MEMORANDUM

To: Louis Hodgetts, Project File
Date: April 29, 2025
From: Aaron Marcus
Subject: IC Tinmouth
Project No.: 430311

This memorandum summarizes the desktop review and field investigation for natural resources, including wetlands, surface waters, RTE (Rare, Threatened and Endangered Species), sensitive animal habitats, and invasive species, for the above referenced project in Tinmouth, Rutland County, Vermont. The project involves the construction of a telecommunications tower on the parcel at 402 VT Route 140.

The project parcel consists of a gravel pit access road along the north side of VT Route 140, approximately 200 feet east of the Tinmouth Channel. The location is illustrated on the attached Project Location Map. The initial project study area (PSA1) from August 21, 2024 measured approximately 4.03 acres, including an approximate 50-buffer from the edge of the original proposed disturbance. The proposed area of impact was modified in response to subsequent modification of proposed impact area of the project, and an additional second PSA (PSA2) was established on an approximately 45-foot wide sliver of land along the westerly boundary of PSA1, to occupy approximately 0.26 acre, for construction of an access road and pad. Both PSA1 and PSA2 are illustrated on the attached Natural Resources Identification Exhibit map. The PSA1 is almost entirely situated on a calcareous gravel quarry parcel. The buffer that includes the area of PSA1 south of Route 140 is on a knoll within the Tinmouth Cemetery.

Desktop Review

The Vermont Agency of Natural Resources (VT ANR) Atlas database was utilized to conduct a desktop review of natural resources, including wetlands, surface waters, floodplains, river corridors, RTE species, uncommon species, invasive plants, hazardous waste sites, and other natural resources available in the database. Other mapping sources including the United States Fish & Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapper, Google Earth, VT Center for Geographic Information (VCGI) 1962 aerial imagery, and United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Web Soil Survey were reviewed for natural resources. Maps depicting soils, RTE species, habitat, wetlands and waterways were created using data from the VT ANR Atlas, and are included in the attachments.

The Tinmouth Channel in this section is known on some maps as the Clarendon River, of which it is a tributary. It travels through a wide swampy valley for approximately 10.4 miles to form the Tinmouth Channel wetland complex, which is one of Vermont's Class I wetlands. Class I wetland status is the highest level of protection, functions, and values assigned to Vermont wetlands. The designation is described further in the Wetlands section below. The designated wetlands in Tinmouth Channel complex are protected by a 300 foot buffer in the northerly section near where this project occurs, and a 100 foot buffer in the designated wetlands south of Route 140, and south of where this project occurs. The north part of the Class I wetland complex is largely part of the >1,200 acre Vermont Department of Fish & Wildlife (VT F&W) Tinmouth Channel Wildlife Management Area (WMA). A very small wedge of this WMA comes into the north end of the PSA1.

The desktop review of VTANR Atlas Vermont Significant Wetland Inventory (VSWI) and USFWS NWI mapping showed that state and federally mapped wetlands are located near, but not within, the combined PSA. All nearby wetlands mapped by the state of Vermont have Class I designation. The Tinmouth Channel's Class I wetlands and associated buffers are mapped to occur to the northwest, east, and southwest of the combined PSA. Hydric soils, which are typically indicative of wetland areas, were not mapped within, nor adjacent to the PSA. State and federally mapped wetlands and hydric soils are illustrated on the attached VTANR Atlas Maps and Natural Resources Identification Exhibit.

The eastern half of the combined PSA1 and PSA2 that includes the entire quarry is mapped to occur on an esker, while the western third of the combined PSA, as the slopes descend toward the Tinmouth Channel, are mapped as glaciolacustrine lake gravel. The esker is a ridge in the middle of the larger Tinmouth Channel wetland complex that is surrounded by lower wetland valley on nearly all sides. East and west of the combined PSA, the eastern and western sides of the wetland complex are walled in by glaciofluvial kame moraine which runs much of the length of the Tinmouth Channel wetland complex. The northeastern 41% of the combined PSA within the quarry and on the esker ridge is mapped as Udipsamments, nearly level. The southwesterly 59% of the PSA is mapped as Hinckley gravelly loamy find sand, 15-25% slopes (see attached NRCS Custom Soil Resource Report). The bedrock beneath the combined PSA is mapped as Winooski Dolostone, and surrounding bedrock types are all dolostone and marble. The northwest corner of the combined PSA is mapped within the river corridor and slightly into the Flood Hazard Area associated with the Tinmouth Channel.

