96.7	$76,996	8.3
Census Tract 33.04	Chittenden	6,031	5.8	91.2	$60,118	5.7
Census Tract 34.00	Chittenden	7,332	1.2	97.6	$94,643	3.8
Census Tract 35.01	Chittenden	3,776	3.6	95.5	$110,344	2.6
Addison County	**N/A**	36,811	3.1	95.5	$57,565	11.3
Census Tract 9602	Addison	2,774	1.6	97.7	$54,818	7.8
Census Tract 9604	Addison	5,063	2.0	96.7	$65,721	6.7
Census Tract 9609	Addison	5,211	1.3	97.4	$60,507	9.0
Rutland County	**N/A**	61,270	1.7	97.0	$49,721	13.0
Census Tract 9623	Rutland	2,345	.8	98.4	$55,417	13.6
Census Tract 9626	Rutland	2,306	.8	98.4	$47,928	13.1
Census Tract 9627	Rutland	4,068	1.3	97.6	$60,095	5.7
Census Tract 9628	Rutland	2,824	1.6	97.2	$63,717	9.9
Census Tract 9634	Rutland	2,562	1.9	96.0	$55,488	11.7
Census Tract 9635	Rutland	1,720	1.4	96.0	$53,194	8.7
Census Tract 9636	Rutland	4,686	3.3	95.8	$54,193	20.7
Census Tract 9637	Rutland	2,711	8.2[6]	91.8	$43,965	11.0
Census Tract 9640	Rutland	3,404	.8	97.2	$51,786	11.3
Windsor County	**N/A**	56,416	1.8	96.3	$52,460	10.3
Census Tract 9662	Windsor	1,904	1.7	97.3	$50,729	9.8
Census Tract 9663	Windsor	1,946	1.6	96.5	$39,850	15.6

2 Census tracts adjacent to the project route, including shoreline tracts in the Lake Champlain segment.
3 Among those identifying as one race only. Percent minority and white columns do not equal 100%.
4 Income in the past 12 months, median household income
5 Poverty status in the past 12 months, percent below poverty level
6 7% of this figure is "some other race" category

This Page Intentionally Left Blank

A Profile of Demographics

County Region

State of Vermont, Addison County VT, Chittenden County VT, Grand Isle County VT, Rutland County VT, Windsor County VT

Produced by
Economic Profile System-Human Dimensions Toolkit
EPS-HDT
March 29, 2015

About the Economic Profile System-Human Dimensions Toolkit (EPS-HDT)

EPS-HDT is a free, easy-to-use software application that produces detailed socioeconomic reports of counties, states, and regions, including custom aggregations. In addition to these geographies, the Demographics report can be run for county subdivisions, cities and towns, American Indian areas, and congressional districts.

EPS-HDT uses published statistics from federal data sources, including Bureau of Economic Analysis and Bureau of the Census, U.S. Department of Commerce; and Bureau of Labor Statistics, U.S. Department of Labor.

The Bureau of Land Management and Forest Service have made significant financial and intellectual contributions to the operation and content of EPS-HDT.

See headwaterseconomics.org/eps-hdt for more information about the other tools and capabilities of EPS-HDT.

For technical questions, contact Patty Gude at eps-hdt@headwaterseconomics.org, or 406-599-7425.

HEADWATERS ECONOMICS

headwaterseconomics.org

Headwaters Economics is an independent, nonprofit research group. Our mission is to improve community development and land management decisions in the West.

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

www.blm.gov

The Bureau of Land Management, an agency within the U.S. Department of the Interior, administers 249.8 million acres of America's public lands, located primarily in 12 Western States. It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

www.fs.fed.us

The Forest Service, an agency of the U.S. Department of Agriculture, administers national forests and grasslands encompassing 193 million acres. The Forest Service's mission is to achieve quality land management under the "sustainable multiple-use management concept" to meet the diverse needs of people while protecting the resource. Significant intellectual, conceptual, and content contributions were provided by the following individuals: Dr. Pat Reed, Dr. Jessica Montag, Doug Smith, M.S., Fred Clark, M.S., Dr. Susan A. Winter, and Dr. Ashley Goldhor-Wilcock.

Table of Contents

Note to Users:

Because ACS is based on a survey, it is subject to error. The Census Bureau reports the accuracy of the data by providing margins of error (MOE) for every data point. In this report, we alert the user to the data accuracy using color-coded text in the tables: BLACK indicates a coefficient of variation (CV) < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a CV > 40%.

This report is one of fourteen reports that can be produced with the EPS-HDT software. You may want to run another EPS-HDT report for either a different geography or topic. Topics include land use, demographics, specific industry sectors, the role of non-labor income, the wildland-urban interface, the role of amenities in economic development, and payments to county governments from federal lands. Throughout the reports, references to on-line resources are indicated by superscripts in parentheses. These resources are provided as hyperlinks on each report's final page. The EPS-HDT software also allows the user to "push" the tables, figures, and interpretive text from a report to a Word document. For further information and to download the free software, go to:

headwaterseconomics.org/eps-hdt

How has population changed?

This page describes the total population and change in total population.

Note: with the exception of some 2000 Decennial Census data used on pages 1-3, all other data used in this report are from the American Community Survey (ACS) of the Census Bureau. Red, orange, and black text indicate different data quality thresholds – please read the Methods section in the Study Guide text.

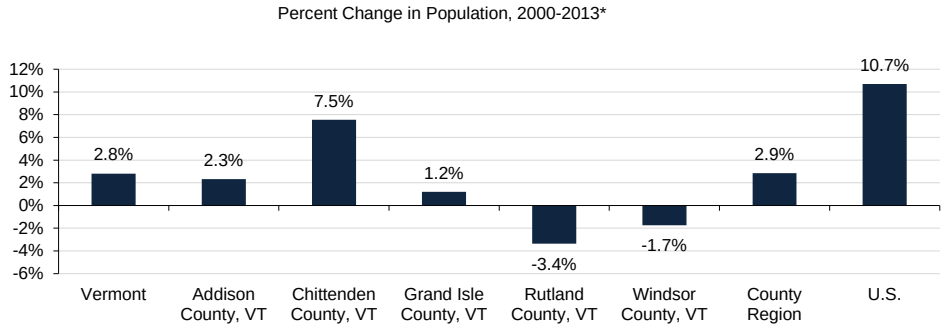
Population, 2000-2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Population (2013*)	625,904	36,811	157,637	6,984	61,270	56,416	319,118	311,536,594
Population (2000)	608,827	35,974	146,571	6,901	63,400	57,418	310,264	281,421,906
Population Change (2000-2013*)	17,077	837	11,066	83	-2,130	-1,002	8,854	30,114,688
Population Percent Change (2000-2013*)	2.8%	2.3%	7.5%	1.2%	-3.4%	-1.7%	2.9%	10.7%

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- From 2000 to the 2009-2013 period, Rutland County, VT had the smallest estimated absolute change in population (-2,130).

- From 2000 to the 2009-2013 period, U.S. had the largest estimated relative change in population (10.7%), and Rutland County, VT had the smallest (-3.4%).



Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.; U.S. Department of Commerce. 2000. Census Bureau, Systems Support Division, Washington, D.C.

Population, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Population (2013*)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Population (2000)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Population Change (2000-2013*)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Population Percent Change (2000-2013*)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Study Guide and Supplemental Information

How has population changed?

What do we measure on this page?

This page describes the total population and change in total population.
Note: with the exception of some 2000 Decennial Census data used on pages 1-3, all other data used in this report are from the American Community Survey (ACS) of the Census Bureau. Red, orange, and black text indicate different data quality thresholds – please read the Methods section below.

Why is this important?

This report covers a broad range of characteristics including gender, race, age, employment status, income levels, education, and home ownership. It is the only EPS-HDT report that can be run for geographic areas other than the U.S., states, and counties. These include cities, towns, and census designated places, American Indian, Alaska native, and native Hawaii areas, congressional districts, and county subdivisions.

In addition to its usefulness for social research, the information throughout this report is valuable for public land managers and others in identifying whether the selected geographies contain minorities and people who are economically and/or socially disadvantaged. This is important because Executive Order 12898, February 11, 1994 states that "...each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations..." (see Additional Resources on Page 2 of this report for more references).

While the data in this report does not constitute an analysis of environmental justice per se, it serves to identify whether minorities and/or economically/socially disadvantaged people live in an area. The assessment of whether environmental justice pertains to an area or management action requires consideration of the presence and distribution of minority individuals, minority populations, and low income populations and whether they are or would be disproportionately subject to high and adverse human health effects (such as bodily impairment, infirmity, illness, or any other negative health effects from cumulative or multiple adverse exposures to environmental hazards), and disproportionately high and adverse environmental effects (such as impacts on the natural environment that significantly or adversely affect minority, low income, or native populations).

Methods

The majority of data in this report comes from the Census Bureau's American Community Survey (ACS). The ACS is a nation-wide survey conducted every year by the Census Bureau that provides current demographic, social, economic, and housing information about communities every year—information that until recently was only available once a decade. The ACS is not the same as the decennial census, which is conducted every ten years (the ACS has replaced the detailed, Census 2000 long-form questionnaire).

For populations of 65,000 or more, ACS provides estimates based on 1 year of sampling. For populations of 20,000 or more, ACS provides estimates based on 3 years of sampling. For all other geographies, estimates based on 5 years of sampling are provided. Data used in this report are 5-year ACS estimates. Moreso than the 1 or 3-year estimates, the 5-year estimates are consistently available for small geographies, such as towns. We show 5-year estimates for all geographies since data obtained using the same survey technique is ideal for cross-geography comparisons. The disadvantage is that multiyear estimates cannot be used to describe any particular year in the period, only what the average value is over the full period. For brevity, table and figure titles show the latest year of the 5-year period. Footnotes are provided to clarify that the data represent average characteristics over a 5-year period.

ACS is based on a survey, and is subject to error. The Census Bureau reports the accuracy of the data by providing margins of error. In this report, we alert the user to the data accuracy using color-coded text and symbols in the tables: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. Less populated areas tend to have lower accuracy. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale. A listing of all coefficients of variation by data point can be found by scrolling down to the tables provided below the border of the page in the Excel workbook.

Additional Resources

An indispensible publication on environmental justice: Council on Environmental Quality. 1997. Environmental Justice: Guidance under the National Environmental Policy Act. Washington, D.C. Available at: epa.gov/compliance/ej/resources/policy/ej_guidance_nepa_ceq1297.pdf [(1)].

For a description of the Census Bureau's ACS survey methodology and data accuracy used by the Census Bureau, see:
census.gov/acs/www/methodology/methodology_main/ [(2)].
census.gov/acs/www/Downloads/data_documentation/Accuracy/MultiyearACSAccuracyofData2009.pdf [(3)].

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.; U.S. Department of Commerce. 2000. Census Bureau, Systems Support Division, Washington, D.C.

Study Guide

What is the age and gender distribution of the population?

This page describes population distribution by age and gender, and the change in median age.

Median Age: The age which divides the population into two numerically equal groups; i.e, half the people are younger than this age and half are older.

Age & Gender Distribution, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population	625,904	36,811	157,637	6,984	61,270	56,416	319,118	311,536,594
Under 5 years	31,237	1,626	7,737	307	2,720	2,668	15,058	20,052,112
5 to 9 years	34,213	2,008	8,370	365	2,939	3,069	16,751	20,409,060
10 to 14 years	36,991	2,103	8,899	401	3,683	3,176	18,262	20,672,609
15 to 19 years	45,658	3,178	13,826	430	4,217	3,200	24,851	21,715,074
20 to 24 years	44,404	3,103	16,719	309	4,139	2,492	26,762	22,099,887
25 to 29 years	35,421	1,692	11,094	301	3,157	3,226	19,470	21,243,365
30 to 34 years	34,840	1,811	9,898	356	2,918	3,039	18,022	20,467,912
35 to 39 years	34,431	1,839	8,923	335	3,014	2,675	16,786	19,876,161
40 to 44 years	42,186	2,565	10,632	562	4,062	3,834	21,655	20,998,001
45 to 49 years	47,199	2,831	11,287	603	4,769	4,308	23,798	22,109,946
50 to 54 years	51,924	3,051	12,279	673	5,223	4,940	26,166	22,396,322
55 to 59 years	49,813	3,037	10,640	639	5,211	4,781	24,308	20,165,892
60 to 64 years	42,509	2,536	8,704	644	4,614	4,507	21,005	17,479,211
65 to 69 years	31,178	1,856	6,089	442	3,465	3,375	15,227	13,189,508
70 to 74 years	21,906	1,212	4,114	242	2,441	2,509	10,518	9,767,522
75 to 79 years	16,415	985	3,097	˙147	1,813	1,805	7,847	7,438,750
80 to 84 years	13,147	679	2,632	˙124	1,527	1,434	6,396	5,781,697
85 years and over	12,432	699	2,697	˙104	1,358	1,378	6,236	5,673,565
Total Female	317,360	18,406	80,722	3,497	31,006	28,728	162,359	158,289,182
Total Male	308,544	18,405	76,915	3,487	30,264	27,688	156,759	153,247,412

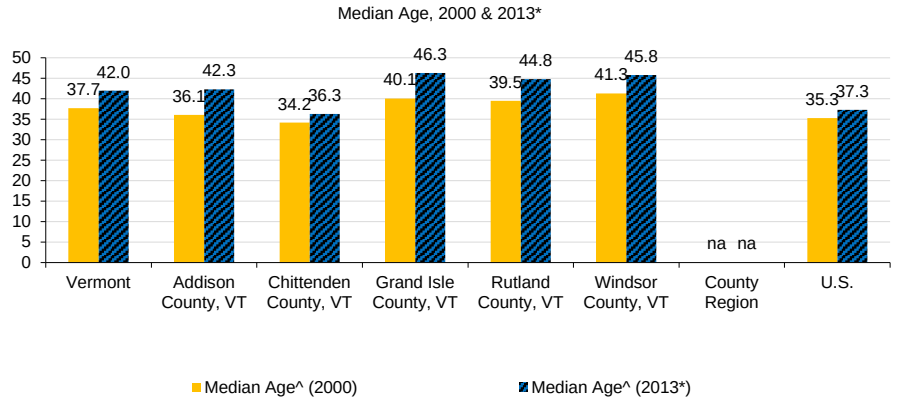
Change in Median Age, 2000-2013*

Median Age^ (2013*)	42.0	42.3	36.3	46.3	44.8	45.8	**na**	37.3
Median Age^ (2000)	37.7	36.1	34.2	40.1	39.5	41.3	**na**	35.3
Median Age % Change	11.4%	17.2%	6.1%	15.5%	13.4%	10.9%	**na**	5.7%

^ Median age is not available for metro/non-metro or regional aggregations.

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- From 2000 to the 2009-2013 period, the median age estimate increased the most in Addison County, VT (36.1 to 42.3, a 17.2% increase) and increased the least in the U.S. (35.3 to 37.3, a 5.7% increase).



Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.; U.S. Department of Commerce. 2000. Census Bureau, Systems Support Division, Washington, D.C.

Age & Gender Distribution, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Under 5 years	0.4%	1.2%	0.5%	1.8%	0.9%	2.3%	0.5%	0.0%
5 to 9 years	1.4%	4.0%	3.1%	8.2%	4.9%	4.7%	2.0%	0.1%
10 to 14 years	1.3%	3.8%	3.0%	8.5%	4.0%	4.5%	1.9%	0.1%
15 to 19 years	0.4%	1.5%	0.7%	3.8%	1.2%	1.1%	0.5%	0.0%
20 to 24 years	1.5%	4.8%	2.7%	9.8%	4.7%	5.7%	2.0%	0.1%
25 to 29 years	0.4%	3.1%	0.7%	2.2%	0.8%	1.8%	0.6%	0.0%
30 to 34 years	0.4%	1.5%	0.9%	2.4%	1.1%	1.6%	0.6%	0.0%
35 to 39 years	1.4%	4.7%	3.1%	11.4%	4.6%	5.0%	2.1%	0.1%
40 to 44 years	1.1%	3.5%	2.6%	7.8%	3.6%	3.6%	1.6%	0.1%
45 to 49 years	0.3%	1.0%	0.7%	2.4%	0.7%	1.0%	0.4%	0.0%
50 to 54 years	0.3%	1.2%	0.7%	2.3%	0.5%	0.7%	0.4%	0.0%
55 to 59 years	1.0%	3.2%	2.6%	7.0%	3.0%	3.1%	1.5%	0.1%
60 to 64 years	1.4%	4.3%	3.9%	7.5%	4.0%	3.8%	2.1%	0.1%
65 to 69 years	1.4%	4.3%	3.8%	8.0%	4.5%	4.3%	2.1%	0.1%
70 to 74 years	1.4%	5.5%	4.2%	10.0%	4.3%	4.3%	2.3%	0.1%
75 to 79 years	1.9%	6.6%	4.6%	12.4%	5.1%	6.5%	2.8%	0.1%
80 to 84 years	2.2%	8.6%	6.3%	18.6%	5.8%	7.4%	3.5%	0.1%
85 years and over	2.3%	7.4%	5.3%	13.4%	6.1%	8.2%	3.3%	0.1%
Total Female	0.1%	0.2%	0.1%	0.6%	0.2%	0.2%	0.1%	0.0%
Total Male	0.1%	0.2%	0.1%	0.6%	0.2%	0.2%	0.1%	0.0%
Median Age^ (2013*)	0.3%	0.4%	0.3%	0.5%	0.3%	0.3%	na	0.2%
Median Age^ (2000)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	na	0.0%
Median Age % Change	2.8%	2.9%	5.8%	3.9%	2.3%	2.7%	na	3.0%

Study Guide and Supplemental Information

What is the age and gender distribution of the population?

What do we measure on this page?

This page describes population distribution by age and gender, and the change in median age.

Median Age: The age which divides the population into two numerically equal groups; i.e., half the people are younger than this age and half are older.

Why is it important?

Different geographies can have different age distributions. For example, in counties with a large number of retirees, the age distribution may be skewed towards categories 65 years and older. In counties with universities, the age distribution will be skewed toward the age group 18-29. In many counties, the largest segment of the population is in the Baby Boomer generation (people born between 1946 and 1964).

The change in median age is one indicator of whether the population has gotten older or younger.

Methods

Data in this report are based on the American Community Survey (ACS) of the Census Bureau. Data used in this report are 5-year estimates for all geographies. The latest year of the 5-year estimate is indicated in tables and figures (for example, 2009* may be listed as the year, but this is a 5-year estimate based on data collected from 2005 through 2009).

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

The U.S. Environmental Protection Agency defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." Environmental Protection Agency environmental justice resources are available at: epa.gov/compliance/ej [(4)].

An indispensible publication on environmental justice: Council on Environmental Quality. 1997. Environmental Justice: Guidance under the National Environmental Policy Act. Washington, D.C. Available at: epa.gov/compliance/ej/resources/policy/ej_guidance_nepa_ceq1297.pdf [(1)].

The nonprofit organization The State of the USA is developing a national indicator system using consistent measures of well-being. Their resources are available at: stateoftheusa.org [(5)].

A useful resource on rural population change is the U.S. Department of Agriculture's Economic Research Service's Briefing Room on "Rural Population and Migration" available at: ers.usda.gov/topics/rural-economy-population/population-migration.aspx [(6)].

William H. Frey's website provides links to publications, issues, media stories, data tools and resources on migration, population redistribution, and demography of both rural and urban populations in the U.S.: frey-demographer.org [(7)].

The U.S. Department of Health and Human Services' Administration on Aging has a host of resources on older Americans at: aoa.gov/aoaroot/aging_statistics/index.aspx [(8)].

The U.S. Census Bureau's Population Estimates Program publishes age data estimates for the U.S., states, counties, and metropolitan areas. This information is available at: http://www.census.gov/popest/ [(9)].

For information on county-level health ranking, see: countyhealthrankings.org/ [(10)].

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.; U.S. Department of Commerce. 2000. Census Bureau, Systems Support Division, Washington, D.C.

What is the age and gender distribution of the population?

This page describes the change in age and gender distribution over time, and the change in age distribution, with age categories separated into five age groups.

Age & Gender Distribution and Change, 2000-2013*

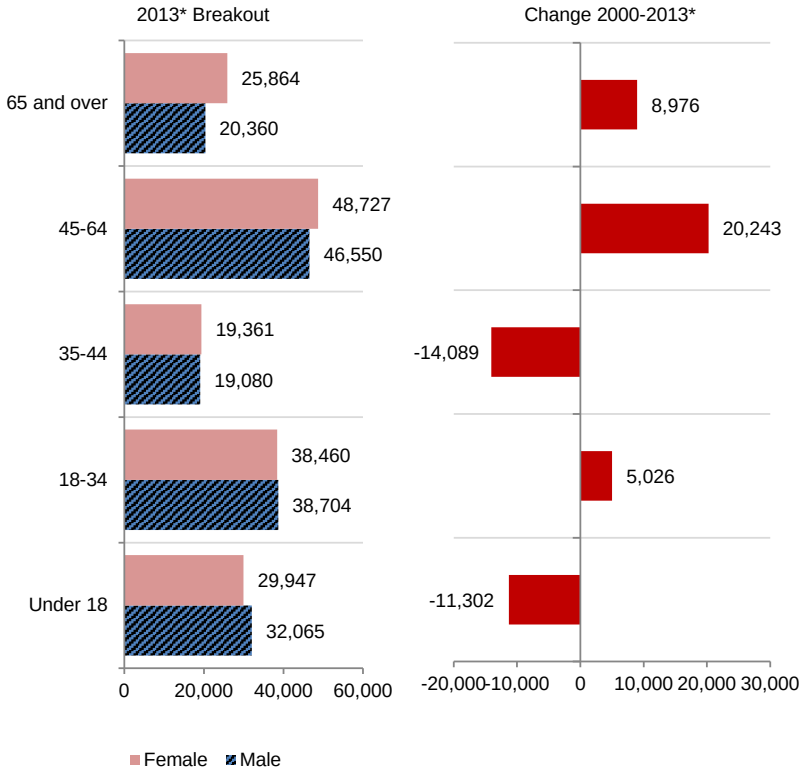
	2000	2013*
Total Population	310,264	319,118
Under 18	73,314	62,012
18-34	72,138	77,164
35-44	52,530	38,441
45-64	75,034	95,277
65 and over	37,248	46,224

Percent of Total

Under 18	23.6%	19.4%
18-34	23.3%	24.2%
35-44	16.9%	12.0%
45-64	24.2%	29.9%
65 and over	12.0%	14.5%

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- In the 2009-2013 period, the age category with the highest estimate for number of women was 45-64 (48,727), and the age category with the highest estimate for number of men was 45-64 (46,550).
- From 2000 to the 2009-2013 period, the age category with the largest estimated increase was 45-64 (20,243), and the age category with the largest estimated decrease was 35-44 (-14,089).



Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.; U.S. Department of Commerce. 2000. Census Bureau, Systems Support Division, Washington, D.C.

Age & Gender Distribution and Change, Coefficients of Variation

	2000	2009*
Total Population	0%	0%
Under 18	0%	1%
18-34	0%	1%
35-44	0%	1%
45-64	0%	1%
65 and over	0%	1%

Percent of Total, Coefficients of Variation

	2000	2009*
Under 18	0%	0%
18-34	0%	0%
35-44	0%	0%
45-64	0%	0%
65 and over	0%	0%

Study Guide and Supplemental Information

What is the age and gender distribution of the population?

What do we measure on this page?

This page describes the change in age and gender distribution over time, and the change in age distribution, with age categories separated into five age groups.

Why is it important?

For public land managers, understanding the age distribution can help highlight whether management actions might affect some age groups more than others. It also may highlight the need to understand the different needs, values, and attitudes of different age groups. If a geography has a large retired population, or soon-to-be-retired population, for example, the needs and interests of the public may place different demands on public land managers than a geography with a large number of minors or young adults.

For many geographies, a significant development is the aging of the population, and in particular the retirement of the "Baby Boomer" generation (those born between 1946 and 1964). As this generation enters retirement age, their mobility, spending patterns, and consumer demands (for health care and housing, for example) can affect how communities develop economically. An aging population can also affect changing demands on land use (e.g., recreation).