Field Investigation

On August 21, and December 18, 2024, Dubois & King (D&K) investigated the IC Tinmouth PSA to delineate state and federal jurisdictional wetlands and complete a natural resource inventory. Flagging was placed along the wetland boundaries and around the boundaries of subpopulations of rare plant species. Flagging and other natural resources identified, including potential bat roost

trees and localized non-native invasive plants, were located using a handheld Juniper Systems Geode GNS3S GPS unit with submeter accuracy.

The entire PSA1 was examined by the surveyors in a meander survey to create a comprehensive vascular plant species list (Table 4 below in this report). No additional plant species were observed in the survey of PSA2. Any rare plants or invasive plants were noted, and rare plants were mapped, counted, and relevant biological data was collected.

Wetlands

Wetland delineations were completed by Aaron Marcus and Lee Toomey of D&K on August 21, 2024 with amended data by Aaron Marcus on December 18, 2024. The delineation was completed in accordance with methods outlined in the *US Army Corps of Engineers Wetlands Delineation Manual*, dated January 1987, and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*, dated 2012 and the Vermont Wetland Rules. Wetlands were delineated through field observations of wetland hydrology, hydric soils, and hydrophytic vegetation. A total of one wetland was delineated within the IC Tinmouth PSA, as shown on the Natural Resources Identification Exhibit map.

In accordance with the Vermont Wetland Rules, subject wetlands were classified as Class I, Class II, or Class III. These wetland classes are defined as follows, according to the Vermont DEC website on Jurisdictional Wetlands:

- **Class I -** Often large, exceptional and/or irreplaceable due to a heightened level or significance of certain functions or values. This class refers to a preordained selection of wetlands that have, according to a determination decision, previously met these requirements. These wetlands generally have a wider (100ft) wetland buffer.
- **Class II -** These wetlands can fall under several different categories, as follows: 1) wetlands over a half-acre in size; 2) wetlands over 2,500 square feet in size, adjacent to a stream, river or open body of water, and contain dense, persistent woody vegetation; 3) wetland contains a species in the Vermont Natural Heritage Inventory (VNHI) database as rare, threatened, endangered or uncommon; or is an exemplary natural community; 4) vernal pools that provide amphibian breeding habitat; and 5) headwater wetlands. Class II wetlands generally have a 50 ft buffer.
- **Class III -** Any wetland that does not fall under the categories of the previously mentioned classes. These are not protected under the Vermont Wetland Rules. These wetlands do not have buffers unless specifically designated by town regulations.

In the course of the field investigation, one Class II wetland was identified in the combined PSA, and no wetlands of other classes were found. The subject wetland is described in more detail in the following section. US Army Corps of Engineers (USACE) Wetland Determination Data Forms

and DEC Verification Correspondence are both provided in the attachments. The mapping and classification of the wetland was field verified by Zapata Courage, VT Department of Environmental Conservation (VT DEC) District Wetlands Ecologist, on September 18, 2024. Photographs of the wetland are included in the Photo Exhibit in the attachments.

Wetland A

Wetland A is a medium-sized (0.59 acre or slightly larger) wetland. It is located in the northwest corners of PSA1, and PSA2 respectively, approximately 200 feet north of Route 140, and occurs along the east bank of the Tinmouth Channel, and originates upslope to the east of the stream along a line of woodland seepage. Wetlands are identified using the codes in The Cowardin System of Wetland Classification and the National Wetlands Inventory (Cowardin). Following Cowardin, this wetland classifies as a PSS1 (Palustrine Deciduous Scrub-Shrub). These are wetlands in which woody plants less than 6-meters or 20 feet tall are dominant (at least 30% areal coverage), having a dominance of broad-leaved deciduous trees. However, the wetland is undergoing succession, and may soon become a mix of PFO1 around the circumference and PFO2 in the middle (Palustrine Forested swamp dominated by woody vegetation 20 feet tall or taller, that is broad-leaved deciduous and needle-leaved deciduous, respectively).

The wetland emerges out of calcareous mucky seeps along its easterly edge, and year-round saturation continues through many of the mucky soils in the middle of the wetland west to where the wetland enters the floodplain and drops down the bank into the Tinmouth Channel (Clarendon River). The wetland is largely a calcareous Woodland Seep (S4) and Alder Swamp (S4), mostly dominated by a thick canopy of alders. There is a small permanently heavily saturated area in the central area, with areas of seasonally standing water, where shrubs become less dominant, and that best fits a depauperate fragmentary description of Calcareous Red Maple-Tamarack Swamp (S2). Black-seeded clearweed (*Pilea fontana*) is a rare species in Vermont that potentially grows in two locations in the wetland, and is described in greater detail in the rare species section. This potential rare plant species was not confirmable on the dates of survey. Dominant hydrophytes in the wetland included speckled alder (*Alnus incana* ssp. *rugosa*), shrubby cinquefoil (*Dasiphora floribunda*), American larch (*Larix laricina*), hooded skullcap (*Scutellaria galericulata*), and cinnamon fern (*Osmundastrum cinnamomeum*). A spring peeper (*Pseudacris crucifer*) was observed among white pine (*Pinus strobus*) trees adjacent the wetland. It can be assumed that spring peepers are among that species utilizing Wetland A. Stumps actively chewed by beaver (*Castor canadensis*) were also present within the wetland. The wetland provides tree cover and cold groundwater directly into the Tinmouth Channel, and thus improves fish habitat. VT ANR Atlas maps this part of this Tinmouth Channel watershed as having brook trout waters.

The wetland is surrounded by sugar maples (Acer saccharum), and mature white pines (Pinus strobus), and some of the wetland has a layer of pine needle duff. Within the wetland, white pines are frequent, but stressed and dwarfed by soil saturation. All but the northern tip of the

wetland, extending south to Route 140, appears to have been open pasture with occasional wolf sugar maples as of the VCGI 1962 aerial imagery shown in Figure 1. The far northern tip appears to have had a partial tree canopy. The wetland includes four invasive shrub species, more sparsely than in the surrounding young forest, and largely appears to have had little disturbance since the pasture land to the south grew back to forest. Wetland A is classified as Class II because it is not known to connect directly to the existing mapped Class I wetlands, and it is hydrologically connected to the Tinmouth Channel to the west, and is over 2,500 square feet in size.

Figure 1. 1962 Aerial Imagery of site

Source: VCGI

Surface Waters

No surface waters were found to occur within PSA1 nor PSA2. However the Tinmouth Channel comes near enough to influence many of the resources described in this inventory, so it is described briefly below.

Tinmouth Channel
The Tinmouth Channel is a perennial stream which flows west and northwest of the combined PSA, and Wetland A connects beyond PSA1 to this perennial stream. West of the PSA, the stream is generally over ten feet wide, under two feet deep, and has a swift current. PSA1 and PSA2 each barely include small corners of the mapped Flood Hazard Areas for Tinmouth Channel, crossing just into the far northwest corners of PSA1 and PSA2 respectively, and the mapped river corridor extends across the northwest corner of PSA1 and the northern third of PSA2 (see attached Natural Resources Identification Exhibit).

Rare, Threatened and Endangered Species and Exemplary Natural Communities

A formal rare species inventory was undertaken during this investigation. Rare species were observed and are reported in this section, while a complete vascular plant species list is compiled in Table 4 at the end of this memo.

Vermont Fish & Wildlife Department (VT F&W) assigns conservation ranks for rare and uncommon species following NatureServe methodology widely used across North and South America. Taxa are assigned ranks at state (S) and global levels (G), mostly ranging from S1 or G1 (statewide or globally rare) to S5 or G5 (statewide or globally common). Split ranks where two ranks are named (e.g. S1S2) refer to cases where either more data are needed to refine the rank, or where the conservation risk is intermediate between the two ranks. The ranks are defined as follows:

- **S1 -** Very rare (Critically imperiled): At very high risk of extinction or extirpation due to extreme rarity (often 5 or fewer populations or occurrences), very steep declines, or other factors
- **S2 -** Rare (Imperiled): At high risk of extinction or extirpation due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors
- **S3 -** Uncommon (Vulnerable): Moderate risk of extinction/extirpation due to restricted range, relatively few populations or occurrences (often 80 or fewer), recent and widespread declines, or other factors
- **S4 -** General, regular, and apparently secure: May be locally uncommon or widely scattered but not uncommon on a statewide basis
- **S5** - Common (Secure): widespread and abundant

Federally Listed Species

No federally listed species were found during the field investigation, but potential summer roosting habitat was found for northern long-eared bats. The following two species in Table 1 are results from the USFWS Information for Planning and Consultation (IPaC). Additional information on these results is included in the attached IPaC Species List.