Methods

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

The non-profit Population Reference Bureau offers a helpful video on population pyramids at: prb.org/Journalists/Webcasts/2009/distilleddemographics1.aspx [(11)].

For a discussion on the implications of rising age trends, see: Peterson, Peter, G. 1999. Gray Dawn: How the Coming Age Wave Will Transform America—and the World. Random House. New York, New York. 280 p.

The Census maintains a useful web site with data, articles, and PowerPoint presentations on the characteristics of different age groups: census.gov/population/age/ [(12)].

The Next Four Decades: Older Population in the United States: 2010 to 2050. May 2010. Census Bureau. census.gov/prod/2010pubs/p25-1138.pdf [(13)].

Cromartie, J. and P. Nelson. 2009. Baby Boom Migration and Its Impact on Rural America. Economic Research Service, Report Number 29. Washington, DC. ers.usda.gov/publications/err-economic-research-report/err79.aspx [(14)].

Frey, W.H. 2006. America's Regional Demographics in the '00 Decade: The Role of Seniors, Boomers and New Minorities. The Brookings Institution, Washington, D.C.

Frey, W. H. 2007. Mapping the Growth of Older America: Seniors and Boomers in the Early 21st Century. Brookings Census 2000 Series. Washington, D.C.: Brookings Institution Metropolitan Policy Program.

Jacobsen, L. A., and Mather, M. 2010. "U.S. Social and Economic Trends Since 2000." Population Bulletin 65(1): 1-16. Washington D.C.: Population Reference Bureau.

U.S. Census Bureau. 2005. "State Interim Population Projections by Age and Sex: 2004-2030." census.gov/population/www/projections/projectionsagesex.html [(15)]. Retrieved September 1, 2010.

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.; U.S. Department of Commerce. 2000. Census Bureau, Systems Support Division, Washington, D.C.

What is the racial makeup of the population?

This page describes the number of people who self-identify as belonging to a particular race.

Race: Race is a self-identification data item in which Census respondents choose the race or races with which they most closely identify. The Office of Management and Budget revised the standards in 1997 for how the Federal government collects and presents data on race and ethnicity.

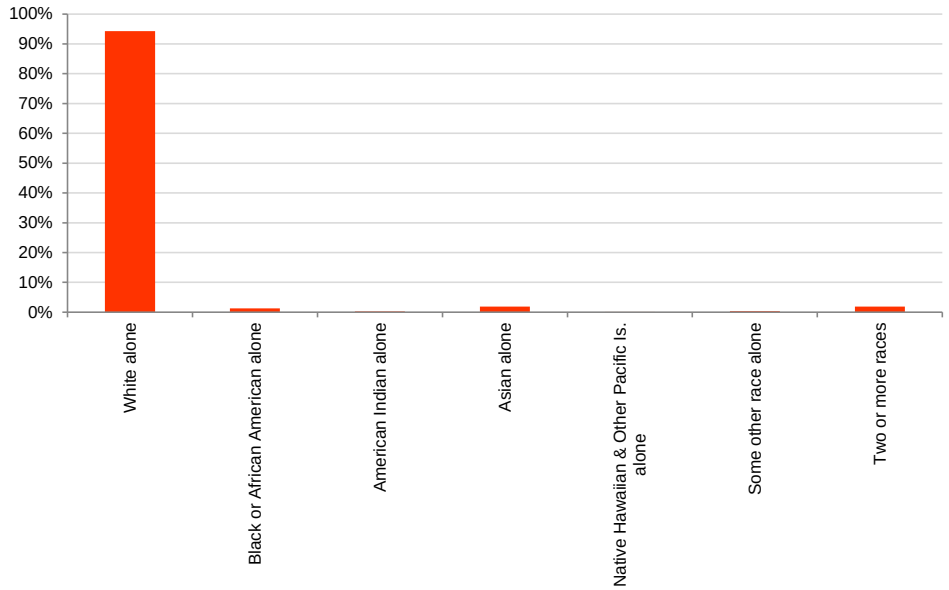
Population by Race, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population	625,904	36,811	157,637	6,984	61,270	56,416	319,118	311,536,594
White alone	595,862	35,166	145,443	6,656	59,409	54,337	301,011	230,592,579
Black or African American alone	6,139	317	3,128	¨**22**	˚298	˚310	4,075	39,167,010
American Indian alone	1,841	˚93	˚432	¨**49**	˚134	˚123	831	2,540,309
Asian alone	7,922	605	4,467	˚20	˚358	˚465	5,915	15,231,962
Native Hawaiian & Other Pacific Is. alone	˚145	¨**31**	¨**8**	¨**0**	¨**0**	¨**0**	¨**39**	526,347
Some other race alone	˚1,744	˚62	˚660	¨**1**	¨**259**	˚180	˚1,162	14,746,054
Two or more races	12,251	537	3,499	˚236	812	1,001	6,085	8,732,333
Percent of Total								
White alone	95.2%	95.5%	92.3%	95.3%	97.0%	96.3%	94.3%	74.0%
Black or African American alone	1.0%	0.9%	2.0%	¨**0.3%**	˚0.5%	0.5%	1.3%	12.6%
American Indian alone	0.3%	˚0.3%	˚0.3%	¨**0.7%**	˚0.2%	˚0.2%	˚0.3%	0.8%
Asian alone	1.3%	1.6%	2.8%	¨**0.3%**	0.6%	˚0.8%	1.9%	4.9%
Native Hawaiian & Other Pacific Is. alone	0.0%	¨**0.1%**	0.0%	¨**0.0%**	¨**0.0%**	¨**0.0%**	0.0%	0.2%
Some other race alone	˚0.3%	˚0.2%	˚0.4%	0.0%	¨**0.4%**	˚0.3%	˚0.4%	4.7%
Two or more races	2.0%	1.5%	2.2%	˚3.4%	1.3%	1.8%	1.9%	2.8%

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- In the 2009-2013 period, the racial category with the highest estimated percent of the population in the County Region was White alone (94.3%), and the racial category the lowest estimated percent of the population was Native Hawaiian & Other Pacific Is. alone (0.0%).

Population by Race, Percent of Total, County Region, 2013*



Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Population by Race, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population	0%	0%	0%	0%	0%	0%	0%	0%
White alone	0%	0%	0%	0%	0%	0%	0%	0%
Black or African American alone	3%	10%	4%	72%	14%	13%	4%	0%
American Indian alone	9%	19%	17%	46%	27%	37%	12%	0%
Asian alone	3%	5%	4%	33%	13%	16%	3%	0%
Native Hawaiian & Other Pacific Is. alone	31%	71%	68%	na	na	na	78%	1%
Some other race	13%	32%	24%	122%	40%	32%	17%	0%
Two or more races	3%	9%	7%	13%	8%	11%	5%	1%

Percent of Total, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
White alone	0%	0%	0%	0%	0%	0%	0%	0%
Black or African American alone	6%	7%	3%	77%	12%	11%	5%	0%
American Indian alone	0%	24%	22%	43%	28%	28%	23%	0%
Asian alone	5%	4%	4%	42%	10%	15%	3%	0%
Native Hawaiian & Other Pacific Is. alone	0%	72%	0%	na	na	na	0%	0%
Some other race	22%	36%	29%	0%	43%	38%	17%	0%
Two or more races	3%	8%	8%	13%	9%	10%	3%	0%

Study Guide and Supplemental Information

What is the racial makeup of the population?

What do we measure on this page?

This page describes the number of people who self-identify as belonging to a particular race.

Race: Race is a self-identification data item in which Census respondents choose the race or races with which they most closely identify. The Office of Management and Budget (OMB) revised the standards in 1997 for how the Federal government collects and presents data on race and ethnicity.
Race Alone Categories: This includes the minimum five race categories required by the OMB, plus the 'some other race alone' included by the Census Bureau, with the approval of the OMB. The categories are: White alone, Black or African-American alone, American Indian or Alaska Native alone, Asian alone, Native Hawaiian or other Pacific Islander alone, and Some other race alone.

Some Other Race: This includes all other responses not included in the "White," "Black or African American," "American Indian and Alaska Native," "Asian" and "Native Hawaiian or Other Pacific Islander" race categories described above. Respondents providing write-in entries such as multiracial, mixed, interracial, or a Hispanic/Latino group (for example, Mexican, Puerto Rican, or Cuban) in the "Some other race" write-in space are included in this category.
Two or More Races: People may have chosen to provide two or more races either by checking two or more race response check boxes, by providing multiple write-in responses, or by some combination of check boxes and write-in responses.

Why is it important?

Federal agencies make use of information on race and ethnicity for implementing a number of programs, while also using this information to promote and enforce equal opportunities, such as in employment or housing, under the Civil Rights Act.

According to the Census Bureau, “Many federal programs are put into effect based on the race data obtained from the decennial census (i.e., promoting equal employment opportunities; assessing racial disparities in health and environmental risks).” In addition, “Data on ethnic groups are important for putting into effect a number of federal statutes (i.e., enforcing bilingual election rules under the Voting Rights Act; monitoring and enforcing equal employment opportunities under the Civil Rights Act). Data on Ethnic Groups are also needed by local governments to run programs and meet legislative requirements (i.e., identifying segments of the population who may not be receiving medical services under the Public Health Act; evaluating whether financial institutions are meeting the credit needs of minority populations under the Community Reinvestment Act).”

For public land managers, one of the important considerations of proposed management actions is whether the action could have disproportionately high and adverse effects on minority populations. This consideration, broadly referred to as "Environmental Justice", is a requirement of Executive Order 12898. The data on this page show which minority populations are represented, but does not analyze whether there is a potential environmental justice issue.

Methods

Race categories include both racial and national-origin groups. The concept of race is separate from the concept of Hispanic origin, which is discussed elsewhere in this report. Percentages for the various race categories add to 100 percent, and should not be combined with the percent Hispanic.

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

For information on revised Federal Office of Management and Budget standards for the classification of Federal data on race and ethnicity (1997), see: whitehouse.gov/omb/fedreg_1997standards [(16)].

For a primer on how the Census 2000 handles race and Hispanic origin, see the U.S. Census Bureau’s publication “Overview of Race and Hispanic Origin,” available at: census.gov/prod/2001pubs/c2kbr01-1.pdf [(17)].

Additional race and ethnicity data from the U.S. Census Bureau can be found at: factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml [(18)].

The American Human Development Project has created a useful resource on the health and welfare of racial and ethnic groups. It is called A Century Apart: New Measures of Well-Being for U.S. Racial and Ethnic Groups and is available at: measureofamerica.org/acenturyapart [(19)].

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Study Guide

What is the Hispanic makeup of the population?

This page describes the number of people who self-identify as Hispanic. The information also is presented according to race. The term "Hispanic" refers to a cultural identification, and Hispanics can be of any race.

Hispanic or Latino Origin: People who identify with the terms "Hispanic" or "Latino" are those who classify themselves in one of the specific Hispanic or Latino categories listed on the Census questionnaire "Mexican," "Puerto Rican," or "Cuban" as well as those who indicate that they are "other Spanish, Hispanic, or Latino." Origin can be viewed as the heritage, nationality group, lineage, or country of birth of the person or the person's parents or ancestors before their arrival in the United States. People who identify their origin as Spanish, Hispanic, or Latino may be of any race.

Hispanic Population, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population	625,904	36,811	157,637	6,984	61,270	56,416	319,118	311,536,594
Hispanic or Latino (of any race)	9,803	701	3,043	93	738	734	5,309	51,786,591
Not Hispanic or Latino	616,101	36,110	154,594	6,891	60,532	55,682	313,809	259,750,003
White alone	588,820	34,592	143,191	6,591	58,961	53,849	297,184	197,050,418
Black or African American alone	5,964	303	3,072	¨**22**	˙295	˙310	4,002	38,093,998
American Indian alone	1,693	˙91	˙325	¨**46**	˙128	˙120	˙710	2,061,752
Asian alone	7,835	605	4,442	˙20	˙358	˙430	5,855	15,061,411
Native Hawaiian & Oth.Pacific Is. alone	˙108	¨**31**	¨**8**	¨**0**	¨**0**	¨**0**	¨**39**	488,646
Some other race	˙508	¨**12**	¨**274**	¨**0**	¨**13**	¨**7**	¨**306**	606,356
Two or more races	11,173	476	3,282	˙212	777	966	5,713	6,387,422

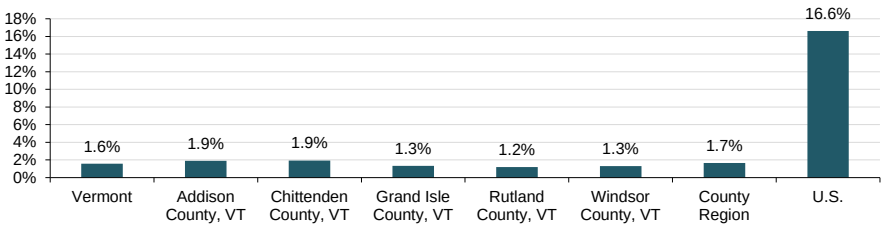
Percent of Total

Hispanic or Latino (of any race)	1.6%	1.9%	1.9%	1.3%	1.2%	1.3%	1.7%	16.6%
Not Hispanic or Latino	98.4%	98.1%	98.1%	98.7%	98.8%	98.7%	98.3%	83.4%
White alone	94.1%	94.0%	90.8%	94.4%	96.2%	95.4%	93.1%	63.3%
Black or African American alone	1.0%	0.8%	1.9%	¨**0.3%**	˙0.5%	0.5%	1.3%	12.2%
American Indian alone	0.3%	˙0.2%	˙0.2%	¨**0.7%**	˙0.2%	˙0.2%	0.2%	0.7%
Asian alone	1.3%	1.6%	2.8%	¨**0.3%**	0.6%	˙0.8%	1.8%	4.8%
Native Hawaiian & Oth.Pacific Is. alone	0.0%	¨**0.1%**	0.0%	¨**0.0%**	¨**0.0%**	¨**0.0%**	0.0%	0.2%
Some other race	0.1%	0.0%	˙0.2%	¨**0.0%**	0.0%	0.0%	¨**0.1%**	0.2%
Two or more races	1.8%	1.3%	2.1%	˙3.0%	1.3%	1.7%	1.8%	2.1%

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- In the 2009-2013 period, the U.S. had the highest estimated percent of the population that self-identify as Hispanic or Latino of any race (16.6%), and Rutland County, VT had the lowest (1.2%).

Hispanic Population, Percent of Total, County Region, 2013*



Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Hispanic Population, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population	0%	0%	0%	0%	0%	0%	0%	0%
Hispanic or Latino (of any race)	0%	0%	0%	0%	0%	0%	0%	0%
Not Hispanic or Latino	0%	0%	0%	0%	0%	0%	0%	0%
White alone	0%	0%	0%	0%	0%	0%	0%	0%
Black or African American alone	3%	10%	4%	72%	14%	13%	4%	0%
American Indian alone	9%	19%	20%	49%	28%	37%	13%	0%
Asian alone	3%	5%	4%	33%	13%	16%	3%	0%
Native Hawaiian & Oth.Pacific Is. alone	34%	71%	68%	na	na	na	78%	1%
Some other race	27%	81%	48%	na	47%	87%	43%	1%
Two or more races	3%	9%	8%	14%	8%	11%	5%	0%

Percent of Total, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Hispanic or Latino (of any race)	0%	0%	0%	0%	0%	0%	0%	0%
Not Hispanic or Latino	0%	0%	0%	0%	0%	0%	0%	0%
White alone	0%	0%	0%	0%	0%	0%	0%	0%
Black or African American alone	6%	7%	3%	77%	13%	11%	5%	0%
American Indian alone	0%	25%	29%	46%	29%	29%	0%	0%
Asian alone	5%	4%	4%	42%	10%	16%	3%	0%
Native Hawaiian & Oth.Pacific Is. alone	0%	72%	0%	na	na	na	0%	0%
Some other race	0%	0%	35%	na	0%	0%	63%	0%
Two or more races	3%	9%	9%	14%	10%	11%	3%	0%

Study Guide and Supplemental Information

What is the Hispanic makeup of the population?

What do we measure on this page?

This page describes the number of people who self-identify as Hispanic. The information also is presented according to race. The term "Hispanic" refers to a cultural identification, and Hispanics can be of any race.

Ethnicity: There are two minimum categories for ethnicity: Hispanic or Latino, and Not Hispanic or Latino. The federal government considers race and Hispanic origin to be two separate and distinct concepts. Hispanics and Latinos may be of any race.

Hispanic or Latino Origin: People who identify with the terms "Hispanic" or "Latino" are those who classify themselves in one of the specific Hispanic or Latino categories listed on the Census questionnaire "Mexican," "Puerto Rican," or "Cuban" as well as those who indicate that they are "other Spanish, Hispanic, or Latino." Origin can be viewed as the heritage, nationality group, lineage, or country of birth of the person or the person's parents or ancestors before their arrival in the United States. People who identify their origin as Spanish, Hispanic, or Latino may be of any race.

Why is it important?

Hispanics are one of the fastest growing segments of the U.S. population. The Census Bureau reported that 15 percent of the population in the U.S. self-identified as being Hispanic in 2010. The Census Bureau predicts that 24.4 percent of the population in the U.S. will be Hispanic by 2050. Between 2000 and 2010, Hispanics accounted for over one-half of the nation's population growth.

Different groups of people may value and use public lands in different ways. Understanding the various values, beliefs, and attitudes of the Hispanic community in an area can be an important consideration for public land managers working to meet the needs of the public or evaluating potentially adverse impacts on a population.

According to the Census Bureau: "Many federal programs are put into effect based on the race data obtained from the decennial census (i.e., promoting equal employment opportunities; assessing racial disparities in health and environmental risks)" and "Data on ethnic groups are important for putting into effect a number of federal statutes (i.e., enforcing bilingual election rules under the Voting Rights Act; monitoring and enforcing equal employment opportunities under the Civil Rights Act). Data on Ethnic Groups are also needed by local governments to run programs and meet legislative requirements (i.e., identifying segments of the population who may not be receiving medical services under the Public Health Act; evaluating whether financial institutions are meeting the credit needs of minority populations under the Community Reinvestment Act)."

Methods

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

For information on revised Federal Office of Management and Budget standards for the classification of Federal data on race and ethnicity (1997), see: whitehouse.gov/omb/fedreg_1997standards [(16)].

For a primer on how the Census 2000 handles race and Hispanic origin, see the U.S. Census Bureau publication "Overview of Race and Hispanic Origin," available at: census.gov/prod/2001pubs/c2kbr01-1.pdf [(17)].

Additional race and ethnicity data from the U.S. Census Bureau can be found at: factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml [(18)].

Additional information on the U.S. Hispanic population from the U.S. Census Bureau is available at: census.gov/newsroom/cspan/hispanic/2012.06.22_cspan_hispanics.pdf [(20)].

For an analysis of Latinos and Hispanics and federal land management in the Columbia River Basin, as well as a literature review on the subject, see: icbemp.gov/science/hansisrichard_10pg.pdf [(21)].

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

What is the tribal makeup of the population?

This page describes, in general terms, the number of people who self-identify as American Indian and Alaska Native alone or in combination with one or more other races.

American Indian: This category shows self-identification among people of American Indian descent. Many American Indians are members of a principal tribe or group empowered to negotiate and make decisions on behalf of the individual members. Census data are available for 34 tribes or Selected American Indian categories: Apache, Blackfeet, Cherokee, Cheyenne, Chickasaw, Chippewa, Choctaw, Colville, Comanche, Cree, Creek, Crow, Delaware, Houma, Iroquois, Kiowa, Lumbee, Menominee, Navajo, Osage, Ottawa, Paiute, Pima, Potawatomi, Pueblo, Puget Sound Salish, Seminole, Shoshone, Sioux, Tohomo O'Odham, Ute, Yakama, Yaqui, Yuman, and All other.

Alaska Native: This category shows self-identification among people of Alaska Native descent. Census data are available for five detailed Alaska Native race and ethnic categories: Alaska Athabaskan, Aleut, Eskimo, Tlingit-Haida, and All other tribes.

Non-Specified Tribes: This category shows self-identification among people of American Indian or Alaska Native decent that does not fall within a major tribal affiliation.

American Indian & Alaska Native Population, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population	625,904	36,811	157,637	6,984	61,270	56,416	319,118	311,536,594
Total Native American	1,841	˙93	˙432	¨**49**	˙134	˙123	831	2,540,309
American Indian Tribes	1,217	˙64	˙195	¨**29**	¨**77**	˙80	˙445	1,997,487
Alaska Native Tribes	¨**15**	¨**0**	¨**0**	¨**0**	¨**12**	¨**0**	¨**12**	108,836
Non-Specified Tribes	˙575	¨**27**	˙215	¨**20**	¨**42**	¨**43**	˙347	363,000

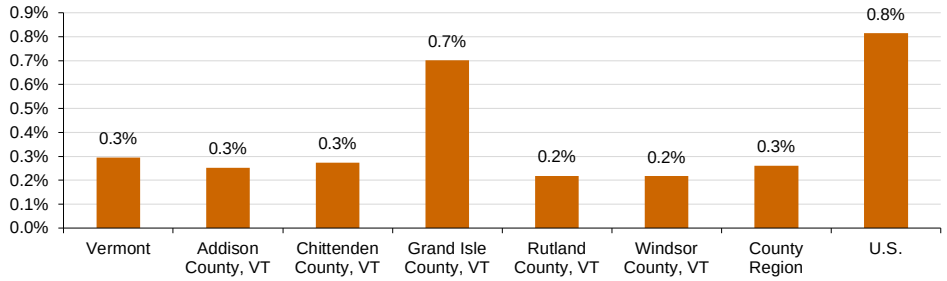
Percent of Total

Total Native American	0.3%	˙0.3%	˙0.3%	¨**0.7%**	˙0.2%	˙0.2%	˙0.3%	0.8%
American Indian Tribes	0.2%	˙0.2%	¨**0.1%**	¨**0.4%**	¨**0.1%**	¨**0.1%**	0.1%	0.6%
Alaska Native Tribes	0.0%	¨**0.0%**	¨**0.0%**	¨**0.0%**	0.0%	¨**0.0%**	0.0%	0.0%
Non-Specified Tribes	0.1%	0.1%	¨**0.1%**	¨**0.3%**	0.1%	¨**0.1%**	0.1%	0.1%

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- In the 2009-2013 period, the U.S. had the highest estimated percent of the population that self-identified as American Indian and Alaska Native (0.8%) and Windsor County, VT had the lowest (0.2%).

Native American Population, Percent of Total, County Region, 2013*



Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

American Indian & Alaska Native Population, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population	0%	0%	0%	0%	0%	0%	0%	0%
Total Native American	9%	19%	17%	46%	27%	37%	12%	0%
American Indian Tribes	11%	26%	31%	55%	45%	35%	18%	0%
Alaska Native Tribes	53%	na	na	na	66%	na	209%	1%
Non-Specified Tribes	18%	41%	31%	70%	43%	75%	23%	1%

Percent of Total, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Native American	0%	24%	22%	43%	28%	28%	23%	0%
American Indian Tribes	0%	35%	49%	59%	48%	43%	0%	0%
Alaska Native Tribes	0%	na	na	na	0%	na	0%	0%
Non-Specified Tribes	0%	0%	45%	64%	0%	80%	0%	0%

Study Guide and Supplemental Information

What is the tribal makeup of the population?

What do we measure on this page?

This page describes, in general terms, the number of people who self-identify as American Indian and Alaska Native alone or in combination with one or more other races.

American Indian: This category shows self-identification among people of American Indian descent. Many American Indians are members of a principal tribe or group empowered to negotiate and make decisions on behalf of the individual members. Census data are available for 34 tribes or Selected American Indian categories: Apache, Blackfeet, Cherokee, Cheyenne, Chickasaw, Chippewa, Choctaw, Colville, Comanche, Cree, Creek, Crow, Delaware, Houma, Iroquois, Kiowa, Lumbee, Menominee, Navajo, Osage, Ottawa, Paiute, Pima, Potawatomi, Pueblo, Puget Sound Salish, Seminole, Shoshone, Sioux, Tohomo O'Odham, Ute, Yakama, Yaqui, Yuman, and All other.

Alaska Native: This category shows self-identification among people of Alaska Native descent. Census data are available for five detailed Alaska Native race and ethnic categories: Alaska Athabaskan, Aleut, Eskimo, Tlingit-Haida, and All other tribes.

Non-Specified Tribes: This category includes respondents who checked the ‘‘American Indian or Alaska Native’’ response category on the Census questionnaire or wrote in the generic term ‘‘American Indian’’ or ‘‘Alaska Native,'' or tribal entries not elsewhere classified.

Why is it important?

Different groups of people may value and use public lands in different ways. Understanding the various values, beliefs, and attitudes of American Indian and Alaska Native tribes is an important consideration for public land managers where these populations reside and have a historical and/or current tie to the land. Some management actions may have disproportionately high and adverse effects on tribes and it is helpful to know if native peoples live in a particular geography.

Methods

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

An indispensible publication on environmental justice: Council on Environmental Quality. 1997. Environmental Justice: Guidance under the National Environmental Policy Act. Washington, D.C. Available at: epa.gov/compliance/ej/resources/policy/ej_guidance_nepa_ceq1297.pdf [(1)].

The U.S. Department of Interior’s Indian Affairs oversees the Bureau of Indian Affairs and Bureau of Indian Education. Indian Affairs resources and contacts are available at: bia.gov/index.htm [(22)].

The American Indian Heritage Foundation hosts an American Indian Resource Directory with a list of all American Indian tribes, including Federally recognized tribes, and the Native Wire news service. These and other resources are available at: indians.org/index.html [(23)].

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

What is the tribal makeup of the population?

This page describes the number of people who self-identify as American Indian and Alaska Native alone or in combination with one or more other races.

American Indian & Alaska Native Population, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population	625,904	36,811	157,637	6,984	61,270	56,416	319,118	311,536,594
Total Native American	1,841	˙93	˙432	¨49	˙134	˙123	831	2,540,309
American Indian Tribes; Specified	1,217	˙64	˙195	¨29	¨77	˙80	˙445	1,997,487
Apache	¨5	¨0	¨0	¨0	¨3	¨0	¨3	69,740
Blackfeet	¨57	¨0	¨8	¨0	¨0	¨3	¨11	26,474
Cherokee	˙88	¨4	¨0	¨0	¨0	¨14	¨18	273,192
Cheyenne	¨2	¨0	¨0	¨0	¨0	¨0	¨0	11,774
Chickasaw	¨5	¨0	¨0	¨0	¨0	¨5	¨5	22,917
Chippewa	¨52	¨0	¨10	¨0	¨10	¨1	¨21	115,253
Choctaw	¨7	¨0	¨0	¨0	¨0	¨0	¨0	90,189
Colville	¨0	¨0	¨0	¨0	¨0	¨0	¨0	8,182
Comanche	¨0	¨0	¨0	¨0	¨0	¨0	¨0	12,228
Cree	¨6	¨3	¨0	¨0	¨0	¨0	¨3	2,191
Creek	¨2	¨0	¨0	¨0	¨0	¨0	¨0	41,521
Crow	¨0	¨0	¨0	¨0	¨0	¨0	¨0	11,424
Delaware	¨16	¨0	¨0	¨0	¨0	¨0	¨0	7,471
Houma	¨0	¨0	¨0	¨0	¨0	¨0	¨0	9,488
Iroquois	¨41	¨0	¨29	¨0	¨0	¨2	¨31	45,639
Kiowa	¨0	¨0	¨0	¨0	¨0	¨0	¨0	8,691
Lumbee	¨21	¨21	¨0	¨0	¨0	¨0	¨21	68,171
Menominee	¨0	¨0	¨0	¨0	¨0	¨0	¨0	8,259
Navajo	¨11	¨0	¨0	¨0	¨0	¨0	¨0	305,552
Osage	¨0	¨0	¨0	¨0	¨0	¨0	¨0	8,332
Ottawa	¨0	¨0	¨0	¨0	¨0	¨0	¨0	7,026
Paiute	¨0	¨0	¨0	¨0	¨0	¨0	¨0	10,545
Pima	¨0	¨0	¨0	¨0	¨0	¨0	¨0	24,212
Potawatomi	¨0	¨0	¨0	¨0	¨0	¨0	¨0	19,337
Pueblo	¨2	¨0	¨0	¨0	¨0	¨0	¨0	71,029
Puget Sound Salish	¨1	¨0	¨0	¨0	¨0	¨1	¨1	13,971
Seminole	¨0	¨0	¨0	¨0	¨0	¨0	¨0	13,987
Shoshone	¨0	¨0	¨0	¨0	¨0	¨0	¨0	9,470
Sioux	¨30	¨0	¨14	¨0	¨0	¨6	¨20	124,383
Tohono O'Odham	¨0	¨0	¨0	¨0	¨0	¨0	¨0	20,343
Ute	¨0	¨0	¨0	¨0	¨0	¨0	¨0	8,629
Yakama	¨0	¨0	¨0	¨0	¨0	¨0	¨0	8,614
Yaqui	¨0	¨0	¨0	¨0	¨0	¨0	¨0	19,942
Yuman	¨0	¨0	¨0	¨0	¨0	¨0	¨0	7,944
All other tribes	˙871	¨36	¨134	¨29	¨64	¨48	˙311	491,367
American Indian; Not Specified	¨34	¨2	¨22	¨0	¨3	¨0	¨27	60,370
Alaska Native Tribes; Specified	¨15	¨0	¨0	¨0	¨12	¨0	¨12	108,836
Alaska Athabaskan	¨15	¨0	¨0	¨0	¨12	¨0	¨12	15,882
Aleut	¨0	¨0	¨0	¨0	¨0	¨0	¨0	11,709
Eskimo	¨0	¨0	¨0	¨0	¨0	¨0	¨0	60,926
Tlingit-Haida	¨0	¨0	¨0	¨0	¨0	¨0	¨0	15,622
All other tribes	¨0	¨0	¨0	¨0	¨0	¨0	¨0	4,697
Alaska Native; Not Specified	¨0	¨0	¨0	¨0	¨0	¨0	¨0	10,616
American Indian or Alaska Native; Not Specified	˙575	¨27	˙215	¨20	¨42	¨43	˙347	363,000

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

American Indian & Alaska Native Population, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population	0%	0%	0%	0%	0%	0%	0%	0%
Total Native American	9%	19%	17%	46%	27%	37%	12%	0%
American Indian Tribes; Specified	11%	26%	31%	55%	45%	35%	18%	0%
Apache	61%	na	na	na	81%	na	799%	2%
Blackfeet	43%	na	114%	na	na	101%	199%	3%
Cherokee	30%	91%	na	na	na	104%	141%	1%
Cheyenne	152%	na	na	na	na	na	na	6%
Chickasaw	122%	na	na	na	na	122%	492%	3%
Chippewa	62%	na	91%	na	91%	122%	93%	1%
Choctaw	96%	na	na	na	na	na	na	1%
Colville	na	na	na	na	na	na	na	5%
Comanche	na	na	na	na	na	na	na	6%
Cree	71%	81%	na	na	na	na	820%	11%
Creek	122%	na	na	na	na	na	na	2%
Crow	na	na	na	na	na	na	na	5%
Delaware	87%	na	na	na	na	na	na	7%
Houma	na	na	na	na	na	na	na	6%
Iroquois	55%	na	73%	na	na	91%	94%	2%
Kiowa	na	na	na	na	na	na	na	7%
Lumbee	58%	58%	na	na	na	na	130%	1%
Menominee	na	na	na	na	na	na	na	4%
Navajo	127%	na	na	na	na	na	na	1%
Osage	na	na	na	na	na	na	na	6%
Ottawa	na	na	na	na	na	na	na	7%
Paiute	na	na	na	na	na	na	na	4%
Pima	na	na	na	na	na	na	na	4%
Potawatomi	na	na	na	na	na	na	na	3%
Pueblo	91%	na	na	na	na	na	na	2%
Puget Sound Salish	122%	na	na	na	na	122%	2386%	4%
Seminole	na	na	na	na	na	na	na	4%
Shoshone	na	na	na	na	na	na	na	5%
Sioux	57%	na	96%	na	na	111%	124%	1%
Tohono O'Odham	na	na	na	na	na	na	na	5%
Ute	na	na	na	na	na	na	na	6%
Yakama	na	na	na	na	na	na	na	5%
Yaqui	na	na	na	na	na	na	na	5%
Yuman	na	na	na	na	na	na	na	6%
All other tribes	16%	42%	41%	55%	52%	44%	23%	1%
American Indian; Not Specified	52%	91%	69%	na	122%	na	82%	3%
Alaska Native Tribes; Specified	53%	na	na	na	66%	na	209%	1%
Alaska Athabaskan	53%	na	na	na	66%	na	209%	4%
Aleut	na	na	na	na	na	na	na	5%
Eskimo	na	na	na	na	na	na	na	1%
Tlingit-Haida	na	na	na	na	na	na	na	4%
All other tribes	na	na	na	na	na	na	na	6%
Alaska Native; Not Specified	na	na	na	na	na	na	na	6%
American Indian or Alaska Native; Not Sp	18%	41%	31%	70%	43%	75%	23%	1%

Study Guide and Supplemental Information

What is the tribal makeup of the population?

What do we measure on this page?

This page describes, in general terms, the number of people who self-identify as American Indian and Alaska Native alone or in combination with one or more other races.

American Indian: This category shows self-identification among people of American Indian descent. Many American Indians are members of a principal tribe or group empowered to negotiate and make decisions on behalf of the individual members. Census data are available for 34 tribes or Selected American Indian categories: Apache, Blackfeet, Cherokee, Cheyenne, Chickasaw, Chippewa, Chocktaw, Colville, Comanche, Cree, Creek, Crow, Delaware, Houma, Iroquois, Kiowa, Lumbee, Menominee, Navajo, Osage, Ottawa, Paiute, Pima, Potawatomi, Pueblo, Puget Sound Salish, Seminole, Shoshone, Sioux, Tohomo O'Odham, Ute, Yakama, Yaqui, Yuman, and All other.

Alaska Native: This category shows self-identification among people of Alaska Native descent. Census data are available for five detailed Alaska Native race and ethnic categories: Alaska Athabaskan, Aleut, Eskimo, Tlingit-Haida, and All other tribes.

Non-Specified Tribes: This category includes respondents who checked the ''American Indian or Alaska Native'' response category on the Census questionnaire or wrote in the generic term ''American Indian'' or ''Alaska Native,' ' or tribal entries not elsewhere classified.

Why is it important?

Different groups of people may value and use public lands in different ways. Understanding the various values, beliefs, and attitudes of American Indian and Alaska Native tribes is an important consideration for public land managers where these populations reside and have a historical and/or current tie to the land. Some management actions may have disproportionately high and adverse effects on tribes and it is helpful to know if native peoples live in a particular geography.

Methods

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

The U.S. Forest Service Office of Tribal Relations, formed in 2004, is a useful source of information and policies related to agency-tribal relations. See: fs.fed.us/spf/tribalrelations/index.shtml [24].

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

What occupations and industries are present?

This page describes what people do for work in terms of the type of work (occupation) and where they work (by industry).

Employment by Occupation, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Civilian employed population > 16 years	324,350	19,166	86,895	3,727	30,233	28,593	168,614	141,864,697
Management, professional, & related	129,476	7,856	40,246	1,305	10,411	11,485	71,303	51,341,226
Service	56,970	3,309	14,992	605	5,848	4,908	29,662	25,645,065
Sales and office	71,214	3,178	19,587	1,026	6,826	6,053	36,670	34,957,520
Farming, fishing, and forestry	4,188	˙618	˙409	¨**33**	˙292	˙460	1,812	1,030,881
Construction, extraction, maint., & repair	28,890	2,013	5,276	˙333	2,806	2,651	13,079	11,832,435
Production, transportation, & material moving	33,612	2,192	6,385	˙425	4,050	3,036	16,088	17,057,570

Percent of Total

Management, professional, & related	39.9%	41.0%	46.3%	35.0%	34.4%	40.2%	42.3%	36.2%
Service	17.6%	17.3%	17.3%	16.2%	19.3%	17.2%	17.6%	18.1%
Sales and office	22.0%	16.6%	22.5%	27.5%	22.6%	21.2%	21.7%	24.6%
Farming, fishing, and forestry	1.3%	˙3.2%	˙0.5%	¨**0.9%**	˙1.0%	˙1.6%	1.1%	0.7%
Construction, extraction, maint., & repair	8.9%	10.5%	6.1%	˙8.9%	9.3%	9.3%	7.8%	8.3%
Production, transportation, & material moving	10.4%	11.4%	7.3%	˙11.4%	13.4%	10.6%	9.5%	12.0%

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

Employment by Industry, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Civilian employed population > 16 years	324,350	19,166	86,895	3,727	30,233	28,593	168,614	141,864,697
Agriculture, forestry, fishing & hunting, mining	8,543	1,381	˙850	˙54	619	˙860	3,764	2,731,302
Construction	23,940	1,636	4,231	˙404	2,308	2,201	10,780	8,864,481
Manufacturing	34,391	1,941	8,616	530	3,455	2,712	17,254	14,867,423
Wholesale trade	7,359	˙349	1,511	˙124	˙780	˙784	3,548	3,937,876
Retail trade	37,300	1,842	10,403	428	4,252	2,726	19,651	16,415,217
Transportation, warehousing, and utilities	10,665	531	2,629	˙166	1,127	˙861	5,314	7,010,637
Information	6,839	˙361	2,047	˙66	˙610	˙660	3,744	3,056,318
Finance and insurance, and real estate	15,576	568	4,769	˙241	1,130	1,312	8,020	9,469,756
Prof., scientific, mgmt., admin., & waste mgmt.	28,375	1,538	9,574	355	2,237	2,630	16,334	15,300,528
Education, health care, & social assistance	90,880	6,064	25,650	810	8,119	8,638	49,281	32,871,216
Arts, entertain., rec., accomodation, & food	30,060	1,442	8,926	˙243	3,051	2,958	16,620	13,262,892
Other services, except public administration	15,008	791	4,046	˙140	1,543	1,094	7,614	7,043,003
Public administration	15,414	722	3,643	˙166	1,002	1,157	6,690	7,034,048

Percent of Total

Agriculture, forestry, fishing & hunting, mining	2.6%	7.2%	˙1.0%	˙1.4%	2.0%	˙3.0%	2.2%	1.9%
Construction	7.4%	8.5%	4.9%	˙10.8%	7.6%	7.7%	6.4%	6.2%
Manufacturing	10.6%	10.1%	9.9%	14.2%	11.4%	9.5%	10.2%	10.5%
Wholesale trade	2.3%	˙1.8%	1.7%	˙3.3%	2.6%	˙2.7%	2.1%	2.8%
Retail trade	11.5%	9.6%	12.0%	11.5%	14.1%	9.5%	11.7%	11.6%
Transportation, warehousing, and utilities	3.3%	2.8%	3.0%	˙4.5%	3.7%	˙3.0%	3.2%	4.9%
Information	2.1%	˙1.9%	2.4%	˙1.8%	˙2.0%	˙2.3%	2.2%	2.2%
Finance and insurance, and real estate	4.8%	3.0%	5.5%	˙6.5%	3.7%	4.6%	4.8%	6.7%
Prof., scientific, mgmt., admin., & waste mgmt.	8.7%	8.0%	11.0%	˙9.5%	7.4%	9.2%	9.7%	10.8%
Education, health care, & social assistance	28.0%	31.6%	29.5%	21.7%	26.9%	30.2%	29.2%	23.2%
Arts, entertain., rec., accomodation, & food	9.3%	7.5%	10.3%	˙6.5%	10.1%	10.3%	9.9%	9.3%
Other services, except public administration	4.6%	4.1%	4.7%	˙3.8%	5.1%	3.8%	4.5%	5.0%
Public administration	4.8%	3.8%	4.2%	˙4.5%	3.3%	˙4.0%	4.0%	5.0%

Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Employment by Occupation, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Civilian employed population > 16 years	0%	1%	1%	2%	1%	1%	0%	0%
Management, professional, & related	1%	3%	2%	6%	3%	2%	1%	0%
Service	1%	5%	3%	10%	4%	5%	2%	0%
Sales and office	1%	4%	3%	7%	4%	4%	2%	0%
Farming, fishing, and forestry	5%	13%	27%	48%	17%	18%	9%	1%
Construction, extraction, maint., & repair	2%	5%	6%	13%	5%	7%	3%	0%
Production, transportation, & material moving	2%	5%	4%	13%	5%	6%	3%	0%

Percent of Total, Coefficients of Variation

Management, professional, & related	1%	3%	2%	6%	3%	2%	1%	0%
Service	1%	5%	3%	10%	4%	5%	2%	0%
Sales and office	1%	4%	3%	7%	4%	4%	2%	0%
Farming, fishing, and forestry	5%	13%	26%	48%	19%	19%	11%	0%
Construction, extraction, maint., & repair	2%	5%	6%	14%	5%	7%	3%	0%
Production, transportation, & material moving	2%	5%	4%	13%	5%	6%	3%	0%

Employment by Industry, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Civilian employed population > 16 years	0%	1%	1%	2%	1%	1%	0%	0%
Agriculture, forestry, fishing & hunting, mining	4%	8%	16%	33%	11%	12%	6%	0%
Construction	2%	6%	6%	13%	6%	7%	3%	0%
Manufacturing	2%	5%	4%	10%	5%	7%	3%	0%
Wholesale trade	4%	13%	10%	26%	12%	14%	6%	0%
Retail trade	2%	6%	4%	11%	5%	6%	3%	0%
Transportation, warehousing, and utilities	3%	10%	8%	18%	10%	12%	5%	0%
Information	4%	15%	8%	27%	14%	12%	6%	0%
Finance and insurance, and real estate	3%	10%	5%	20%	10%	11%	4%	0%
Prof., scientific, mgmt., admin., & waste mgmt.	2%	7%	3%	12%	7%	7%	2%	0%
Education, health care, & social assistance	1%	3%	2%	7%	3%	3%	1%	0%
Arts, entertain., rec., accomodation, & food	2%	7%	4%	18%	5%	8%	3%	0%
Other services, except public administration	3%	10%	6%	18%	7%	11%	4%	0%
Public administration	3%	8%	7%	16%	9%	11%	4%	0%

Percent of Total, Coefficients of Variation

Agriculture, forestry, fishing & hunting, mining	5%	8%	19%	34%	12%	12%	5%	0%
Construction	2%	6%	6%	13%	6%	7%	3%	0%
Manufacturing	2%	5%	4%	10%	5%	6%	2%	0%
Wholesale trade	3%	13%	10%	26%	12%	13%	6%	0%
Retail trade	2%	6%	4%	11%	5%	6%	3%	0%
Transportation, warehousing, and utilities	4%	11%	8%	18%	10%	12%	6%	0%
Information	3%	16%	8%	27%	15%	13%	5%	0%
Finance and insurance, and real estate	3%	10%	6%	20%	10%	11%	4%	0%
Prof., scientific, mgmt., admin., & waste mgmt.	2%	7%	3%	12%	7%	7%	3%	0%
Education, health care, & social assistance	1%	3%	2%	7%	3%	3%	1%	0%
Arts, entertain., rec., accomodation, & food	3%	7%	5%	18%	5%	8%	3%	0%
Other services, except public administration	3%	9%	7%	18%	7%	11%	4%	0%
Public administration	3%	8%	7%	16%	9%	12%	5%	0%

Study Guide and Supplemental Information

What occupations and industries are present?

What do we measure on this page?

This page describes what people do for work in terms of the type of work (occupation) and where they work (by industry).

Employment by Occupation: Refers to the Standard Occupational Classification (SOC) system, where workers are classified into occupations with similar job duties, skills, education, and/or training, regardless of industry.

Employment by Industry: Refers to the employment by industry, listed according to the North American Industry Classification System (NAICS).

Why is it Important?

Employment statistics are usually reported by industry (as with other reports in EPS-HDT). This is a useful way to show the relative diversity of the economy and the degree of dependence on certain sectors. Employment by occupation offers additional information that describes what people do for a living and the type of work they do, regardless of the industry. For example, management and professional occupations are generally of higher wage and require formal education, and these occupations could exist in any number of industries (for example, managers could be working for a software firm, a mine, or a construction company). Occupation information describes what people do, while employment by industry describes where people work.

Methods

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

The Census Bureau provides a definition of SOCS: census.gov/hhes/www/ioindex/overview.html [(25)].

Occupations are also defined by U.S. Bureau of Labor Statistics: bls.gov/soc/ [(26)].

The Bureau of Labor Statistics provides an analysis of the prospects for different types of jobs, including training and education needed, earnings, working conditions, and what workers do on the job: bls.gov/oco/ [(27)].

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

What are the characteristics of labor participation?

This page describes workers by weeks worked per year and usual hours works per week.

Labor Participation Characteristics, 2013*

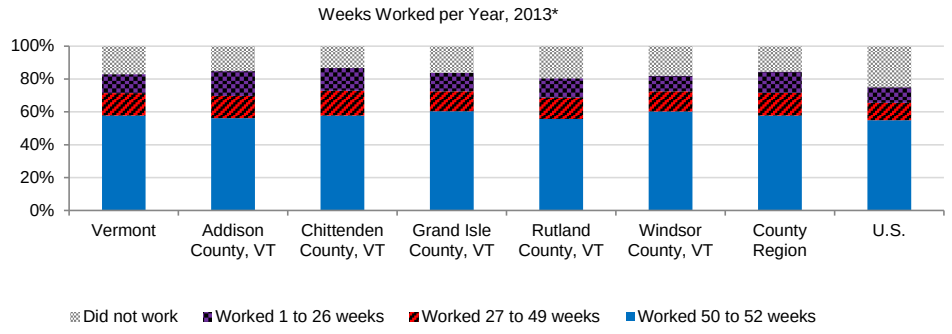
	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Population 16 to 64	420,406	25,129	112,068	4,756	40,480	36,340	218,773	204,340,912
WEEKS WORKED PER YEAR:								
Worked 50 to 52 weeks	242,902	14,102	64,710	2,869	22,520	21,900	126,101	112,330,371
Worked 27 to 49 weeks	57,061	3,423	16,875	580	5,265	4,450	30,593	21,646,421
Worked 1 to 26 weeks	49,101	3,776	15,487	534	4,798	3,456	28,051	19,225,138
Did not work	71,342	3,828	14,996	773	7,897	6,534	34,028	51,138,982
HOURS WORKED PER WEEK:								
Worked 35 or more hours per week	253,109	14,689	67,078	3,001	23,866	22,607	131,241	116,424,223
Worked 15 to 34 hours per week	71,784	4,530	21,539	827	6,744	5,538	39,178	29,453,219
Worked 1 to 14 hours per week	24,171	2,082	8,455	˙155	1,973	1,661	14,326	7,324,488
Did not work	71,342	3,828	14,996	773	7,897	6,534	34,028	51,138,982
Mean usual hours worked for workers	37.5	37.2	36.4	38.9	37.7	38.4	37.1	38.4

Percent of Total

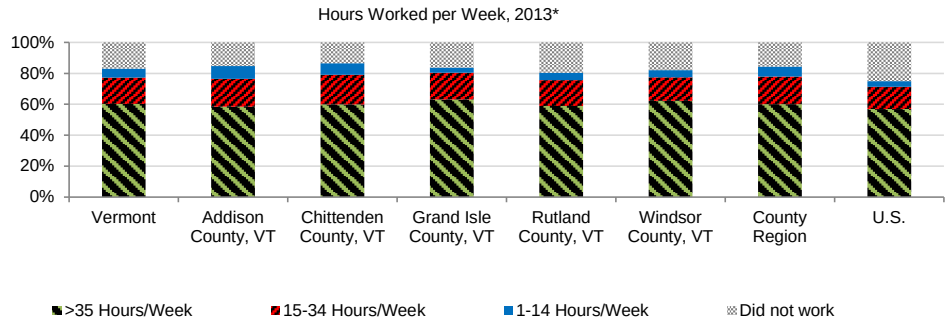
WEEKS WORKED PER YEAR:								
Worked 50 to 52 weeks	57.8%	56.1%	57.7%	60.3%	55.6%	60.3%	57.6%	55.0%
Worked 27 to 49 weeks	13.6%	13.6%	15.1%	12.2%	13.0%	12.2%	14.0%	10.6%
Worked 1 to 26 weeks	11.7%	15.0%	13.8%	11.2%	11.9%	9.5%	12.8%	9.4%
Did not work	17.0%	15.2%	13.4%	16.3%	19.5%	18.0%	15.6%	25.0%
HOURS WORKED PER WEEK:								
Worked 35 or more hours per week	60.2%	58.5%	59.9%	63.1%	59.0%	62.2%	60.0%	57.0%
Worked 15 to 34 hours per week	17.1%	18.0%	19.2%	17.4%	16.7%	15.2%	17.9%	14.4%
Worked 1 to 14 hours per week	5.7%	8.3%	7.5%	3.3%	4.9%	4.6%	6.5%	3.6%
Did not work	17.0%	15.2%	13.4%	˙16.3%	19.5%	18.0%	15.6%	25.0%

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- In the 2009-2013 period, Grand Isle County, VT had the highest estimated percent of people that worked 50 to 52 weeks per year (60.3%), and the U.S. had the lowest (55.0%).



- In the 2009-2013 period, Grand Isle County, VT had the highest estimated percent of people that worked 35 or more hours per week (63.1%), and the U.S. had the lowest (57.0%).



Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Labor Participation Characteristics, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Population 16 to 64	0%	0%	0%	0%	0%	0%	0%	0%
WEEKS WORKED PER YEAR:								
Worked 50 to 52 weeks	1%	2%	1%	3%	2%	2%	1%	0%
Worked 27 to 49 weeks	1%	5%	3%	10%	4%	5%	2%	0%
Worked 1 to 26 weeks	2%	5%	3%	10%	5%	6%	2%	0%
Did not work	1%	4%	3%	8%	3%	4%	2%	0%
HOURS WORKED PER WEEK:								
Worked 35 or more hours per week	0%	1%	1%	2%	1%	1%	1%	0%
Worked 15 to 34 hours per week	1%	3%	2%	7%	4%	4%	2%	0%
Worked 1 to 14 hours per week	2%	6%	4%	14%	7%	7%	3%	0%
Did not work	1%	4%	3%	8%	3%	4%	2%	0%
Mean usual hours worked for workers	0%	1%	1%	1%	1%	1%	0%	0%

Percent of Total, Coefficients of Variation

WEEKS WORKED PER YEAR:								
Worked 50 to 52 weeks	1%	2%	1%	3%	2%	2%	1%	0%
Worked 27 to 49 weeks	1%	4%	3%	10%	4%	5%	2%	0%
Worked 1 to 26 weeks	2%	5%	3%	10%	5%	6%	2%	0%
Did not work	1%	4%	3%	7%	3%	4%	2%	0%
HOURS WORKED PER WEEK:								
Worked 35 or more hours per week	0%	1%	1%	2%	1%	1%	1%	0%
Worked 15 to 34 hours per week	1%	3%	3%	7%	4%	4%	2%	0%
Worked 1 to 14 hours per week	2%	6%	4%	15%	7%	8%	3%	0%
Did not work	1%	4%	3%	7%	3%	4%	2%	0%

Study Guide and Supplemental Information

What are the characteristics of labor participation?

What do we measure on this page?

This page describes workers by hours worked per week and by weeks worked per year.

Note: Weeks worked per year and hours worked per week are irrespective of each other. For example, regardless of whether an individual worked 10 or 40 hours per week, if they worked 50 weeks per year, they will be recorded as having "worked 50 to 52 weeks per year".

Why is it important?

Often, if too few hours are worked per week or weeks worked per year, the local economy may suffer from underemployment of labor and human capital, translating to lower real incomes and a lower standard of living. For example, labor incomes in agriculture and other seasonal sources of employment have consistently been among the lowest of the industrial classes as reported by the U.S. Census.

However, shorter work weeks and fewer weeks worked per year can be indicative of worker preference. Part-time jobs (those that average less than 35 hours/week) are often ideal for students, people who are responsible for taking care of their dependents, and the elderly who wish to remain active in the workplace but do not want to work a full schedule. Advances in computer technologies have also enabled workers to telecommute and work shorter and more flexible hours. And, in some cases, young adults seek out seasonal, tourism, or recreation related employment by choice. Since the 1960s, during periods of economic stability, the vast majority of part-time workers have been voluntary. For example, in 2006, only about one in seven part-time workers were involuntary (individuals wanting full-time jobs but working less than 35 hours/week).

To understand the degree to which the data on this page are related to underemployment and economic hardship versus worker preference, data on age and income distribution should be examined.

Most employment statistics count full time, part time, and seasonal employment as the same, a single job. In places where a relatively large percent of the employment base is either part time or seasonally employed this may explain falling wages or rates of employment that outpace population change (see the Socioeconomic Measures report for changes in wages, employment, and population over time).

Methods

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

Maynard, D. C. & Feldman, D. C. (Eds.) 2011. Underemployment: Psychological, economic and social challenges. New York: Springer.

A. Levenson. 2006. Trends in Jobs and Wages in the U.S. Economy. CEO Publication G 06-12 (501). Available at: ceo.usc.edu/pdf/G0612501.pdf [28].

For historical fluctuations of involuntary part-time employment, see: bls.gov/opub/ils/pdf/opbils71.pdf [29].

For information on unemployment, run the EPS-HDT Measures, Summary, or Tourism reports.

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

What are commuting patterns?

This page describes workers who do not work from home by place of work and by travel time to work.

Commuting Characteristics, 2013*

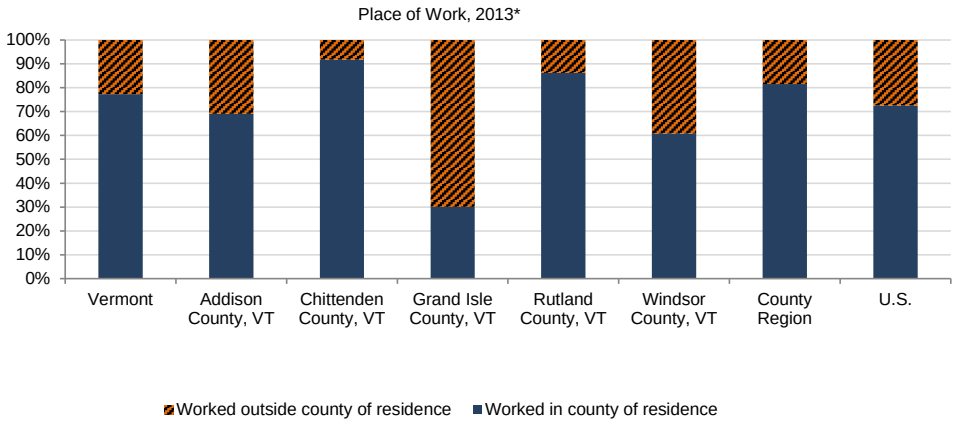
	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Workers 16 years and over	316,127	18,698	84,486	3,651	29,545	27,831	164,211	139,786,639
PLACE OF WORK:								
Worked in county of residence	244,571	12,910	77,532	1,098	25,466	16,924	133,930	101,321,530
Worked outside county of residence	71,556	5,788	6,954	2,553	4,079	10,907	30,281	38,465,109
TRAVEL TIME TO WORK:								
Less than 10 minutes	59,028	3,884	12,907	˙360	7,425	5,113	29,689	18,023,639
10 to 14 minutes	46,483	2,021	13,691	˙256	5,089	3,749	24,806	19,150,654
15 to 19 minutes	45,667	2,111	15,468	˙188	3,516	3,899	25,182	20,753,054
20 to 24 minutes	39,425	2,063	13,267	˙251	3,598	3,870	23,049	19,796,414
25 to 29 minutes	17,828	1,047	6,023	˙184	1,656	1,627	10,537	8,189,640
30 to 34 minutes	32,893	1,852	8,534	694	2,847	3,281	17,208	18,220,851
35 to 39 minutes	8,279	602	1,924	˙245	˙649	˙767	4,187	3,673,571
40 to 44 minutes	9,726	767	1,920	˙382	624	˙776	4,469	4,920,004
45 to 59 minutes	18,992	1,586	3,113	489	1,034	1,808	8,030	10,154,523
60 or more minutes	15,488	1,077	1,984	˙334	1,426	1,066	5,887	10,857,904
Mean travel time to work (minutes)	22	24	20	33	20	22	21	26

Percent of Total

PLACE OF WORK:								
Worked in county of residence	77.4%	69.0%	91.8%	30.1%	86.2%	60.8%	81.6%	72.5%
Worked outside county of residence	22.6%	31.0%	8.2%	69.9%	13.8%	39.2%	18.4%	27.5%
TRAVEL TIME TO WORK:								
Less than 10 minutes	18.7%	20.8%	15.3%	˙9.9%	25.1%	18.4%	18.1%	12.9%
10 to 14 minutes	14.7%	10.8%	16.2%	˙7.0%	17.2%	13.5%	15.1%	13.7%
15 to 19 minutes	14.4%	11.3%	18.3%	˙5.1%	11.9%	14.0%	15.3%	14.8%
20 to 24 minutes	12.5%	11.0%	15.7%	˙6.9%	12.2%	13.9%	14.0%	14.2%
25 to 29 minutes	5.6%	5.6%	7.1%	˙5.0%	5.6%	5.8%	6.4%	5.9%
30 to 34 minutes	10.4%	9.9%	10.1%	19.0%	9.6%	11.8%	10.5%	13.0%
35 to 39 minutes	2.6%	3.2%	2.3%	˙6.7%	˙2.2%	˙2.8%	2.5%	2.6%
40 to 44 minutes	3.1%	4.1%	2.3%	˙10.5%	2.1%	˙2.8%	2.7%	3.5%
45 to 59 minutes	6.0%	8.5%	3.7%	13.4%	3.5%	6.5%	4.9%	7.3%
60 or more minutes	4.9%	5.8%	2.3%	˙9.1%	4.8%	3.8%	3.6%	7.8%

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- In the 2009-2013 period, Grand Isle County, VT had the highest estimated percent of people that worked outside the county of residence (69.9%), and Chittenden County, VT had the lowest (8.2%).



Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Commuting Characteristics, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Workers 16 years and over	0%	1%	1%	2%	1%	1%	1%	0%
PLACE OF WORK:								
Worked in county of residence	0%	2%	1%	7%	1%	2%	1%	0%
Worked outside county of residence	1%	4%	5%	4%	4%	3%	2%	0%
TRAVEL TIME TO WORK:								
Less than 10 minutes	2%	5%	4%	12%	4%	6%	2%	0%
10 to 14 minutes	2%	6%	3%	15%	5%	5%	2%	0%
15 to 19 minutes	1%	6%	3%	18%	5%	5%	2%	0%
20 to 24 minutes	1%	6%	3%	16%	4%	5%	2%	0%
25 to 29 minutes	2%	9%	5%	18%	8%	9%	4%	0%
30 to 34 minutes	2%	6%	4%	9%	6%	7%	3%	0%
35 to 39 minutes	4%	12%	8%	17%	14%	15%	5%	0%
40 to 44 minutes	3%	9%	8%	15%	11%	14%	5%	0%
45 to 59 minutes	2%	7%	6%	11%	9%	9%	4%	0%
60 or more minutes	2%	8%	9%	13%	8%	11%	4%	0%
Mean travel time to work (minutes)	1%	3%	2%	4%	3%	2%	1%	0%

Percent of Total, Coefficients of Variation

PLACE OF WORK:								
Worked in county of residence	0%	2%	1%	7%	1%	2%	1%	0%
Worked outside county of residence	1%	4%	4%	4%	4%	3%	2%	0%
TRAVEL TIME TO WORK:								
Less than 10 minutes	2%	5%	4%	12%	4%	6%	2%	0%
10 to 14 minutes	2%	6%	3%	16%	5%	5%	2%	0%
15 to 19 minutes	1%	5%	3%	18%	6%	5%	2%	0%
20 to 24 minutes	1%	6%	3%	16%	4%	5%	2%	0%
25 to 29 minutes	2%	9%	5%	18%	8%	8%	4%	0%
30 to 34 minutes	2%	6%	4%	9%	6%	7%	3%	0%
35 to 39 minutes	5%	11%	8%	17%	14%	15%	5%	0%
40 to 44 minutes	4%	9%	8%	15%	12%	13%	4%	0%
45 to 59 minutes	2%	7%	7%	10%	9%	9%	4%	0%
60 or more minutes	2%	7%	8%	13%	9%	11%	5%	0%

Study Guide and Supplemental Information

What are commuting patterns?

What do we measure on this page?

This page describes workers who do not work from home by place of work and by travel time to work.

Place of Work: The values reported under "place of work" describe the number of workers that live in the selected geographic area who worked either in or outside the county they live in. If the selected geography is not a county, the workers may or may not work within the selected geography. For example, for the city of Phoenix, the data reported for "Worked in county of residence" describes the number of city of Phoenix residents that worked in Maricopa County (but not necessarily within the city of Phoenix).

Why is it important?

High rates of out-commuting are more common in non-metro areas, and in parts of the U.S. where communities are closer together.

Economic development is sometimes affected by commuting in unanticipated ways: strategies aimed at increasing jobs in a community will not necessarily mean jobs for residents. Conversely, creating job opportunities for residents does not always require bringing jobs into that community.

High out-commuting rates can also separate tax revenues from demands for services, complicating fiscal planning for local governments. "Bedroom communities," those with high levels of out-commuting, may struggle to provide social services, housing, and water and sewer facilities without an adequate source of revenue. Higher levels and longer distance of commuting likely indicate a housing-job imbalance. This can result from unaffordable housing prices or other residential constraints.

Methods

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

Aldrich, L., Beale, B. and K. Kasse. 1997. Commuting and the Economic Functions of Small Towns and Places. Rural Development Perspectives 12(3). ers.usda.gov/Publications/RDP/RDP697/RDP697e.pdf [30].

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

How is income distributed?

This page describes the distribution of household income.

Household Income Distribution, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Per Capita Income (2013 $s)	$29,167	$28,722	$33,281	$33,159	$26,205	$30,932	na	$28,155
Median Household Income^ (2013 $s)	$54,267	$57,565	$63,989	$59,509	$49,271	$52,460	na	$53,046
Total Households	257,004	14,164	62,587	3,023	25,754	25,024	130,552	115,610,216
Less than $10,000	15,122	˚728	3,520	˚85	1,674	1,400	7,407	8,380,364
$10,000 to $14,999	14,349	674	3,207	˚99	1,488	1,517	6,985	6,214,548
$15,000 to $24,999	26,875	1,524	5,080	˚281	3,195	2,662	12,742	12,468,604
$25,000 to $34,999	25,846	1,131	5,153	˚280	2,761	2,600	11,925	11,929,761
$35,000 to $49,999	36,490	2,033	7,730	473	3,985	3,597	17,818	15,723,148
$50,000 to $74,999	50,853	2,952	11,165	665	5,104	4,725	24,611	20,744,045
$75,000 to $99,999	35,306	2,231	9,388	380	3,488	3,378	18,865	14,107,031
$100,000 to $149,999	32,198	1,856	10,078	401	2,667	3,161	18,163	14,858,239
$150,000 to $199,999	11,164	567	3,820	˚181	880	1,117	6,565	5,651,848
$200,000 or more	8,801	˚468	3,446	˚178	˚512	867	5,471	5,532,628
Gini Coefficient^	0.44	0.43	0.44	0.42	0.42	0.44	na	0.47

Percent of Total

Less than $10,000	5.9%	˚5.1%	5.6%	˚2.8%	6.5%	5.6%	5.7%	7.2%
$10,000 to $14,999	5.6%	4.8%	5.1%	˚3.3%	5.8%	6.1%	5.4%	5.4%
$15,000 to $24,999	10.5%	10.8%	8.1%	˚9.3%	12.4%	10.6%	9.8%	10.8%
$25,000 to $34,999	10.1%	8.0%	8.2%	˚9.3%	10.7%	10.4%	9.1%	10.3%
$35,000 to $49,999	14.2%	14.4%	12.4%	15.6%	15.5%	14.4%	13.6%	13.6%
$50,000 to $74,999	19.8%	20.8%	17.8%	22.0%	19.8%	18.9%	18.9%	17.9%
$75,000 to $99,999	13.7%	15.8%	15.0%	12.6%	13.5%	13.5%	14.5%	12.2%
$100,000 to $149,999	12.5%	13.1%	16.1%	13.3%	10.4%	12.6%	13.9%	12.9%
$150,000 to $199,999	4.3%	4.0%	6.1%	˚6.0%	3.4%	4.5%	5.0%	4.9%
$200,000 or more	3.4%	˚3.3%	5.5%	˚5.9%	˚2.0%	3.5%	4.2%	4.8%

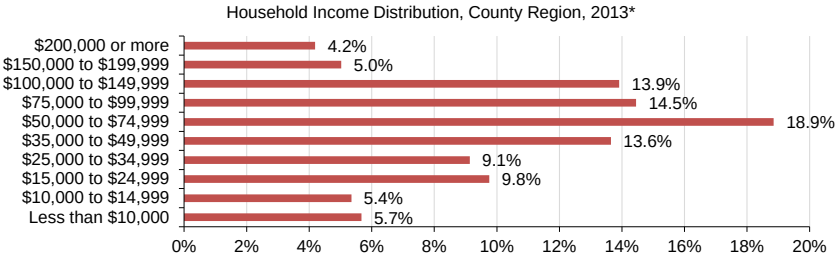
^ Median Household Income and Gini Coefficient are not available for metro/non-metro or regional aggregations.

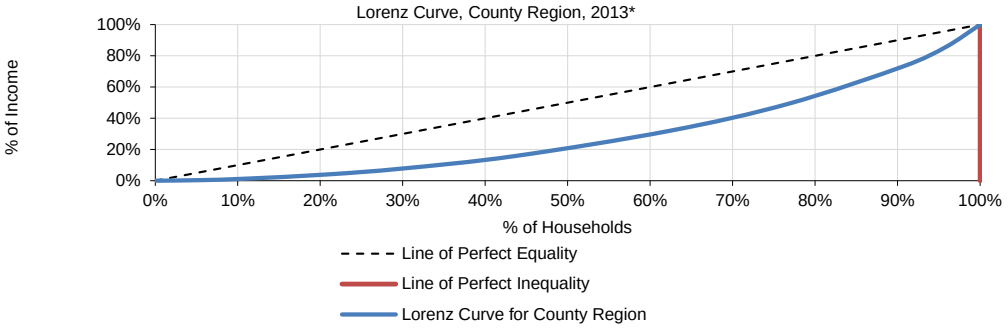
* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- In the 2009-2013 period, the income category in the County Region with the most households was $50,000 to $74,999 (18.9% of households). The income category with the fewest households was $200,000 or more (4.2% of households).

- In the 2009-2013 period, the bottom 40% of households in the County Region accumulated approximately 13.2% of total income, and the top 20% of households accumulated approximately 52.7% of total income.

- In the 2009-2013 period, Grand Isle County, VT had the most equal income distribution between high and low income households (Gini coef. of 0.42) and the U.S. had the least equal income distribution (Gini coef. of 0.47).





Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Household Income Distribution, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Per-Capita Income	1%	3%	1%	3%	1%	2%	na	0%
Median Household Income^ (2013) $s	1%	2%	1%	3%	2%	3%	na	0%
Total Households	0%	1%	0%	3%	1%	1%	0%	0%
Less than $10,000	3%	13%	6%	25%	6%	9%	4%	0%
$10,000 to $14,999	3%	12%	6%	21%	8%	8%	4%	0%
$15,000 to $24,999	2%	8%	5%	14%	6%	7%	3%	0%
$25,000 to $34,999	2%	8%	6%	14%	5%	7%	3%	0%
$35,000 to $49,999	2%	5%	4%	10%	5%	6%	3%	0%
$50,000 to $74,999	1%	5%	3%	11%	5%	5%	2%	0%
$75,000 to $99,999	2%	5%	4%	10%	4%	5%	2%	0%
$100,000 to $149,999	2%	6%	3%	10%	6%	6%	2%	0%
$150,000 to $199,999	3%	9%	5%	15%	11%	10%	4%	0%
$200,000 or more	3%	13%	6%	17%	13%	9%	4%	0%
Gini Coefficient	1%	3%	1%	3%	1%	2%	na	0%

Percent of Total, Coefficients of Variation

Less than $10,000	3%	13%	6%	26%	7%	9%	4%	0%
$10,000 to $14,999	2%	11%	6%	22%	7%	8%	5%	0%
$15,000 to $24,999	2%	8%	5%	14%	6%	7%	3%	0%
$25,000 to $34,999	2%	8%	6%	14%	6%	8%	3%	0%
$35,000 to $49,999	2%	5%	4%	10%	6%	5%	3%	0%
$50,000 to $74,999	2%	5%	3%	11%	5%	5%	2%	0%
$75,000 to $99,999	2%	5%	4%	10%	4%	5%	3%	0%
$100,000 to $149,999	1%	6%	3%	10%	5%	6%	2%	0%
$150,000 to $199,999	3%	9%	5%	15%	11%	10%	4%	0%
$200,000 or more	4%	13%	6%	18%	12%	9%	4%	0%

Study Guide and Supplemental Information

How is income distributed?

What do we measure on this page?

This page describes the distribution of household income.
Per Capita Income: Total personal income divided by total population of an area.
Household: A household includes all the people who occupy a housing unit as their usual place of residence.
Gini Coefficient: provides a summary value of the inequality of income distribution. A value of 0 represents perfect equality and a value of 1 represents perfect inequality. The lower the Gini coefficient, the more equal the income distribution.
Lorenz Curve: a graphic representation comparing income distribution in the geography selected to the hypothetical lines of perfect equality and perfect inequality. Every point on the Lorenz curve can be used to develop statements such as "the bottom __% of households have __% of all income," or "the top __% of households have __% of all income."

Why is it important?

For public land managers, one of the important considerations of proposed management actions is whether low income populations could experience disproportionately high and adverse effects of proposed management actions. Understanding income differences within and between geographies helps to highlight areas where the population or a sub-population may be experiencing economic hardship.

The distribution of income can help to highlight several important aspects of economic well-being. A large number of households in the lower end of income distribution indicates economic hardship. A bulge in the middle distribution can be interpreted as the size of the middle class. A figure that shows a proportionally large number of households at both extremes indicates a geography characterized by "haves" and "have-nots."

Income distribution has always been a central concern of economic theory and economic policy. Classical economists were mainly concerned with the distribution of income between the main factors of production, land, labor, and capital. Modern economists have also addressed this issue, but have been more concerned with the distribution of income across individuals and households.

According to the Census Bureau, "Researchers believe that changes in the labor market and... household composition affected the long-run increase in income inequality. The wage distribution has become considerably more unequal with workers at the top experiencing real wage gains and those at the bottom real wage losses... At the same time, long-run changes in society's living arrangements have taken place also tending to exacerbate household income differences. For example, divorces, marital separations, births out of wedlock, and the increasing age at first marriage have led to a shift away from married-couple households to single-parent families and nonfamily households. Since non-married-couple households tend to have lower income and less equally distributed income than other types of households... changes in household composition have been associated with growing income inequality."

Methods

While the Census Bureau does not have an official definition of the "middle class," it does derive several measures related to the distribution of income and income inequality. Two standard measures of income equality are the Lorenz Curve and the Gini Coefficient. Mean values for each cohort were used to calculate total income, in the case of the top income cohort, income was assumed to be $250,000, a value which tends to yield lower than actual values for income disparity. For details on how to calculate, see Additional Resources below.

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

The U.S. Department of Agriculture's Economic Research Service published a useful article on metro and non-metro income levels and inequality. McLaughlin, Diane K. "Income Inequality in America." 2002. Rural America. Vol. 17(2). It is available at: ers.usda.gov/publications/ruralamerica/ra172/ra172c.pdf [(31)].

For useful remarks and scholarly references on the level and distribution of economic well-being, see Federal Reserve System Chairman Ben S. Bernanke's speech on February 6, 2007, available at: federalreserve.gov/newsevents/speech/Bernanke20070206a.htm [(32)].

For a helpful definition and description of the Lorenz Curve and Gini Coefficient see: econedlink.org/lessons/index.php?lid=885&type=educator [(33)].

For source material on how the Gini Coefficient and Lorenz Curve were computed see: https://docs.google.com/Doc?docid=0AXe2E1Mm09WIZGhzazhxaDRfMjUzZ25nMjdkZzY&hl=en [(34)].

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Study Guide

What are poverty levels?

This page describes the number of individuals and families living below the poverty line.

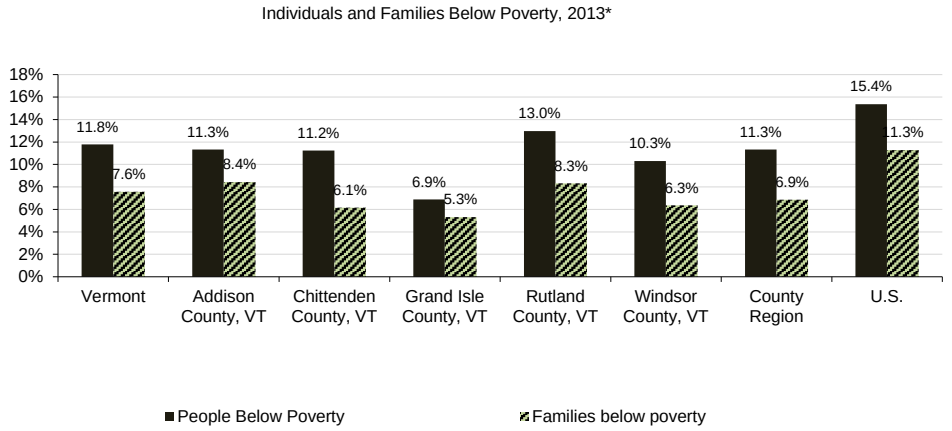
Poverty: Following the Office of Management and Budget's Directive 14, the Census Bureau uses a set of income thresholds that vary by family size and composition to detect who is poor. If the total income for a family or an unrelated individual falls below the relevant poverty threshold, then the family or an unrelated individual is classified as being "below the poverty level."

Poverty, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
People	601,245	34,217	148,314	6,979	58,981	55,366	303,857	303,692,076
Families	161,275	9,530	37,546	2,142	16,215	15,483	80,916	76,744,358
People Below Poverty	70,873	3,875	16,672	˙481	7,655	5,708	34,391	46,663,433
Families below poverty	12,205	803	2,309	˙114	1,349	983	5,558	8,666,630
Percent of Total								
People Below Poverty	11.8%	11.3%	11.2%	˙6.9%	13.0%	10.3%	11.3%	15.4%
Families below poverty	7.6%	8.4%	6.1%	˙5.3%	8.3%	6.3%	6.9%	11.3%

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- In the 2009-2013 period, the U.S. had the highest estimated percent of individuals living below poverty (15.4%), and Grand Isle County, VT had the lowest (6.9%).
- In the 2009-2013 period, the U.S. had the highest estimated percent of families living below poverty (11.3%), and Grand Isle County, VT had the lowest (5.3%).



Percent Below Poverty Level by Age & Family Type~, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
People	11.8%	11.3%	11.2%	˙6.9%	13.0%	10.3%	11.3%	15.4%
Under 18 years	14.8%	16.1%	11.1%	˙10.3%	16.8%	12.8%	13.0%	21.6%
65 years and older	7.5%	˙7.0%	˙6.5%	˙2.3%	8.3%	˙7.5%	7.1%	9.4%
Families	7.6%	8.4%	6.1%	˙5.3%	8.3%	6.3%	6.9%	11.3%
Families with related children < 18 years	13.4%	˙14.8%	10.5%	˙10.5%	15.0%	˙13.3%	12.3%	17.8%
Married couple families	3.2%	˙3.2%	˙2.1%	˙2.0%	˙4.1%	˙2.3%	2.7%	5.6%
with children < 18 years	4.5%	˙4.1%	˙2.8%	¨**2.8%**	˙5.9%	˙3.1%	˙3.5%	8.3%
Female householder, no husband present	28.5%	˙33.1%	˙26.4%	¨**14.7%**	˙28.1%	˙27.2%	27.5%	30.6%
with children < 18 years	37.4%	˙41.1%	˙37.0%	¨**18.9%**	˙36.4%	˙36.9%	37.0%	40.0%

~Percent below poverty level by age and family type is calculated by dividing the number of people by demographic in poverty by the total population of that demographic.

Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Poverty, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
People	0%	0%	0%	0%	0%	0%	0%	0%
Families	1%	2%	1%	3%	1%	2%	1%	0%
Individuals Below Poverty	2%	6%	4%	19%	6%	6%	3%	0%
Families Below Poverty	3%	10%	9%	26%	9%	11%	5%	0%

Percent of Total, Coefficients of Variation

Individuals Below Poverty	2%	6%	4%	19%	6%	6%	3%	0%
Families Below Poverty	3%	10%	9%	25%	9%	11%	5%	0%

Percent Below Poverty Level by Age and Family Type, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
People	2%	6%	4%	19%	6%	6%	3%	0%
Under 18 years	3%	9%	7%	27%	9%	11%	4%	0%
65 years and older	4%	14%	12%	35%	10%	12%	6%	0%
Families	3%	10%	9%	26%	9%	11%	5%	0%
Families with related children < 18 years	4%	12%	10%	29%	12%	15%	6%	0%
Married couple families	6%	19%	17%	40%	15%	18%	9%	0%
with children < 18 years	7%	24%	20%	61%	22%	24%	12%	1%
Female householder, no husband present	5%	16%	13%	51%	16%	18%	8%	0%
with children < 18 years	6%	17%	14%	55%	17%	20%	8%	0%

Study Guide and Supplemental Information

What are poverty levels?

What do we measure on this page?

This page describes the number of individuals and families living below the poverty line.

Family: A group of two or more people who reside together and who are related by birth, marriage, or adoption.

Poverty: Following the Office of Management and Budget's Directive 14, the Census Bureau uses a set of income thresholds that vary by family size and composition to detect who is poor. If the total income for a family or an unrelated individual falls below the relevant poverty threshold, then the family or an unrelated individual is classified as being "below the poverty level."

Why is it important?

Poverty is an important indicator of economic well-being. For public land managers, understanding the extent of poverty is important for several reasons. First, people with limited income may have different needs, values, and attitudes as they relate to public lands. Second, proposed activities on public lands may need to be analyzed in the context of whether people who are economically disadvantaged could experience disproportionately high and adverse effects.

Poverty rates are often reported in aggregate, which can hide important differences. The bottom table shows poverty for various types of individuals and families. This is important because aggregate poverty rates (for example, families below poverty) may hide some important information (for example, the poverty rate for single mothers with children).

Methods

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

For more information on rural poverty, see U.S. Department of Agriculture, Economic Research Service, Briefing Room, "Rural Income, Poverty, and Welfare: High Poverty Counties" available at: ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being.aspx [(35)].

The University of Michigan's National Poverty Center has a range of resources on poverty in the United States. See: www.npc.umich.edu/poverty [(36)].

The U.S. Environmental Protection Agency defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." Environmental Protection Agency environmental justice resources are available at: epa.gov/compliance/ej [(4)].

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

What are poverty levels?

This page describes the number of people living in poverty by race and ethnicity. It also shows the share of all people living in poverty by race and ethnicity, and the share of each race and ethnicity living in poverty.

Race: Race is a self-identification data item in which Census respondents choose the race or races with which they most closely identify.

Ethnicity: There are two minimum categories for ethnicity: Hispanic or Latino and Not Hispanic or Latino. The federal government considers race and Hispanic origin to be two separate and distinct concepts. Hispanics and Latinos may be of any race.

Poverty by Race and Ethnicity^, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population (all races) in Poverty	70,873	3,875	16,672	˙481	7,655	5,708	34,391	46,663,433
White alone	65,165	3,577	13,735	˙460	7,404	5,373	30,549	28,254,647
Black or African American alone	˙1,415	˙144	˙905	¨**0**	¨**31**	˙82	˙1,162	10,165,935
American Indian alone	˙509	¨**32**	˙180	¨**6**	¨**73**	¨**50**	˙341	701,439
Asian alone	˙1,277	¨**29**	˙817	¨**0**	¨**51**	¨**93**	˙990	1,872,394
Native Hawaiian & Oth.Pacific Is. alone	¨**0**	¨**0**	¨**0**	¨**0**	¨**0**	¨**0**	¨**0**	99,943
Some other race	˙233	¨**9**	¨**117**	¨**0**	¨**0**	¨**11**	˙137	3,872,191
Two or more races	2,274	˙84	˙918	¨**15**	˙96	˙99	˙1,212	1,696,884
All Ethnicities in Poverty								
Hispanic or Latino (of any race)	1,383	˙82	˙456	¨**11**	¨**28**	¨**157**	˙734	12,507,866
Not Hispanic or Latino (of any race)	69,490	3,793	16,216	˙470	7,627	5,551	33,657	34,155,567

Percent of Total (Total = All individuals in poverty)

White alone	91.9%	92.3%	82.4%	˙95.6%	96.7%	94.1%	88.8%	60.5%
Black or African American alone	˙2.0%	˙3.7%	˙5.4%	¨**0.0%**	¨**0.4%**	˙1.4%	˙3.4%	21.8%
American Indian alone	˙0.7%	¨**0.8%**	˙1.1%	¨**1.2%**	¨**1.0%**	¨**0.9%**	˙1.0%	1.5%
Asian alone	˙1.8%	¨**0.7%**	˙4.9%	¨**0.0%**	¨**0.7%**	¨**1.6%**	˙2.9%	4.0%
Native Hawaiian & Oth.Pacific Is. alone	¨**0.0%**	¨**0.0%**	¨**0.0%**	¨**0.0%**	¨**0.0%**	¨**0.0%**	¨**0.0%**	0.2%
Some other race	˙0.3%	¨**0.2%**	¨**0.7%**	¨**0.0%**	¨**0.0%**	¨**0.2%**	¨**0.4%**	8.3%
Two or more races	3.2%	˙2.2%	˙5.5%	¨**3.1%**	˙1.3%	˙1.7%	˙3.5%	3.6%
Hispanic or Latino (of any race)	2.0%	2.1%	2.7%	2.3%	0.4%	2.8%	2.1%	26.8%
Not Hispanic or Latino (of any race)	98.0%	97.9%	97.3%	97.7%	99.6%	97.2%	97.9%	73.2%

^ Percent of total population in poverty by race and ethnicity is calculated by dividing the number of people in poverty in each racial or ethnic category by the total population.
* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

Percent of People by Race and Ethnicity Who Are Below Poverty~, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
White alone	11.4%	10.8%	10.0%	˙6.9%	12.9%	10.1%	10.6%	12.5%
Black or African American alone	˙26.1%	˙55.0%	˙31.3%	¨**0.0%**	¨**14.9%**	¨**29.9%**	˙31.8%	27.1%
American Indian alone	˙28.9%	¨**34.4%**	˙42.4%	¨**12.2%**	¨**56.2%**	¨**44.6%**	˙42.2%	28.6%
Asian alone	˙17.4%	¨**8.0%**	˙19.4%	¨**0.0%**	¨**14.5%**	¨**20.0%**	˙18.3%	12.5%
Native Hawaiian & Oceanic alone	¨**0.0%**	¨**0.0%**	**na**	**na**	**na**	**na**	¨**0.0%**	˙19.6%
Some other race alone	˙14.3%	¨**42.9%**	¨**18.6%**	¨**0.0%**	¨**0.0%**	¨**6.3%**	¨**12.7%**	26.8%
Two or more races alone	19.8%	˙19.4%	˙28.1%	¨**6.4%**	˙12.6%	˙10.0%	˙21.3%	20.1%
Hispanic or Latino alone	15.3%	˙15.0%	˙16.5%	¨**11.8%**	¨**4.1%**	¨**21.7%**	˙15.3%	24.7%
Non-Hispanic/Latino alone	11.3%	10.8%	9.9%	˙6.8%	13.0%	10.0%	10.6%	10.6%

~Poverty prevalence by race and ethnicity is calculated by dividing the number of people by race in poverty by the total population of that race.

Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Poverty by Race and Ethnicity, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population (all races)	2%	6%	4%	19%	6%	6%	3%	0%
White alone	2%	6%	4%	20%	6%	6%	3%	0%
Black or African American alone	17%	22%	26%	na	57%	39%	20%	0%
American Indian alone	19%	44%	28%	101%	45%	66%	20%	1%
Asian alone	14%	59%	19%	na	55%	42%	16%	1%
Native Hawaiian & Oth.Pacific Is. alone	na	na	na	na	na	na	na	2%
Some other race	27%	81%	43%	na	na	72%	39%	1%
Two or more races	10%	31%	18%	65%	29%	32%	14%	0%
All Ethnicities								
Hispanic or Latino (of any race)	12%	29%	21%	83%	56%	56%	18%	0%
Not Hispanic/Latino	2%	6%	4%	20%	6%	7%	3%	1%

Percent of Total, Coefficients of Variation

White alone	2%	6%	4%	20%	6%	6%	3%	0%
Black or African American alone	18%	21%	26%	na	60%	38%	20%	0%
American Indian alone	17%	44%	28%	102%	45%	62%	18%	0%
Asian alone	13%	57%	19%	na	55%	41%	17%	0%
Native Hawaiian & Oth.Pacific Is. alone	na	na	na	na	na	na	na	0%
Some other race	18%	79%	43%	na	na	63%	46%	1%
Two or more races	9%	31%	18%	64%	29%	32%	14%	0%
Hispanic or Latino (of any race)	0%	0%	0%	0%	0%	0%	0%	0%
Not Hispanic/Latino	0%	1%	1%	2%	0%	2%	0%	0%

Percent Below Poverty Level by Race and Ethnicity, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
White alone	2%	7%	4%	20%	6%	7%	3%	0%
Black or African American alone	17%	26%	26%	na	60%	42%	21%	0%
American Indian alone	21%	48%	33%	111%	53%	76%	24%	1%
Asian alone	22%	94%	24%	na	112%	86%	23%	1%
Native Hawaiian & Oceanic alone	na	na	na	na	na	na	na	18%
Some other race alone	30%	100%	50%	na	na	79%	43%	1%
Two or more races alone	10%	32%	19%	66%	30%	34%	15%	1%
Hispanic or Latino alone	12%	30%	21%	83%	57%	56%	18%	0%
Non-Hispanic/Latino alone	2%	7%	4%	20%	6%	7%	3%	1%

Study Guide and Supplemental Information

What are poverty levels?

What do we measure on this page?

This page describes the number of people living in poverty by race and ethnicity. It also shows the share of all people living in poverty by race and ethnicity, and the share of each race and ethnicity living in poverty.

Race: Race is a self-identification data item in which Census respondents choose the race or races with which they most closely identify.

Ethnicity: There are two minimum categories for ethnicity: Hispanic or Latino, and Not Hispanic or Latino. The federal government considers race and Hispanic origin to be two separate and distinct concepts. Hispanics and Latinos may be of any race.

Poverty: Following the Office of Management and Budget's Directive 14, the Census Bureau uses a set of income thresholds that vary by family size and composition to detect who is poor. If the total income for a family or an unrelated individual falls below the relevant poverty threshold, then the family or an unrelated individual is classified as being "below the poverty level."

Why is it important?

For public land managers, understanding whether different races and ethnicities are affected by poverty can be important. People with limited income and from different races and ethnicities may have different needs, values, and attitudes as they relate to public lands. In addition, proposed activities on public lands may need to be analyzed in the context of whether minorities and people who are economically disadvantaged could experience disproportionately high and adverse effects.

Methods

The Census Bureau uses the federal government's official poverty definition. According to the Census: “Families and persons are classified as below poverty if their total family income or unrelated individual income was less than the poverty threshold specified for the applicable family size, age of householder, and number of related children under 18 present" (see below for poverty level thresholds).

The poverty thresholds are updated every year by the Census Bureau to reflect changes in the Consumer Price Index. The poverty thresholds are the same for all parts of the country. They are not adjusted for regional, state or local variations in the cost of living. The specific thresholds used for tabulation of income for particular years are shown at: census.gov/hhes/www/poverty/data/threshld/index.html [37].

Race categories include both racial and national-origin groups. The concept of race is separate from the concept of Hispanic origin. Percentages for the various race categories add to 100 percent, and should not be combined with the percent Hispanic.

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

The University of Michigan’s National Poverty Center hosts a body of research on race and ethnicity as they relate to poverty. See: npc.umich.edu/research/ethnicity [38].

The U.S. Census Bureau briefing on “Poverty Areas” shows that Blacks and Hispanics are disproportionately affected by poverty. “Four times as many Blacks and three times as many Hispanics lived in poverty areas than lived outside them.” For more information, see: census.gov/population/socdemo/statbriefs/povarea.html [39].

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

What are the components of household earnings?

This page describes household earnings by income source and mean household earnings by source.

Number of Households Receiving Earnings, by Source, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total households:	257,004	14,164	62,587	3,023	25,754	25,024	130,552	115,610,216
Labor earnings	204,178	11,534	52,138	2,458	19,683	19,268	105,081	90,436,935
Social Security (SS)	80,465	4,413	15,825	976	8,946	8,620	38,780	33,386,448
Retirement income	43,303	2,440	10,036	645	4,839	4,514	22,474	20,504,523
Supplemental Security Income (SSI)	13,709	641	2,816	˙138	1,660	1,469	6,724	5,716,592
Cash public assistance income	11,311	˙524	2,805	˙135	1,653	˙901	6,018	3,255,213
Food Stamp/SNAP	34,437	1,831	6,684	˙401	4,161	3,330	16,407	14,339,330

Percent of Total^

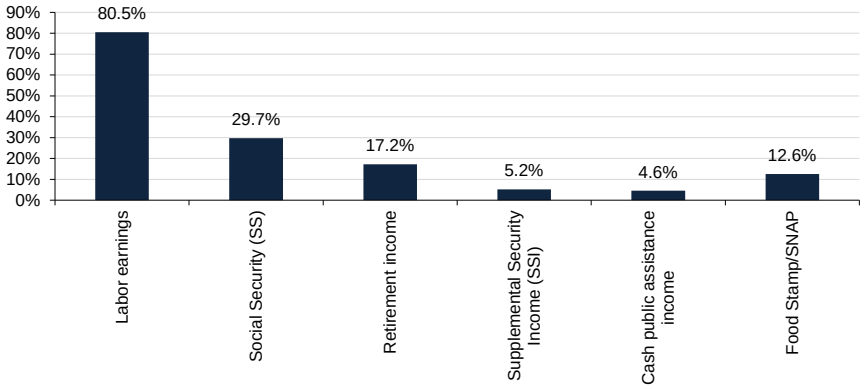
Labor earnings	79.4%	81.4%	83.3%	81.3%	76.4%	77.0%	80.5%	78.2%
Social Security (SS)	31.3%	31.2%	25.3%	32.3%	34.7%	34.4%	29.7%	28.9%
Retirement income	16.8%	17.2%	16.0%	21.3%	18.8%	18.0%	17.2%	17.7%
Supplemental Security Income (SSI)	5.3%	˙4.5%	4.5%	˙4.6%	6.4%	5.9%	5.2%	4.9%
Cash public assistance income	4.4%	3.7%	4.5%	˙4.5%	6.4%	3.6%	4.6%	2.8%
Food Stamp/SNAP	13.4%	12.9%	10.7%	˙13.3%	16.2%	13.3%	12.6%	12.4%

^ Total may add to more than 100% due to households receiving more than 1 source of income.

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- In the 2009-2013 period, the highest estimated percent of public assistance in the County Region was in the form of Social Security (SS) (29.7%), and the lowest was in the form of Cash public assistance income (4.6%).

Percent of Households Receiving Earnings, by Source, 2013*



Mean Annual Household Earnings by Source, 2013 (2013 $s)

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Mean earnings	$68,644	$67,245	$80,585	$76,522	$60,325	$68,553	$73,025	$75,017
Mean Social Security income	$17,081	$17,393	$17,676	$17,611	$16,830	$17,646	$17,440	$17,189
Mean retirement income	$20,691	$20,047	$22,726	˙$22,686	$20,812	$21,105	$21,696	$23,589
Mean Supplemental Security Income	$9,217	˙$8,041	˙$9,042	˙$8,732	$9,153	˙$8,847	$8,925	$9,152
Mean cash public assistance income	$3,410	˙$5,042	˙$3,405	¨**$3,313**	˙$3,269	˙$3,170	$3,473	$3,808

Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Number of Households Receiving Earnings, By Source, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total households:	0%	1%	0%	3%	1%	1%	0%	0%
Labor earnings	0%	1%	1%	3%	1%	1%	1%	0%
Social Security (SS)	1%	2%	2%	5%	2%	2%	1%	0%
Retirement income	1%	4%	3%	7%	3%	4%	2%	0%
Supplemental Security Income (SSI)	3%	12%	8%	18%	8%	9%	5%	0%
Cash public assistance income	4%	12%	7%	24%	8%	12%	5%	0%
Food Stamp/SNAP	2%	6%	5%	13%	6%	6%	3%	0%

Percent of Total, Coefficients of Variation

Labor earnings	0%	1%	1%	3%	1%	1%	1%	0%
Social Security (SS)	1%	3%	2%	5%	2%	2%	1%	0%
Retirement income	1%	4%	3%	7%	4%	4%	2%	0%
Supplemental Security Income (SSI)	3%	12%	8%	19%	8%	9%	5%	0%
Cash public assistance income	4%	12%	7%	25%	9%	12%	5%	0%
Food Stamp/SNAP	2%	6%	5%	13%	6%	6%	3%	0%

Mean Annual Household Earnings by Source, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Mean earnings	1%	2%	1%	4%	2%	2%	1%	0%
Mean Social Security income	1%	3%	3%	7%	3%	3%	1%	0%
Mean retirement income	2%	8%	5%	12%	7%	7%	3%	0%
Mean Supplemental Security Income	4%	17%	13%	26%	12%	14%	7%	0%
Mean cash public assistance income	6%	24%	14%	40%	15%	21%	8%	0%

Study Guide and Supplemental Information

What are the components of household earnings?

What do we measure on this page?

This page describes household earnings by source.

Labor Earnings: Refers to households that receive wage or salary income and net income from self-employment.

Social Security: Refers to households that receive income that includes Social Security pensions and survivor benefits, permanent disability insurance payments made by the Social Security Administration before deductions for medical insurance, and railroad retirement insurance. It does not include Medicare reimbursement.

Retirement income: Consists of families that receive income from: (1) retirement pensions and survivor benefits from a former employer; labor union; or federal, state, or local government; and the U.S. military; (2) disability income from companies or unions; federal, state, or local government; and the U.S. military; (3) periodic receipts from annuities and insurance; and (4) regular income from IRA and Keogh plans. It does not include Social Security income.

Supplemental Security Income (SSI): Refers to households that receive assistance by the Social Security Administration that guarantees a minimum level of income for needy aged, blind, or disabled individuals.

Cash Public Assistance Income: Are households that receive public assistance that includes general assistance and Temporary Assistance to Needy Families (TANF). It does not include separate payments received for hospital or other medical care (vendor payments) or Supplemental Security Income (SSI) or noncash benefits such as Food Stamps.

Food Stamps/SNAP: Refers to households that receive coupons or cards that can be used to purchase food. This program was recently renamed the Supplemental Nutrition Assistance Program (SNAP). ACS does not report mean dollar amounts for this item.

Methods

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Why is this important?

Earnings are not the only source of income, and for many families and communities a significant portion of income can be in the form of additional sources, such as retirement and Social Security. While some payments may be an indication of an aging population or an influx of retirees (retirement payments), other measures (for example, SSI or Food Stamps) are an indication of economic hardship.

Additional Resources

For a glossary of terms used in ACS, see:
census.gov/acs/www/Downloads/data_documentation/SubjectDefinitions/2009_ACSSubjectDefinitions.pdf (40).

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

What are education and enrollment levels?

This page describes educational attainment and school enrollment.

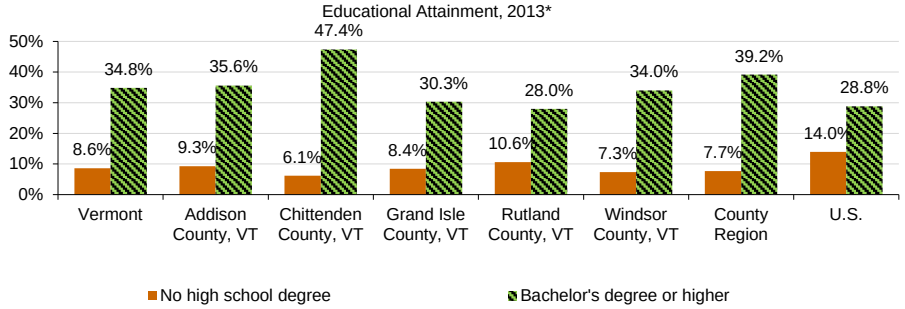
Educational Attainment, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population 25 yrs or older	433,401	24,793	102,086	5,172	43,572	41,811	217,434	206,587,852
No high school degree	37,321	2,294	6,266	ˇ437	4,615	3,072	16,684	28,887,721
High school graduate	396,080	22,499	95,820	4,735	38,957	38,739	200,750	177,700,131
Associates degree	36,977	1,710	9,388	517	3,494	3,447	18,556	16,135,795
Bachelor's degree or higher	150,866	8,823	48,338	1,567	12,183	14,216	85,127	59,583,138
Bachelor's degree	91,084	4,937	30,118	978	7,646	7,738	51,417	37,286,246
Graduate or professional	59,782	3,886	18,220	589	4,537	6,478	33,710	22,296,892
Percent of Total								
No high school degree	8.6%	9.3%	6.1%	ˇ8.4%	10.6%	7.3%	7.7%	14.0%
High school graduate	91.4%	90.7%	93.9%	91.6%	89.4%	92.7%	92.3%	86.0%
Associates degree	8.5%	6.9%	9.2%	10.0%	8.0%	8.2%	8.5%	7.8%
Bachelor's degree or higher	34.8%	35.6%	47.4%	30.3%	28.0%	34.0%	39.2%	28.8%
Bachelor's degree	21.0%	19.9%	29.5%	18.9%	17.5%	18.5%	23.6%	18.0%
Graduate or professional	13.8%	15.7%	17.8%	11.4%	10.4%	15.5%	15.5%	10.8%

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- In the 2009-2013 period, Chittenden County, VT had the highest estimated percent of people over the age of 25 with a bachelor's degree or higher (47.4%), and Rutland County, VT had the lowest (28.0%).

- In the 2009-2013 period, the U.S. had the highest estimated percent of people over the age of 25 with no high school degree (14.0%), and Chittenden County, VT had the lowest (6.1%).



School Enrollment, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population over 3 years old:	608,105	35,864	153,316	6,852	59,781	54,828	310,641	299,795,523
Enrolled in school:	153,287	9,880	46,360	1,530	14,252	11,906	83,928	82,624,806
Enrolled in nursery school, preschool	8,718	492	2,510	ˇ144	998	ˇ770	4,914	5,011,192
Enrolled in kindergarten	6,716	407	1,806	ˇ86	ˇ459	ˇ596	3,354	4,208,394
Enrolled in grade 1 to grade 4	27,746	1,591	6,621	303	2,571	2,549	13,635	16,286,543
Enrolled in grade 5 to grade 8	28,883	1,702	6,814	320	2,888	2,425	14,149	16,510,313
Enrolled in grade 9 to grade 12	32,146	1,990	7,618	344	2,980	2,905	15,837	17,153,559
Enrolled in college, undergraduate years	40,815	3,363	17,960	ˇ245	3,745	1,516	26,829	19,333,036
Graduate or professional school	8,263	ˇ335	3,031	ˇ88	ˇ611	ˇ1,145	5,210	4,121,769
Not enrolled in school	454,818	25,984	106,956	5,322	45,529	42,922	226,713	217,170,717
Percent of Total								
Enrolled in school:	25.2%	27.5%	30.2%	22.3%	23.8%	21.7%	27.0%	27.6%
Enrolled in nursery school, preschool	1.4%	1.4%	1.6%	ˇ2.1%	1.7%	ˇ1.4%	1.6%	1.7%
Enrolled in kindergarten	1.1%	1.1%	1.2%	ˇ1.3%	ˇ0.8%	1.1%	1.1%	1.4%
Enrolled in grade 1 to grade 4	4.6%	4.4%	4.3%	4.4%	4.3%	4.6%	4.4%	5.4%
Enrolled in grade 5 to grade 8	4.7%	4.7%	4.4%	4.7%	4.8%	4.4%	4.6%	5.5%
Enrolled in grade 9 to grade 12	5.3%	5.5%	5.0%	5.0%	5.0%	5.3%	5.1%	5.7%
Enrolled in college, undergraduate years	6.7%	9.4%	11.7%	ˇ3.6%	6.3%	2.8%	8.6%	6.4%
Graduate or professional school	1.4%	ˇ0.9%	2.0%	ˇ1.3%	1.0%	ˇ2.1%	1.7%	1.4%
Not enrolled in school	74.8%	72.5%	69.8%	77.7%	76.2%	78.3%	73.0%	72.4%

Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Educational Attainment, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population 25 yrs or older	0%	0%	0%	1%	0%	0%	0%	0%
No high school degree	2%	6%	5%	13%	5%	6%	3%	0%
High school graduate	0%	2%	1%	3%	1%	2%	1%	0%
Associates degree	2%	6%	4%	10%	5%	5%	3%	0%
Bachelor's degree or higher	1%	3%	2%	5%	3%	3%	1%	0%
Bachelor's degree	1%	3%	2%	7%	3%	4%	1%	0%
Graduate or professional	1%	4%	3%	8%	4%	4%	2%	0%

Percent of Total, Coefficients of Variation

No high school degree	2%	7%	5%	13%	5%	6%	2%	0%
High school graduate	0%	2%	1%	3%	1%	2%	1%	0%
Associates degree	1%	5%	4%	10%	5%	5%	3%	0%
Bachelor's degree or higher	1%	3%	2%	5%	3%	3%	1%	0%
Bachelor's degree	1%	3%	2%	6%	3%	4%	1%	0%
Graduate or professional	1%	4%	2%	8%	5%	4%	2%	0%

School Enrollment, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Population over 3 years old:	0%	0%	0%	0%	0%	0%	0%	0%
Enrolled in school:	0%	1%	1%	3%	2%	2%	1%	0%
Enrolled in nursery school, preschool	3%	9%	6%	18%	12%	14%	5%	0%
Enrolled in kindergarten	4%	11%	8%	19%	14%	14%	5%	0%
Enrolled in grade 1 to grade 4	2%	5%	3%	9%	6%	6%	2%	0%
Enrolled in grade 5 to grade 8	2%	4%	4%	11%	5%	6%	2%	0%
Enrolled in grade 9 to grade 12	1%	3%	3%	8%	4%	3%	2%	0%
Enrolled in college, undergraduate years	1%	4%	2%	13%	6%	9%	2%	0%
Graduate or professional school	4%	16%	7%	19%	13%	16%	6%	0%
Not enrolled in school	0%	1%	0%	1%	1%	1%	0%	0%

Percent of Total, Coefficients of Variation

Enrolled in school:	0%	2%	1%	4%	2%	2%	1%	0%
Enrolled in nursery school, preschool	4%	9%	7%	17%	11%	13%	4%	0%
Enrolled in kindergarten	6%	11%	10%	19%	16%	11%	6%	0%
Enrolled in grade 1 to grade 4	1%	5%	3%	8%	6%	7%	3%	0%
Enrolled in grade 5 to grade 8	1%	4%	4%	10%	5%	5%	3%	0%
Enrolled in grade 9 to grade 12	1%	3%	2%	7%	4%	3%	1%	0%
Enrolled in college, undergraduate years	1%	4%	2%	14%	6%	9%	2%	0%
Graduate or professional school	4%	13%	6%	19%	12%	15%	7%	0%
Not enrolled in school	0%	1%	0%	1%	1%	1%	0%	0%

Study Guide and Supplemental Information

What are education and enrollment levels?

What do we measure on this page?

This page describes levels of educational attainment.

Educational Attainment: This refers to the level of education completed by people 25 years and over in terms of the highest degree or the highest level of schooling completed.

School Enrollment: The ACS defines people as enrolled in school if when the survey was conducted they were attending a public or private school or college at any time during the three months prior to the time of interview. People enrolled in vocational, technical, or business school such as post secondary vocational, trade, hospital school, and on job training were not reported as enrolled in school.

Why is it important?

Education is one of the most important indicators of the potential for economic success, and lack of education is closely linked to poverty. Studies show that geographies with a higher than average educated workforce grow faster, have higher incomes, and suffer less during economic downturns than other geographies. See "Additional Resources" below for more information.

For public land managers, understanding the differences in education levels can highlight whether certain people in geographic areas might experience disproportionately high and adverse effects of particular management actions. It also can help to identify how communication and outreach efforts could be tailored to different audiences.

School enrollment is an important indicator of the number of dependents in a community that are not of working age, access to education, and potential for future growth. Some government agencies also use this information for funding allocations.

Methods

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

For information on the relationship between level of education, earnings, year-round employment, and unemployment rates, see:

The Bureau of Labor Statistics' web resource: bls.gov/emp/ep_chart_001.htm (41).

U.S. Census Bureau's 2002 publication "The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings," available at: census.gov/prod/2002pubs/p23-210.pdf (42).

Card, David (1999). "The Causal Effect of Education on Earnings" in Orley Ashenfelter and David Card, eds., Handbook of Labor Economics, vol. 3A. New York: Elsevier, pp. 1801-63.

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

What languages are spoken?

This page measures the primary language people speak at home.

Language Spoken at Home: The language currently used by respondents five years and over at home, either "English only" or a non-English language which is used in addition to English or in place of English.

Language Spoken at Home, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Population 5 yrs or older	594,667	35,185	149,900	6,677	58,550	53,748	304,060	291,484,482
Speak only English	563,632	33,375	137,350	6,447	56,146	51,579	284,897	231,122,908
Speak a language other than English	31,035	1,810	12,550	ˇ230	2,404	2,169	19,163	60,361,574
Spanish or Spanish Creole	6,179	526	1,743	ˇ19	ˇ691	ˇ649	3,628	37,458,624
Other Indo-European languages	18,349	ˇ891	6,859	ˇ189	ˇ1,275	ˇ1,169	10,383	10,737,607
Asian and Pacific Island languages	4,808	ˇ334	2,754	¨**14**	ˇ320	ˇ283	3,705	9,539,099
Other languages	ˇ1,699	¨**59**	ˇ1,194	¨**8**	¨**118**	¨**68**	ˇ1,447	2,626,244
Speak English less than "very well"	8,754	ˇ456	4,677	¨**34**	ˇ576	ˇ457	6,200	25,148,900

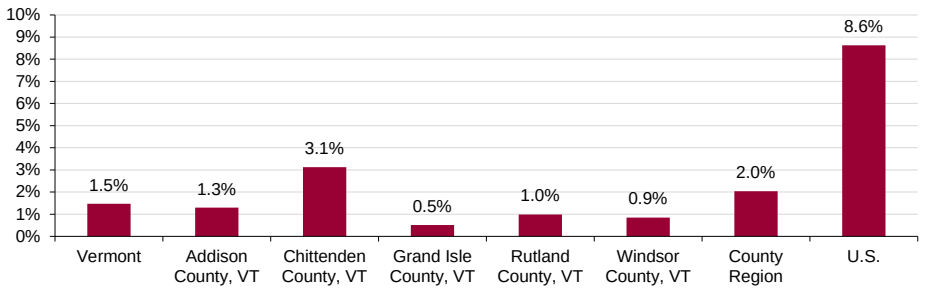
Percent of Total

Speak only English	94.8%	94.9%	91.6%	96.6%	95.9%	96.0%	93.7%	79.3%
Speak a language other than English	5.2%	5.1%	8.4%	ˇ3.4%	4.1%	4.0%	6.3%	20.7%
Spanish or Spanish Creole	1.0%	1.5%	1.2%	¨**0.3%**	ˇ1.2%	ˇ1.2%	1.2%	12.9%
Other Indo-European languages	3.1%	ˇ2.5%	4.6%	ˇ2.8%	ˇ2.2%	ˇ2.2%	3.4%	3.7%
Asian and Pacific Island languages	0.8%	ˇ0.9%	ˇ1.8%	¨**0.2%**	ˇ0.5%	ˇ0.5%	1.2%	3.3%
Other languages	ˇ0.3%	¨**0.2%**	ˇ0.8%	¨**0.1%**	¨**0.2%**	¨**0.1%**	ˇ0.5%	0.9%
Speak English less than "very well"	1.5%	ˇ1.3%	3.1%	¨**0.5%**	ˇ1.0%	ˇ0.9%	2.0%	8.6%

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- In the 2009-2013 period, the U.S. had the highest estimated percent of people that spoke English less than 'very well' (8.6%), and Grand Isle County, VT had the lowest (0.5%).

Percent of Population that Speaks English Less Than "Very Well", 2013*



Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Language Spoken at Home, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Population 5 yrs or older	0%	0%	0%	0%	0%	0%	0%	0%
Speak only English	0%	0%	0%	0%	0%	0%	0%	0%
Speak a language other than English	3%	7%	5%	23%	8%	10%	4%	0%
Spanish or Spanish Creole	5%	10%	9%	35%	16%	16%	6%	0%
Other Indo-European languages	4%	12%	7%	22%	13%	15%	5%	0%
Asian and Pacific Island languages	8%	17%	12%	165%	22%	23%	9%	0%
Other languages	17%	55%	22%	266%	58%	132%	20%	1%
Speak English less than "very well"	5%	19%	9%	141%	18%	29%	7%	0%

Percent of Total, Coefficients of Variation

Speak only English	0%	0%	0%	0%	0%	0%	0%	0%
Speak a language other than English	2%	7%	5%	23%	9%	9%	4%	0%
Spanish or Spanish Creole	6%	8%	10%	43%	15%	15%	5%	0%
Other Indo-European languages	4%	12%	7%	21%	14%	14%	5%	0%
Asian and Pacific Island languages	8%	19%	13%	174%	22%	23%	10%	0%
Other languages	21%	73%	23%	254%	60%	144%	26%	0%
Speak English less than "very well"	4%	19%	8%	143%	19%	29%	6%	0%

Study Guide and Supplemental Information

What languages are spoken?

What do we measure on this page?

This page measures the primary language people speak at home.

Language Spoken at Home: The language currently used by respondents five years and over at home, either "English only" or a non-English language which is used in addition to English or in place of English.

Why is it important?

For public land managers who are trying to communicate with citizens of communities adjacent to public lands, it is important to know whether a significant portion of that population has trouble speaking English. If this is the case, public outreach, meetings, plans, and implementation may need to be conducted in multiple languages.

Methods

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

The Modern Language Association has developed an online mapping tool that shows languages spoken for most geographies in the United States. This tool is available at: mla.org/map_single [43].

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

What are the main housing characteristics?

This page describes whether housing is occupied or vacant, for rent or seasonally occupied, and the year built.

Housing Characteristics, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Housing Units	322,915	16,767	66,002	5,073	33,725	34,077	155,644	132,057,804
Occupied	257,004	14,164	62,587	3,023	25,754	25,024	130,552	115,610,216
Vacant	65,911	2,603	3,415	2,050	7,971	9,053	25,092	16,447,588
For rent	4,449	ˇ212	ˇ619	¨**55**	1,076	ˇ632	2,594	3,230,123
Rented, not occupied	ˇ1,054	¨**23**	¨**115**	¨**26**	ˇ211	ˇ65	ˇ440	599,884
For sale only	3,326	ˇ315	ˇ388	ˇ120	ˇ383	ˇ509	1,715	1,682,020
Sold, not occupied	ˇ658	¨**0**	¨**18**	¨**0**	¨**23**	ˇ140	ˇ181	608,590
For seasonal, recreational, occasional use	48,401	1,683	ˇ1,373	1,705	5,548	6,759	17,068	5,122,778
For migrant workers	¨**119**	¨**0**	¨**0**	¨**0**	¨**17**	¨**19**	¨**36**	34,233
Other vacant	7,904	ˇ370	ˇ902	ˇ144	ˇ713	ˇ929	3,058	5,169,960
Year Built								
Built 2005 or later	1,255	ˇ48	ˇ393	¨**16**	ˇ95	¨**75**	ˇ627	771,765
Built 2000 to 2004	32,399	1,797	7,408	798	2,155	3,280	15,438	19,385,497
Built 1990 to 1999	37,046	2,191	8,723	663	3,027	3,700	18,304	18,390,124
Built 1980 to 1989	52,602	2,426	11,487	844	5,291	5,611	25,659	18,345,244
Built 1970 to 1979	51,207	2,621	10,188	716	5,640	5,670	24,835	21,042,566
Built 1960 to 1969	28,754	1,506	6,579	531	3,584	2,668	14,868	14,634,125
Built 1959 or earlier	119,652	6,178	21,224	1,505	13,933	13,073	55,913	39,488,483
Median year structure built^	1973	1973	1975	1977	1968	1972	**na**	1976

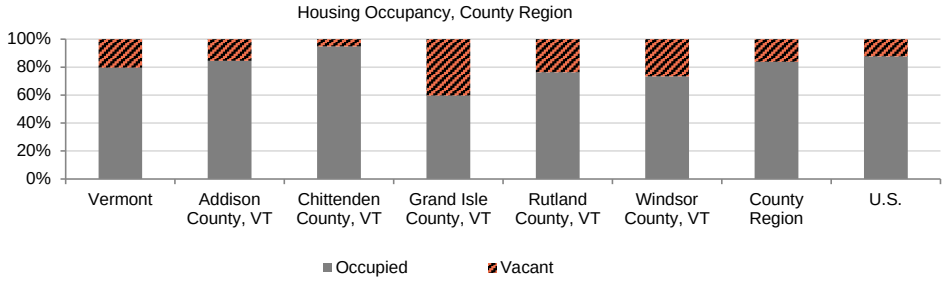
Percent of Total

Occupancy								
Occupied	79.6%	84.5%	94.8%	59.6%	76.4%	73.4%	83.9%	87.5%
Vacant	20.4%	15.5%	5.2%	40.4%	23.6%	26.6%	16.1%	12.5%
For rent	1.4%	ˇ1.3%	ˇ0.9%	¨**1.1%**	3.2%	ˇ1.9%	1.7%	2.4%
Rented, not occupied	ˇ0.3%	¨**0.1%**	ˇ0.2%	¨**0.5%**	ˇ0.6%	ˇ0.2%	ˇ0.3%	0.5%
For sale only	1.0%	ˇ1.9%	ˇ0.6%	ˇ2.4%	ˇ1.1%	ˇ1.5%	1.1%	1.3%
Sold, not occupied	ˇ0.2%	¨**0.0%**	0.0%	¨**0.0%**	¨**0.1%**	ˇ0.4%	¨**0.1%**	0.5%
For seasonal, recreational, or occasional use	15.0%	10.0%	2.1%	33.6%	16.5%	19.8%	11.0%	3.9%
For migrant workers	0.0%	¨**0.0%**	¨**0.0%**	¨**0.0%**	¨**0.1%**	¨**0.1%**	0.0%	0.0%
Other vacant	2.4%	ˇ2.2%	ˇ1.4%	ˇ2.8%	ˇ2.1%	ˇ2.7%	2.0%	3.9%
Year Built								
Built 2005 or later	ˇ0.4%	¨**0.3%**	ˇ0.6%	¨**0.3%**	ˇ0.3%	¨**0.2%**	ˇ0.4%	0.6%
Built 2000 to 2004	10.0%	10.7%	11.2%	15.7%	6.4%	9.6%	9.9%	14.7%
Built 1990 to 1999	11.5%	13.1%	13.2%	13.1%	9.0%	10.9%	11.8%	13.9%
Built 1980 to 1989	16.3%	14.5%	17.4%	16.6%	15.7%	16.5%	16.5%	13.9%
Built 1970 to 1979	15.9%	15.6%	15.4%	14.1%	16.7%	16.6%	16.0%	15.9%
Built 1960 to 1969	8.9%	9.0%	10.0%	10.5%	10.6%	7.8%	9.6%	11.1%
Built 1959 or earlier	37.1%	36.8%	32.2%	29.7%	41.3%	38.4%	35.9%	29.9%

^ Median year structure built is not available for metro/non-metro or regional aggregations.

* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- In the 2009-2013 period, Grand Isle County, VT had the highest estimated percent of the vacant housing (40.4%), and Chittenden County, VT had the lowest (5.2%).



Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Housing Characteristics, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Total Housing Units	0%	1%	0%	1%	0%	0%	0%	0%
Occupied	0%	1%	0%	3%	1%	1%	0%	0%
Vacant	1%	5%	8%	4%	3%	3%	2%	1%
For rent	6%	25%	23%	48%	12%	18%	9%	1%
Rented, not occupied	15%	58%	44%	65%	28%	38%	19%	1%
For sale only	8%	24%	26%	28%	20%	15%	10%	1%
Sold, not occupied	18%	na	101%	na	50%	36%	31%	1%
For seasonal, recreational, or occasional use	1%	4%	12%	4%	3%	3%	2%	0%
For migrant workers	42%	na	na	na	72%	70%	74%	2%
Other vacant	5%	15%	18%	22%	16%	14%	8%	1%
Year Built								
Built 2005 or later	11%	33%	25%	49%	29%	45%	17%	0%
Built 2000 to 2004	2%	6%	4%	9%	7%	5%	2%	0%
Built 1990 to 1999	2%	5%	3%	11%	6%	5%	2%	0%
Built 1980 to 1989	1%	6%	3%	9%	4%	5%	2%	0%
Built 1970 to 1979	1%	5%	4%	10%	3%	3%	2%	0%
Built 1960 to 1969	2%	7%	4%	10%	5%	6%	3%	0%
Built 1959 or earlier	1%	3%	2%	6%	3%	3%	1%	0%
Median year structure built	0%	0%	0%	0%	0%	0%	na	0%

Percent of Total, Coefficients of Variation

Occupancy								
Occupied	0%	1%	0%	3%	1%	1%	0%	0%
Vacant	1%	5%	8%	4%	3%	3%	2%	1%
For rent	4%	24%	19%	45%	11%	20%	7%	0%
Rented, not occupied	19%	44%	35%	71%	29%	32%	22%	0%
For sale only	6%	23%	21%	28%	21%	16%	11%	0%
Sold, not occupied	30%	na	0%	na	89%	30%	52%	0%
For seasonal, recreational, or occasional use	1%	4%	12%	4%	3%	3%	2%	0%
For migrant workers	0%	na	na	na	121%	109%	0%	0%
Other vacant	5%	14%	18%	21%	17%	13%	9%	2%
Year Built								
Built 2005 or later	16%	42%	20%	58%	22%	55%	15%	0%
Built 2000 to 2004	2%	6%	4%	9%	7%	5%	2%	0%
Built 1990 to 1999	2%	5%	3%	11%	6%	5%	2%	0%
Built 1980 to 1989	1%	5%	3%	9%	4%	5%	2%	0%
Built 1970 to 1979	1%	5%	4%	10%	3%	3%	2%	0%
Built 1960 to 1969	2%	7%	4%	10%	5%	6%	3%	0%
Built 1959 or earlier	1%	3%	2%	6%	3%	3%	1%	0%

Study Guide and Supplemental Information

What are the main housing characteristics?

What do we measure on this page?

This page describes whether housing is occupied or vacant, for rent or seasonally occupied, and the year built.

Rent: The number of homes for rent was defined as occupied housing units that were for rent, vacant housing units that were for rent, and vacant units rented but not occupied at the time of interview.

For Seasonal, Recreational, or Occasional Use: Refers to vacant units used or intended for use only in certain seasons or for weekends or other occasional use throughout the year.

For Migrant Workers: refers to housing units intended for occupancy by migratory workers employed in farm work during the crop season.

Why is it important?

Vacancy status is an indicator of the housing market and provides information on the stability and quality of housing for certain areas. The data is used to assess the demand for housing, to identify housing turnover within areas, and to better understand the population within the housing market over time. These data also serve to aid in the development of housing programs to meet the needs of persons at different economic levels.

Seasonal or recreational homes (i.e., "second homes") are often an indicator of the desirability of a place for recreation and tourism. This could also be used as an indicator of recreational and scenic amenities, which can be one of the economic contributions of public lands.

While the late 1990s and early 2000s were a period of rapid home development throughout the country, there have been other periods when housing grew at a fast rate (the late 1970s, for example, in some parts of the country). Understanding the relative growth rates of housing is relevant for public lands managers in the context of the wildland-urban interface, and as an indicator of overall economic growth. The year the home was built also provides information on the age of the housing stock, which can be used to forecast future demand of services, such as energy consumption and fire protection.

Housing that is classified as available for migrant workers can be used an indicator of a certain type of economic activity, in particular crop agriculture.

Methods

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

For a glossary of terms used in ACS, see:
census.gov/acs/www/Downloads/data_documentation/SubjectDefinitions/2009_ACSSubjectDefinitions.pdf [40].

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

How affordable is housing?

This page describes whether housing is affordable for homeowners and renters.

Housing Costs as a Percent of Household Income, 2013*

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Owner-occupied housing units with a mortgage	120,485	6,970	29,517	1,666	11,194	11,136	60,483	49,820,840
Monthly cost <15% of household income	17,598	882	4,595	˙254	1,658	1,478	8,867	9,215,740
Monthly cost >30% of household income	44,405	2,602	9,806	738	4,245	4,427	21,818	17,636,343
Specified renter-occupied units	74,467	3,667	21,851	568	7,812	7,562	41,460	40,534,516
Gross rent <15% of household income	6,186	˙405	1,495	¨**32**	˙767	˙828	3,527	4,355,942
Gross rent >30% of household income	36,059	1,619	11,687	˙242	3,728	3,274	20,550	19,581,493
Median monthly mortgage cost^	$1,546	$1,559	$1,832	$1,712	$1,431	$1,557	**na**	$1,540
Median gross rent^	$875	$877	$1,026	$871	$789	$852	**na**	$904

Percent of Total

Monthly cost <15% of household income	14.6%	12.7%	15.6%	˙15.2%	14.8%	13.3%	14.7%	18.5%
Monthly cost >30% of household income	36.9%	37.3%	33.2%	44.3%	37.9%	39.8%	36.1%	35.4%
Gross rent <15% of household income	8.3%	˙11.0%	6.8%	¨**5.6%**	˙9.8%	˙10.9%	8.5%	10.7%
Gross rent >30% of household income	48.4%	44.2%	53.5%	˙42.6%	47.7%	43.3%	49.6%	48.3%

^ Median monthly mortgage cost and median gross rent are not available for metro/non-metro or regional aggregations.

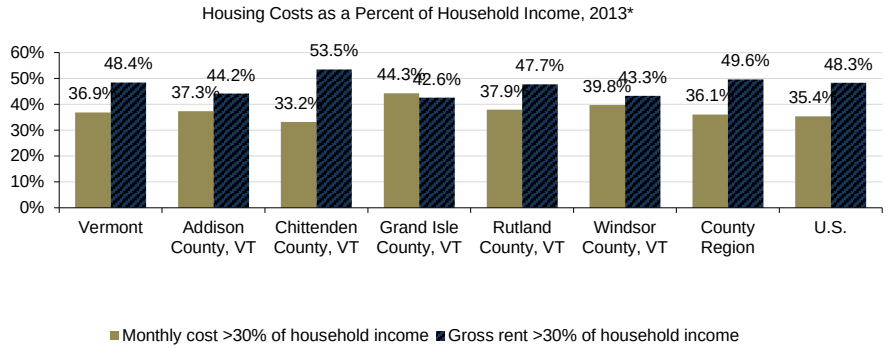
* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

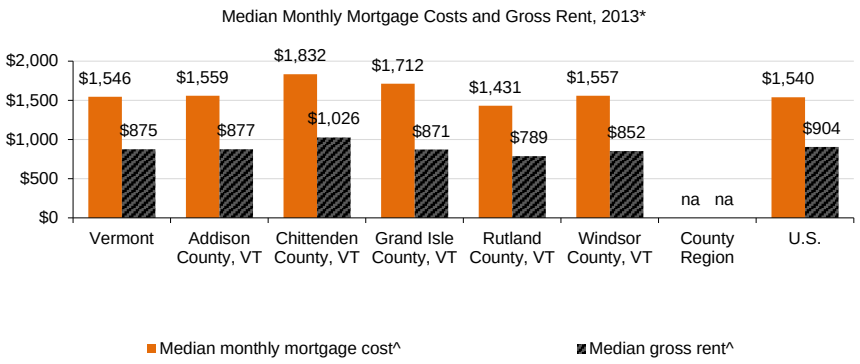
- In the 2009-2013 period, Grand Isle County, VT had the highest estimated percent of owner-occupied households where greater than 30% of household income was spent on mortgage costs (44.3%), and Chittenden County, VT had the lowest (33.2%).

- In the 2009-2013 period, Chittenden County, VT had the highest estimated percent of renter-occupied households where greater than 30% of household income was spent on gross rent (53.5%), and Grand Isle County, VT had the lowest (42.6%).

- In the 2009-2013 period, Chittenden County, VT had the highest estimated monthly mortgage costs for owner-occupied homes ($1,832), and Rutland County, VT had the lowest ($1,431).

- In the 2009-2013 period, Chittenden County, VT had the highest estimated monthly gross rent for renter-occupied homes ($1,026), and Rutland County, VT had the lowest ($789).





Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Housing Costs as a Percent of Household Income, Coefficients of Variation

	Vermont	Addison County, VT	Chittenden County, VT	Grand Isle County, VT	Rutland County, VT	Windsor County, VT	County Region	U.S.
Owner-occupied housing units with a mortgage	0.7%	2.0%	1.4%	4.6%	2.1%	2.3%	0.9%	0.3%
Monthly cost <15% of household income	2.4%	8.2%	5.4%	15.3%	7.1%	8.2%	3.5%	0.3%
Monthly cost >30% of household income	1.5%	4.8%	3.7%	7.9%	4.7%	4.9%	2.2%	0.1%
Specified renter-occupied units	0.9%	3.7%	1.6%	9.6%	3.9%	3.6%	1.3%	0.2%
Gross rent <15% of household income	5.1%	14.0%	11.6%	49.4%	14.3%	13.4%	6.8%	0.3%
Gross rent >30% of household income	1.9%	7.9%	3.7%	16.1%	6.0%	6.9%	2.7%	0.1%
Median monthly mortgage cost^	0.5%	1.5%	0.9%	3.1%	1.6%	1.9%	na	0.0%
Median gross rent^	0.6%	2.6%	1.4%	7.2%	1.8%	2.4%	na	0.1%

Percent of Total, Coefficients of Variation

Monthly cost <15% of household income	2.5%	8.2%	5.5%	15.2%	7.0%	8.2%	3.3%	0.3%
Monthly cost >30% of household income	1.5%	4.7%	3.7%	8.0%	4.6%	4.9%	2.2%	0.2%
Gross rent <15% of household income	5.1%	13.8%	11.6%	49.6%	14.2%	13.3%	7.1%	0.6%
Gross rent >30% of household income	1.9%	7.8%	3.6%	16.1%	6.0%	6.9%	2.7%	0.1%

Study Guide and Supplemental Information

How affordable is housing?

What do we measure on this page?

This page describes whether housing is affordable for homeowners and renters.

Owner-Occupied Housing Unit: A housing unit is owner-occupied if the owner or co-owner lives in the unit even if it is mortgaged or not fully paid for.

Renter-Occupied Housing Unit: All occupied units which are not owner-occupied, whether they are rented for cash rent or occupied without payment of cash rent, are classified as renter-occupied.

Household: A household includes all the people who occupy a housing unit as their usual place of residence.

Monthly Costs (owner-occupied): The sum of payment for mortgages, real estate taxes, various insurances, utilities, fuels, mobile home costs, and condominium fees.

Gross Rent: The amount of the contract rent plus the estimated average monthly cost of utilities (electricity, gas, and water and sewer) and fuels (oil, coal, kerosene, wood, etc.) if these are paid for by the renter (or paid for the renter by someone else).

Why is it important?

An important indicator of economic hardship is whether housing is affordable. This page measures housing affordability in terms of the share of household income that is devoted to mortgage and related costs (for homeowners) and rent and related costs (for renters). The income share devoted to housing that is below 15 percent is a good proxy for highly affordable, while the income share devoted to housing that is above 30 percent is a good proxy for unaffordable.

Methods

The lowest ownership costs and gross rent share of household income reported in ACS is 15 percent. Many government agencies define as excessive (or unaffordable) housing costs that exceed 30 percent of monthly household income.

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Additional Resources

The U.S. Census Bureau's American Housing Survey has additional information on housing and housing affordability. See: census.gov/hhes/www/housing/ahs/ahs.html [(44)].

For housing prices, for-profit online real-estate services may have the most recent price information. See, for example, zillow.com [(45)].

For current calculations on housing affordability, see the National Association of Realtors' Housing Affordability Index, available at: realtor.org/research/research/housinginx [(46)].

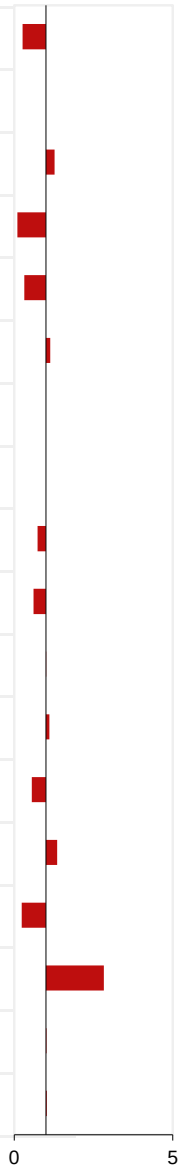
Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

How do demographic, income, and social characteristics in the region compare to the U.S.?

This page compares key demographic, income, and social indicators from the region to the United States.

	Indicators	County Region	U.S.	County Region vs. U.S.
Demographics	Population Growth (% change, 2000-2013*)	2.9%	10.7%	
	Median Age (2013*)	na	37.3	
	Percent Population White Alone (2013*)	94.3%	74.0%	
	Percent Population Hispanic or Latino (2013*)	1.7%	16.6%	
	Percent Population American Indian or Alaska Native (2013*)	0.3%	0.8%	
	Percent of Population 'Baby Boomers' (2013*)	34.6%	30.6%	
Income	Median Household Income (2013*)	na	$53,046	
	Per Capita Income (2013*)	na	$28,155	
	Percent Individuals Below Poverty (2013*)	11.3%	15.4%	
	Percent Families Below Poverty (2013*)	6.9%	11.3%	
	Percent of Households with Retirement and Social Security Income (2013*)	46.9%	46.6%	
	Percent of Households with Public Assistance Income (2013*)	22.3%	20.2%	
Structure	Percent Population 25 Years or Older without High School Degree (2013*)	7.7%	14.0%	
	Percent Population 25 Years or Older with Bachelor's Degree or Higher (2013*)	39.2%	28.8%	
	Percent Population That Speak English Less Than 'Very Well' (2013*)	2.0%	8.6%	
	Percent of Houses that are Seasonal Homes (2013*)	11.0%	3.9%	
	Owner-Occupied Homes where Greater than 30% of Household Income Spent on Mortgage (2013*)	36.1%	35.4%	
	Renter-Occupied Homes where Greater than 30% of Household Income Spent on Gross Rent (2013*)	49.6%	48.3%	



* The data in this table are calculated by ACS using annual surveys conducted during 2009-2013 and are representative of average characteristics during this period.

- The County Region is most different from the U.S. in Percent of Houses that are Seasonal Homes (2013*), Percent Population Hispanic or Latino (2013*), and Percent Population That Speak English Less Than 'Very Well' (2013*).

Data Sources: U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Indicators

	Region	US
Population Growth (% change, 2000-2009*)	0.0%	0.0%
Median Age (2009*)	na	0.2%
Percent Population White Alone (2009*)	0.1%	0.0%
Percent Population Hispanic or Latino (2009*)	0.0%	0.0%
Percent Population American Indian or Alaska Native	23.3%	0.0%
Percent of Population "Baby	0.5%	0.0%
Median Family Income (2009*)	na	0.1%
Per Capita Income (2009*)	na	0.2%
Percent Individuals Below Poverty (2009*)	2.7%	0.4%
Percent Families Below Poverty (2009*)	5.3%	0.0%
Percent of Households with Retirement and Social	1.0%	0.1%
Percent of Households with Public Assistance Income	2.2%	0.3%
Percent Population 25 Years or Older without High	2.4%	0.0%
Percent Population 25 Years or Older with Bachelor's	1.1%	0.2%
Percent Population That Speak English Less Than	6.0%	0.0%
Percent of Houses that are Seasonal Homes (2009*)	1.7%	0.0%
Owner-Occupied Homes where Greater than 30% of	2.2%	0.2%
Renter-Occupied Homes where Greater than 30% of	2.7%	0.1%

Study Guide and Supplemental Information

How do demographic, income, and social characteristics in the region compare to the U.S.?

What do we measure on this page?

This page compares key demographic, income, and social indicators from the region to the United States.

The term "benchmark" in this report should not be construed as having the same meaning as in the National Forest Management Act.

Race: Race is a self-identification data item in which Census respondents choose the race or races with which they most closely identify. The Office of Management and Budget revised the standards in 1997 for how the Federal government collects and presents data on race and ethnicity.

Poverty: Following the Office of Management and Budget's Directive 14, the Census Bureau uses a set of income thresholds that vary by family size and composition to detect who is poor. If the total income for a family or an unrelated individual falls below the relevant poverty threshold, then the family or an unrelated individual is classified as being "below the poverty level."

Baby Boomers: Baby boomers are defined as having been born between 1946-1964. The reported percent of population that are "baby boomers" has some associated error since ACS generally reports age classes in 5-year increments (55 to 59 years, 60 to 64 years, etc.).

Social Security: Refers to households who receive income that includes Social Security pensions and survivor benefits, permanent disability insurance payments made by the Social Security Administration before deductions for medical insurance, and railroad retirement insurance. It does not include Medicare reimbursement.

Retirement Income: Consists of families that receive income from: (1) retirement pensions and survivor benefits from a former employer; labor union; or federal, state, or local government; and the U.S. military; (2) disability income from companies or unions; federal, state, or local government; and the U.S. military; (3) periodic receipts from annuities and insurance; and (4) regular income from IRA and Keogh plans. It does not include Social Security income.

Why is it important?

This page shows a quick comparison of a number of indicators covered in this report to highlight where the region is different from the U.S.

It also offers an at-a-glance view of whether groups of indicators are atypical compared to the U.S. For example, this page may show that a geography has an older population, relatively unaffordable housing, and difficulties communicating in English. In combination, these indicators can help public land managers identify groups of people and aspects of hardship that can aid with outreach and consideration of whether the impacts of land management actions could have disproportionately high and adverse impacts on disadvantaged people or places.

Methods

The ratio of the selected region to the U.S. is a percentage calculated by dividing the figure from the region by the figure from the U.S.

Data accuracy is indicated as follows: BLACK indicates a coefficient of variation < 12%; ORANGE (preceded with one dot) indicates between 12 and 40%; and **RED BOLD** (preceded with two dots) indicates a coefficient of variation > 40%. If data have consistently low accuracy throughout a report, we suggest running another demographics report at a larger geographic scale.

Median Age, Median Household Income and Per Capita Income are not calculated for multi-geography regions due to data availability.

Data Sources

U.S. Department of Commerce. 2013. Census Bureau, American Community Survey Office, Washington, D.C.

Data Sources

EPS-HDT uses published statistics from government sources that are available to the public and cover the entire country. All data used in EPS-HDT can be readily verified by going to the original source. The contact information for databases used in this profile is:

- **2000 Decennial U.S. Census**
  Census Bureau, U.S. Department of Commerce.
  http://www.census.gov
  Tel. 303-969-7750

- **American Community Survey**
  Census Bureau, U.S. Department of Commerce.
  http://www.census.gov
  Tel. 303-969-7750
  The on-line ACS data retrieval tool is available at:
  http://www.census.gov/acs/www/

Methods

EPS-HDT core approaches

EPS-HDT is designed to focus on long-term trends across a range of important measures. Trend analysis provides a more comprehensive view of changes than spot data for select years. We encourage users to focus on major trends rather than absolute numbers.

EPS-HDT displays detailed industry-level data to show changes in the composition of the economy over time and the mix of industries at points in time.

EPS-HDT employs cross-sectional benchmarking, comparing smaller geographies such as counties to larger regions, states, and the nation, to give a sense of relative performance.

EPS-HDT allows users to aggregate data for multiple geographies, such as multi-Regions, to accommodate a flexible range of user-defined areas of interest and to allow for more sophisticated cross-sectional comparisons.

About the American Community Survey (ACS)

With the exception of some 2000 Decennial Census data used on pages 1-3, all other data used in this report is based on the American Community Survey (ACS) of the Census Bureau.

The ACS is a nation-wide survey conducted every year by the Census Bureau that provides current demographic, social, economic, and housing information about communities every year—information that until recently was only available once a decade. The ACS is not the same as the decennial census, which is conducted every ten years (the ACS has replaced the detailed, Census 2000 long-form questionnaire).

Data used in this report are 5-year ACS estimates. Moreso than the 1 or 3-year estimates, the 5-year estimates are consistently available for small geographies, such as towns. We show 5-year estimates for all geographies since data obtained using the same survey technique is ideal for cross-geography comparisons. The disadvantage is that multiyear estimates cannot be used to describe any particular year in the period, only what the average value is over the full period.

Links to Additional Resources

For more information about EPS-HDT see:

headwaterseconomics.org/eps-hdt

Web pages listed under Additional Resources include:

Throughout this report, references to on-line resources are indicated by superscripts in parentheses. These resources are provided as hyperlinks here.

1 www.epa.gov/compliance/ej/resources/policy/ej_guidance_nepa_ceq1297.pdf
2 www.census.gov/acs/www/methodology/methodology_main/
3 www.census.gov/acs/www/Downloads/data_documentation/Accuracy/MultiyearACSAccuracyofData2009.pdf
4 www.epa.gov/compliance/ej
5 www.stateoftheusa.org
6 www.ers.usda.gov/topics/rural-economy-population/population-migration.aspx
7 www.frey-demographer.org
8 www.aoa.gov/aoaroot/aging_statistics/index.aspx
9 www.census.gov/popest/
10 www.countyhealthrankings.org/
11 www.prb.org/Journalists/Webcasts/2009/distilleddemographics1.aspx
12 www.census.gov/population/age/
13 www.census.gov/prod/2010pubs/p25-1138.pdf
14 www.ers.usda.gov/publications/err-economic-research-report/err79.aspx
15 www.census.gov/population/www/projections/projectionsagesex.html
16 www.whitehouse.gov/omb/fedreg_1997standards
17 www.census.gov/prod/2001pubs/c2kbr01-1.pdf
18 http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml
19 www.measureofamerica.org/acenturyapart
20 www.census.gov/newsroom/cspan/hispanic/2012.06.22_cspan_hispanics.pdf
21 www.icbemp.gov/science/hansisrichard_10pg.pdf
22 www.bia.gov/index.htm
23 www.indians.org/index.html
24 www.fs.fed.us/spf/tribalrelations/index.shtml
25 www.census.gov/hhes/www/ioindex/overview.html
26 www.bls.gov/soc/
27 www.bls.gov/oco/
28 www.ceo.usc.edu/pdf/G0612501.pdf
29 www.bls.gov/opub/ils/pdf/opbils71.pdf
30 www.ers.usda.gov/Publications/RDP/RDP697/RDP697e.pdf
31 www.ers.usda.gov/publications/ruralamerica/ra172/ra172c.pdf
32 www.federalreserve.gov/newsevents/speech/Bernanke20070206a.htm
33 www.econedlink.org/lessons/index.php?lid=885&type=educator
34 https://docs.google.com/Doc?docid=0AXe2E1Mm09WIZGhzazhxaDRfMjUzZ25nMjdkZzY&hl=en
35 www.ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being.aspx
36 www.npc.umich.edu/poverty
37 www.census.gov/hhes/www/poverty/data/threshld/index.html
38 www.npc.umich.edu/research/ethnicity
39 www.census.gov/population/socdemo/statbriefs/povarea.html
40 www.census.gov/acs/www/Downloads/data_documentation/SubjectDefinitions/2009_ACSSubjectDefinitions.pdf
41 www.bls.gov/emp/ep_chart_001.htm
42 www.census.gov/prod/2002pubs/p23-210.pdf
43 www.mla.org/map_single
44 www.census.gov/hhes/www/housing/ahs/ahs.html
45 www.zillow.com
46 www.realtor.org/research/research/housinginx

APPENDIX K AIR QUALITY ANALYSIS BACKGROUND

This Page Intentionally Left Blank

Table K-1. Estimated Equipment and Vehicle Use during Aquatic Cable Installation, Lake Champlain Segment

Activity	Equipment and Vehicles			Hours per Day	Working Days[1]	LF	Trips	Cables	Total Hours
	Type	BHP	Qty						
Cable Installation	Primary Cable Vessel								
	2 Azimuth Units	2640	2	24	22	0.25	1	2	528
	Azimuth Unit	1360	1	24	22	0.25	1	2	264
	Retractable Azimuth Unit	2475	1	24	22	0.1	1	2	106
	Tunnel Unit	1300	1	24	22	0.25	1	2	264
	Generators (500 kVA)	536	4	24	22	0.75	1	2	3168
	Generators (600 kVA)	643	1	24	22	0.5	1	2	528
	Survey Boat	1131	1	24	22	0.5	1	2	528
	Crew Boat	425	1	24	22	0.2	1	2	211
Installation of Cable Protection	Tugboat, Towboat	1970	1	12	22	0.25	1	2	132
	Crew Boat	425	1	12	22	0.2	1	2	106
Cable Shipments [2]	Main Propulsion	8201	1	10		0.5	19		95
	Auxiliary Engine	1776	1	10		0.17	19		32

Notes:
BHP Brake-horsepower. The maximum rated load of the vehicle or vessel engine(s).
LF Load Factor
[1] 22 work-days based on 1 to 3 miles per day from MP 0 to MP 98.
[2] Cable shipments emission duration of 10 hours per trip based on 12 mph for 120 miles.
[3] 120 miles is the average distance for each of the 19 cable shipments (6 miles of cable per shipment) round trip.

Table K-2. Emission Factors,[1] Lake Champlain Segment

Activity	Equipment and Vehicles			VOC lb/hr	CO lb/hr	NO_x lb/hr	SO_x lb/hr	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	CO_2 lb/hr	CH_4 lb/hr[2]	N_2O lb/hr[2]
	Type	Category	BHP									
Cable Installation	2 Azimuth Units	Marine	2640	2.07	10.48	29.64	0.03	1.41	1.37	3118.31	0.12	0.02
	Azimuth Unit	Marine	1360	1.06	5.40	15.27	0.01	0.73	0.70	1606.40	0.06	0.01
	Retractable Azimuth Unit	Marine	2475	1.94	9.82	27.79	0.03	1.32	1.28	2923.41	0.11	0.02
	Tunnel Unit	Marine	1300	1.02	5.16	14.60	0.01	0.69	0.67	1535.53	0.06	0.01
	Generators (500 kVA)	Marine	536	0.33	1.47	5.46	0.01	0.23	0.23	626.53	0.02	0.00
	Generators (600 kVA)	Marine	643	0.40	1.76	6.55	0.01	0.28	0.27	751.60	0.03	0.01
	Survey Boat	Marine	1131	0.89	4.49	12.70	0.01	0.60	0.59	1335.91	0.05	0.01
	Crew Boat	Marine	425	0.21	1.44	3.47	0.00	0.19	0.18	502.37	0.02	0.00
Installation of Cable Protection	Tugboat, Towboat	Marine	1970	1.67	8.66	23.20	0.02	1.18	1.14	2326.55	0.09	0.02
	Crew Boat	Marine	425	0.21	1.44	3.48	0.00	0.19	0.18	502.37	0.02	0.00
Cable Shipments[3]	OVG Main Propulsion	Marine (kW)	8201	10.85	25.31	307.36	65.45	8.14	7.59	10645.38	0.11	0.56
	OVG Auxiliary Engine	Marine (kW)	1776	1.57	4.31	54.42	16.60	1.92	1.76	2704.41	0.02	0.12

Notes:
lb/hr = pounds per hour

[1]Emission factors weighted for calendar year 2013 (EPA 2003, EPA 2006, EPA 2009a).
[2]Offroad N_2O and CH_4 emissions are based on 40 CFR 98, Subpart C.
[3]Cable Shipment emissions based on EPA 2009b.

Table K-3. Estimated Total Emissions,[1] Lake Champlain Segment

Activity	Equipment and Vehicles			VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2-eqv[2] lbs
	Type	Category	Hours										
Cable Installation	2 Azimuth Units	Marine	528	1,093	5,533	15,650	16	744	723	1,646,468	63	11	1,651,199
	Azimuth Unit	Marine	264	280	1,426	4,031	3	193	185	424,090	16	3	425,272
	Retractable Azimuth Unit	Marine	106	206	1,041	2,946	3	140	136	309,881	12	2	310,805
	Tunnel Unit	Marine	264	269	1,362	3,854	3	182	177	405,380	16	3	406,563
	Generators (500 kVA)	Marine	3168	1,045	4,657	17,297	32	729	729	1,984,847	63	0	1,986,431
	Generators (600 kVA)	Marine	528	211	929	3,458	5	148	143	396,845	16	5	398,814
	Survey Boat	Marine	528	470	2,371	6,706	5	317	312	705,360	26	5	707,594
	Crew Boat	Marine	211	44	304	732	0	40	38	106,000	4	0	106,106
Installation of Cable Protection	Tugboat, Towboat	Marine	132	220	1,143	3,062	3	156	150	307,105	12	3	308,188
	Crew Boat	Marine	106	22	153	369	0	20	19	53,251	2	0	53,304
Cable Shipments	OVG Main Propulsion	Marine (kW)	95	1,031	2,404	29,199	6218	773	721	1,011,311	10	53	1,027,426
	OVG Auxiliary Engine	Marine (kW)	32	51	139	1,758	536	62	57	87,352	1	4	88,524
Total Underwater Cable Laying Emissions, lbs				**4,943**	**21,462**	**89,063**	**6,823**	**3,504**	**3,389**	**7,437,890**	**242**	**88**	**7,470,225**
Total Underwater Cable Laying Emissions, tons				**2.47**	**10.73**	**44.53**	**3.41**	**1.75**	**1.69**	**3,718.95**	**0.12**	**0.04**	**3735.11**

Notes:
lb pound

[1]Emissions weighted for calendar year 2013 (EPA 2003, EPA 2006, EPA 2009a).
[2]Carbon dioxide equivalents (CO_2-eqv) are calculated by summing the products of mass GHG emissions by species times their respective global warming potential coefficients (EPA 2015).

Table K-4. Estimated Equipment and Vehicle Use during Terrestrial Cable Installation, Overland Segment

Activity	Equipment and Vehicles				Working Days (57 miles)	Daily Hours	# Equipment Hours Operation (57 miles)	Miles Per Hour (on road only)	VMT
	Equipment Type	Progress (miles)/8 hour day	BHP	Qty					
Vegetation Clearing	Brush Hog	1	11	1	57	8	456		
Topsoil Removal and Storage	Small Bulldozer	1	285	1	57	8	456		
	Bobcat	1	73	1	57	8	456		
Access Path Prep (gravel)	Small Bulldozer	0.5	285	1	114	8	912		
	18-yard dump	0.5		2	114	8	1824	5	9,120
Trench Excavation	Backhoe	0.25	73	1	228	8	1824		
	Bobcat	0.25	73	1	228	8	1824		
	Ram Hoe	0.25	330	1	228	4	912		
	Hard Rock Trencher	0.25	335	1	228	2	456		
Deliver Cable	Flatbed Truck, 30 mph	0.5		1	114	8	912	30	27,360
	Crane	0.5	300	1	114	2	228		
Horizontal Directional Drill (HDD)[1]	Drilling Unit				532	8	4256		
	Drilling Power Unit		800		532	8	4256		
	Generator		50		532	8	4256		
	Water Pumps				532	8	4256		
	Mud Pump				532	8	4256		
Site Delivery and Pull Cable	Flatbed Truck, 30 mph	0.5		1	114	8	912	30	27,360
	Crane, 40-ton	0.5		1	114	2	228		
	Puller/Tensioner	0.5	165	2	114	8	1824		
	Mid-pull Caterpillars	0.5	165	2	114	8	1824		
Splice Cable	Generators	0.25	48	1	228	8	1824		
	Propane Heaters	0.25	0.5	1	228	8	1824		
Deliver and Install Thermal Backfill	18-yard dump	0.25		2	228	8	3648	30	10,9440
	Backhoe	0.25	73	1	228	8	1824		
	Bobcat	0.25	73	1	228	8	1824		
Install Native Backfill	Backhoe	0.5	73	1	114	8	912		
	Bobcat	0.5	73	1	114	8	912		
	Shaker/Screen	0.5	110	1	114	8	912		

	Compressor for Tampers	0.5		1	114	8	912		
Remove Excess Native Fill from Site	18-yard dump	1		2	57	8	912	5	4,560
	Backhoe	1	73	1	57	8	456		
Replace Topsoil, York Rake	Small Bulldozer	0.5	285	1	114	8	912		
	Hydroseed Sprayer	0.5	115	1	114	8	912		
Miscellaneous[2]	Pickup Trucks			10	220	4	8800	30	264,000

Notes:
Overland equipment estimate assumes approximately 57 miles.
BHP: Brake-horsepower. This should be the maximum rated load of the vehicle or vessel engine(s).
[1]HDD includes HDD and Jack & Bore for 38 upland locations and entry/exit from Lake Champlain. Installation day assumptions are as follows:

	Quantity	**Days per Installation**	**Total**
Jack and Bore	13	10	130
300 ft HDD	4	7	28
500 ft HDD	7	13	91
1,000 ft HDD	11	18	198
1,500 ft HDD	1	25	25
2,000 ft HDD	2	30	60
		Total	**532**

Notes:
ft = feet
[2]Miscellaneous pickup truck use based on estimate of length of construction season (i.e., late spring to fall).

Table K-5. Emission Factors,[1,2] Overland Segment

Activity	Equipment and Vehicles			VOC lb/unit	CO lb/unit	NOx lb/unit	SOx lb/unit	PM_{10} lb/unit[3]	$PM_{2.5}$ lb/unit[3]	CO_2 lb/unit[6]	CH_4 lb/unit[4,5]	N_2O lb/unit[4,5]
	Equipment Type	Category	BHP									
Vegetation Clearing	Brush Hog	Off Road	11	0.02	0.11	0.11	0.00	0.01	0.01	14.27	0.00	0.00
Topsoil Removal and Storage	Small Bulldozer	Off Road	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Bobcat	Off Road	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Access Path Prep (gravel)	Small Bulldozer	Off Road	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	18-yard dump	On Road HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
Trench Excavation	Backhoe	Off Road	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	Off Road	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Ram Hoe	Off Road	330	0.14	0.94	2.35	0.00	0.13	0.13	390.14	0.01	0.00
	Hard Rock Trencher	Off Road	335	0.24	1.61	3.40	0.00	0.22	0.21	395.76	0.02	0.00
Cable Delivery	Flatbed Truck, 30 mph	On Road HHD		0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Crane	Off Road	300	0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
Horizontal Directional Drill (HDD)[1]	Drilling Unit	Off Road		0.89	3.39	11.69	0.01	0.54	0.52	933.94	0.04	0.01
	Generator	Off Road	50	0.03	0.18	0.53	0.00	0.03	0.03	64.97	0.00	0.00
Site Delivery and Pull Cable	Flatbed Truck, 30 mph	On Road HHD		0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Crane, 40-ton	Off Road		0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
	Puller/Tensioner	Off Road	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
	Mid-pull Caterpillars	Off Road	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
Splice Cable	Generators	Off Road	48	0.03	0.18	0.51	0.00	0.03	0.03	62.37	0.00	0.00
	Propane Heaters	Off Road	0.5	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00
Deliver and Install Thermal Backfill	18-yard dump	On Road HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe	Off Road	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	Off Road	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Install Native Backfill	Backhoe	Off Road	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	Off Road	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Shaker/Screen	Off Road	110	0.07	0.22	0.90	0.00	0.05	0.05	128.57	0.01	0.00
	Compressor for Tampers	Off Road		0.03	0.12	0.22	0.00	0.02	0.02	25.94	0.00	0.00
Remove Excess Native Fill from Site	18-yard dump	On Road HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe	Off Road	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00

Activity	Equipment and Vehicles			VOC lb/unit	CO lb/unit	NOx lb/unit	SOx lb/unit	PM_{10} lb/unit[3]	$PM_{2.5}$ lb/unit[3]	CO_2 lb/unit[6]	CH_4 lb/unit[4,5]	N_2O lb/unit[4,5]
	Equipment Type	Category	BHP									
Replace Topsoil, York Rake	Small Bulldozer	Off Road	285	0.13	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Hydroseed Sprayer	Off Road	115	0.27	0.99	1.64	0.00	0.17	0.17	158.04	0.01	0.00
Miscellaneous	Pickup Trucks	On Road LD		0.00	0.02	0.00	0.00	0.00	0.00	0.97	0.00	0.00

Notes:
HDD: Horizontal Directional Drilling. LD: Light Duty. HHD: Heavy Heavy Duty.
[1]Emission factors weighted for calendar year 2013.
[2]Units are operating hours for offroad engines, vehicle miles traveled (VMT) for onroad vehicles.
[3]Offroad diesel exhaust $PM_{2.5}$=92% of PM_{10}; Onroad HHD particulate emission factors include allowances for tire and brake wear.
[4]Offroad N_2O and CH_4 emissions are based on 40 CFR 98, Subpart C.
[5]Onroad N_2O and CH_4 emissions are based on the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008 (EPA 2009b).
[6]Onroad CO_2 emissions are based on EPA420-F-05-001 which rates gasoline emissions at 19.4 lb/gas and diesel at 22.2 lb/gas (EPA 2005).

Table K-6. Fugitive Dust Estimation Calculations-Earthmoving, Overland Segment

Construction Earthmoving	Project Hours	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	PM_{10} lbs	$PM_{2.5}$ lbs
Topsoil Removal and Storage					
Small Bulldozer	456	16.64	4.91	7,588	2,239
Bobcat	456	0.00034	0.000052	0.16	0.02
Access Path Prep (gravel)					
Small Bulldozer	912	16.64	4.91	15,175.68	4,477.92
18-yard dump	1824	0.00034	0.000052	0.62	0.09
Trench Excavation					
Backhoe	1824	0.00034	0.000052	0.62	0.09
Bobcat	1824	0.103	0.005126	187.87	9.35
Ram Hoe	912	0.103	0.005126	93.94	4.67
Hard Rock Trencher	456	0.103	0.005126	46.97	2.34
Horizontal Directional Drill (HDD)1					
Drilling Unit	4256	0.00034	0.000052	1.45	0.22
Generator	4256	0.00034	0.000052	1.45	0.22
Deliver and Install Thermal Backfill					
18-yard dump	3648	0.00034	0.000052	1.24	0.19
Backhoe	1824	0.00034	0.000052	0.62	0.09
Bobcat	1824	16.64	4.91	30,351.36	8,955.84
Install Native Backfill					
Backhoe	912	0.00034	0.000052	0.31	0.05
Bobcat	912	16.64	4.91	15,175.68	4,477.92
Shaker/Screen	912	0.00034	0.000052	0.31	0.05
Compressor for Tampers	912	0.00034	0.000052	0.31	0.05
Remove Excess Native Fill from Site					
18-yard dump	912	0.00034	0.000052	0.31	0.05
Backhoe	456	0.00034	0.000052	0.16	0.02
Replace Topsoil, York Rake					
Small Bulldozer	912	16.64	4.91	15,175.68	4,477.92
Hydroseed Sprayer	912	0.10328	0.005124	94.19	4.67
Total Earthmoving Dust Emissions (lbs)				**83,896.75**	**24,650.75**
Total Earthmoving Dust Emissions (tons)				**41.95**	**12.33**

Notes:
HDD: Horizontal Directional Drilling
Based on EPA 2006 (EPA 2006).
AP-42 Section 11.9 for dozing (Table 11.9-1):
$E = 0.75 * (s)^{1.5} / (M)^{1.4}$ for PM_{10}
$E = 0.105 * 5.7 \times (s)^{1.2} / (M)^{1.3}$ for $PM_{2.5}$
E = lb/hr fugitive
s = Silt Content assumed to be 55% for construction sites. (CHPEI 2010)
M = moisture content = 8% (assumes unwatered subsoil)

AP-42 Section 11.9 for grading, rolling, and excavating (Table 11.9-1) (EPA 2006)
$E = S * 0.60 * 0.051 \times (S)^{2.0}$ for PM_{10}
$E = S * 0.031 * 0.040 \times (S)^{2.5}$ for $PM_{2.5}$
Simplifies to $E = 0.60 * 0.051 \times (S)^{3.0}$ for PM_{10}
Simplified to $E = 0.031 * 0.040 \times (S)^{3.5}$ for $PM_{2.5}$
E = lb/VMT * VMT/hr = lb/hr fugitive

S = Mean Vehicle Speed assumed to be 3 mph for graders, 1.5 mph for excavators & rollers
Assumes VMT = S * hours of use

AP-42 Section 13.2.4 Loading/Handling (digger, driller, backhoe, loader): (EPA 2006)
$E = 0.35 * 0.0032 * (U/5)^{1.3}/(M/2)^{1.4}$ for PM_{10}
$E = 0.053 * 0.0032 * (U/5)^{1.3}/(M/2)^{1.4}$ for $PM_{2.5}$
E = lb/ton * tons/hr = lb/hr fugitive
U = average wind speed is 8.9 mph for Albany, New York (NOAA 2002)
M = moisture content = 8% (assumes unwatered subsoil)

Table K-7. Fugitive Dust Estimation Calculations-Road Dust[1], Overland Segment

Construction Road Dust	Project VMT	PM_{10} lb/VMT	$PM_{2.5}$ lb/VMT	PM_{10} lbs	$PM_{2.5}$ lbs
All Roads					
Pickup Truck	264,000				
Flatbed Truck	54,720				
Subtotal	**318,720**				
Paved Roads					
Pickup Truck	237,600	0.00622	0.00076	1,478	181
Flatbed Truck	49,248	0.20521	0.03061	10,106	1,507
Subtotal	**286,848**			**11,584**	**1,688**
Unpaved Roads					
Pickup Truck	26,400	0.06820	0.00682	1,800	180
Flatbed Truck	5,472	0.19222	0.01922	1,052	105
Subtotal	**31,872**			**2,852**	**285**
Total Road Dust Emissions (lbs)				**14,436**	**1,973**
Total Road Dust Emissions (tons)				**7.22**	**0.99**

Notes:
[1]Assumes 90% of roads are paved.
Based on EPA 2006 and EPA 2003.
Unpaved Road Dust (AP-42 Section 13.2.2):
$E = 1.5 * (s/12)^{0.9} * (W/3)^{0.45} * PC * (1\text{-}CE)$ for PM_{10}
$E = 0.15 * (s/12)^{0.9} * (W/3)^{0.45} * PC * (1\text{-}CE)$ for $PM_{2.5}$
E = lb/VMT fugitive
s = surface silt content = 9%
(average for unpaved roads and construction sites, AP-42 Table 13.2.2-1)
W = average vehicle weight (see below)
PC=(365-P/365)
CE = Control Efficiency for watering = 90% for M between 4 and 5
(AP-42 Figure 13.2.2-2)

Based on EPA 2006.
Paved Road Dust (AP-42 Section 13.2.1)
$E=0.016*(sL/2)^{0.65}*(W/3)^{1.5}-0.00047*PC$ for PM_{10}
$E=0.0024*(sL/2)^{0.65}*(W/3)^{1.5}-0.00036*PC$ for $PM_{2.5}$
E = lb/VMT fugitive
sL=Silt Loading assumed to be 0.5 g/m^2 for average ADT categories from Table 13.2.1-3
Note: precipitation correction not used (PC=1) for worst case day calculations
PC=(1-P/4N)
P = number of wet days over 0.01 in precipitation for averaging period
(150 days/year average for New York State)
N=days of period = 365 days

Vehicle Weights based on EPA 2010.
Light Duty = 3 tons average
Medium Duty = 8 tons average
Heavy Heavy Duty = 30 tons average (loaded 40 tons, unloaded 20 tons)

Table K-8. Estimated Total Emissions[1] Overland Segment

Activity	Equipment and Vehicles				VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2-eqv
	Equipment Type	**Category**	**Hours**	**VMT**										
Vegetation Clearing	Brush Hog	0ff Road	456		9	50	50	0	5	5	6,507	0	0	6,507
Topsoil Removal and Storage	Small Bulldozer	Off Road	456		68	278	821	0	55	50	153,613	5	0	153,708
	Bobcat	Off Road	456		91	461	415	0	68	68	50,808	0	0	50,808
Access Path Prep (gravel)	Small Bulldozer	Off Road	912		137	556	1,642	0	109	100	307,225	9	0	307,417
	18-yard dump	On Road HHD	1,824	9,120	0	91	182	0	0	0	33,744	0	0	33,744
Trench Excavation	Backhoe	Off Road	1,824		365	1,842	1,660	0	274	274	203,230	0	0	203,230
	Bobcat	Off Road	1,824		365	1,842	1,660	0	274	274	203,230	0	0	203,230
	Ram Hoe	Off Road	912		128	857	2,143	0	119	119	355,808	9	0	355,999
	Hard Rock Trencher	Off Road	456		109	734	1550	0	100	96	180,467	9	0	180,658
Deliver Cable	Flatbed Truck, 30 mph	On Road HHD	912	27,360	0	0	274	0	0	0	101,232	0	0	101,232
	Crane	Off Road	228		39	107	506	0	23	21	79,966	2	0	80,014
Horizontal Directional Drill (HDD)	Drilling Unit	Off Road	4,256		3,788	14,428	49,753	43	2,298	2213	3,974,849	170	43	3,991,617
	Generator	Off Road	4,256		128	766	2,256	0	128	128	276,512	0	0	276,512
Site Delivery and Pull Cable	Flatbed Truck, 30 mph	On Road HHD	912	27,360	0	0	274	0	0	0	101,232	0	0	101,232
	Crane, 40-ton	Off Road	228		39	107	506	0	23	21	79,966	2	0	80,014
	Puller/Tensioner	Off Road	1,824		620	2,335	3,684	0	420	401	413,902	18	0	414,285
	Mid-pull Caterpillars	Off Road	1,824		620	2,335	3,684	0	420	401	413,902	18	0	414,285
Splice Cable	Generators	Off Road	1,824		55	328	930	0	55	55	113,763	0	0	113,763
	Propane Heaters	Off Road	1,824		0	18	36	0	0	0	37,647	0	0	37,647
Deliver and Install Thermal Backfill	18-yard dump	On Road HHD	3,648	109,440	0	1,094	2,189	0	0	0	404,928	0	0	404,928
	Backhoe	Off Road	1,824		365	1,842	1,660	0	274	274	203,230	0	0	203,230
	Bobcat	Off Road	1,824		365	1,842	1,660	0	274	274	203,230	0	0	203,230
Install Native Backfill	Backhoe	Off Road	912		182	921	830	0	137	137	101,615	0	0	101,615
	Bobcat	Off Road	912		182	921	830	0	137	137	101,615	0	0	101,615
	Shaker/Screen	Off Road	912		64	201	821	0	46	46	117,256	9	0	117,447
	Compressor for Tampers	Off Road	912		27	109	201	0	18	18	23,657	0	0	23,657
Remove Excess Native Fill from Site	18-yard dump	On Road HHD	912	4,560	0	46	91	0	0	0	16,872	0	0	16,872
	Backhoe	Off Road	456		91	461	415	0	68	68	50,808	0	0	50,808
Replace Topsoil, York Rake	Small Bulldozer	Off Road	912		137	556	1,642	0	109	100	307,225	9	0	307,417
	Hydroseed Sprayer	Off Road	912		246	903	1,496	0	155	155	144,132	9	0	144,324
Miscellaneous	Pickup Trucks	On Road LD	8,800	264,000	0	5,280	0	0	0	0	256,080	0	0	256,080
Total Combustion Emissions (lbs)					**8,220**	**41,313**	**83,860**	**43**	**5,586**	**5,432**	**9,018,252**	**271**	**43**	**9,037,128**
Total Fugitive Dust Emissions (lbs)									**98,333**	**26,624**				
Total Combustion and Fugitive Dust Emissions (lbs)					**8,220**	**41,313**	**83,860**	**43**	**103,919**	**32,057**	**9,018,252**	**271**	**43**	**9,037,128**
Total Combustion and Fugitive Dust Emissions (tons)					**4.11**	**20.66**	**41.93**	**0.02**	**51.96**	**16.03**	**4,509.13**	**0.14**	**0.02**	**4,518.56**

This Page Intentionally Left Blank

References

Code of Federal Regulations. 40 CFR 98 Electronic. Mandatory Greenhouse Gas Reporting. Title 40, Part 98, Subpart C. Available online: <http://ecfr.gpoaccess.gov>.

Champlain Hudson Power Express, Inc. (CHPEI). 2010. Champlain Hudson Power Express Project, Supplement to the Article VII Application. Appendix D

National Oceanic and Atmospheric Administration (NOAA). 2002. Weather Data. Available online: <www.noaa.gov>.

U.S. Environmental Protection Agency (EPA). 1996. AP-42. Large Stationary Diesel and All Stationary Duel-fuel Engines. Table 3.4-1. Page 3.4-5.

U.S. Environmental Protection Agency (EPA). 2003. MOBILE6.2.0.3 Mobile Vehicle Emissions Factor Model and AP-42 Methods for Re-entrained Road Dust. September 2003.

U.S. Environmental Protection Agency (EPA). 2005. Office of Transportation and Air Quality. Emission Facts –Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel. EPA420-F-05-001. February 2005.

U.S. Environmental Protection Agency (EPA). 2006. AP 42, Fifth Edition, Volume 1, Chapter 13: Miscellaneous Sources. Available online: <www.epa.gov>.

U.S. Environmental Protection Agency (EPA). 2009a. Office of Transportation and Air Quality. "NONROAD2008a Installation and Updates." Available online: <http://www.epa.gov/otaq/models/nonrdmdl/nonrdmdl2008/readme08.htm>.

U.S. Environmental Protection Agency (EPA). 2009b. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008.

U.S. Environmental Protection Agency (EPA). 2010. Office of Transportation and Air Quality. Draft Regulatory Impact Analysis. EPA-420-D-10-901. October 2010.

U.S. Environmental Protection Agency (EPA). 2014. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012. EPA 430-R-14-003. April 15, 2014.

U.S. Environmental Protection Agency (EPA). 2015. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013. EPA 430-R-15-004. April 15, 2015.

This Page Intentionally Left Blank

APPENDIX L CONTRACTOR DISCLOSURE STATEMENT

This Page Intentionally Left Blank

Exhibit A

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE *NEW ENGLAND CLEAN POWER LINK ENVIRONMENTAL IMPACT STATEMENT*

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

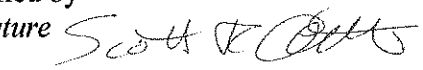
"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offer or and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) __X__ Offer or and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b)_____ Offer or and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests
1.
2.
3.

Certified by
Signature 

Scott R. Ault, Senior Vice President
Printed Name and Title

Kleinschmidt Associates
Company

July 28, 2014
Date

This Page Intentionally Left Blank