Table 1. USFWS IPaC Results

Common Name	Scientific Name	Federal Listing
Northern long-eared bat	*Myotis septentrionalis*	Endangered
Monarch Butterfly	*Danaus plexippus*	Proposed Threatened

Source: USFWS IPaC Species List

According to the USFWS IPaC, there are no areas of critical habitat for Threatened and Endangered species within the PSAs. However, there is proposed critical habitat for the Proposed Threatened monarch butterfly

Potential northern long-eared bat habitat in the combined PSA is discussed below in the bat section of this report. This bat has a state conservation rank of S1 and a global rank of G2G3, and the state of Vermont also lists this species as Endangered. The VT ANR Atlas likewise shows Tinmouth to be in the range of northern long-eared bat, but not of Indiana bat (*Myotis sodalis* S1 G2; Federally Endangered; State Endangered) nor of tricolored bat (*Perimyotis subflavus* S1 G3G4 State Endangered; Federally Proposed Endangered). Vermont Natural Heritage Inventory rare bat GIS data, provided for the purpose of environmental review, show no known federally protected bat populations within 2.5 miles of the PSA as of December 2024.

Habitat in the area of proposed disturbance is largely young forest, which does not provide much habitat nor host many milkweed (*Asclepias* spp.) plants for monarch butterflies (S1S3B G4). The project may create new forest edge areas at the edges of disturbance, which could provide additional habitat for these butterflies. Currently, the only host plant present in the PSA is common milkweed (*Asclepias syriaca*), and the species is occasional in the old quarry area, where impacts are not anticipated.

The IPaC review also indicated the potential presence of the bald eagle (*Haliaeetus leucocephalus*). The bald eagle is protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act, however, it is not a Bird of Conservation Concern (BCC) in the PSA. In addition, there are seven migratory birds protected by the Migratory Bird Treaty Act listed on the IPaC resource list. These are summarized in Table 2. None of these bird species were identified during the field investigation, however, a formal survey was not conducted.

Table 2. IPaC Resource List Migratory Bird Treaty Act potential species

Latin Name	English Name	State Status*
Catharus fuscenscens	Veery	S5B
Chaetura pelagica	Chimney swift	S4B
Coccyzus erythropthalmus	Black-billed cuckoo	S5B
Dolichonyx oryzivorus	Bobolink	S5B
Hylocichla mustelina	Wood thrush	S5B
Haliaeetus leucocephalus	Bald eagle	S1B, S4N
Pheucticus ludovicianus	Rose-breasted grosbeak	S5B
Wilsonia canadensis	Canada warbler	S4B

Source: USFWS IPaC review and NatureServe Explorer

State Rare, Threatened and Endangered Species

According to the VT ANR Atlas, no known elements of concern (rare, threatened, endangered, or uncommon species, and significant natural communities) are located in or immediately adjacent to the PSA, though there is potential for northern long-eared bat. However, many rare species and state significant wetland natural communities are known throughout the broader Tinmouth Channel wetland complex. The globally rare Schweinitz's sedge (*Carex schweinitzii* S2 G3G4), and sage willow (*Salix candida* S3 G5), which have been documented by Vermont Natural Heritage Inventory in the Rich Fen and calcareous swamp communities approximately in the region 75-300 meters east of the PSA1, are also known from multiple populations through the broader wetland complex. Bog bedstraw (*Galium labradoricum* S1 G5; Threatened), and the one known population of water-speedwell (*Veronica catenata* S1 G5) in the state are also known from further afield in the larger wetland complex. The speedwell is known from high pH shores of the Tinmouth Channel, while the other three plants named are typically found in Rich Fen natural communities. None of the known rare species of Tinmouth Channel wetland complex region were found during the course of the field investigation, and only a small area of habitat, that is still developing some of the appropriate conditions through succession, exists for most of these species—in the center of Wetland A.

Long-headed Thimbleweed

The most significant rare species observed is long-headed thimbleweed (*Anemone cylindrica* S1S2). A complete biological description and assessment of the ten subpopulations found is provided in the attached Rare Plant Form, and associated photographs are provided in the attached Photo Exhibit. A total of 205-206 genets (genetic individuals arising independently from the soil) were observed, of which 180 were reproductive, bearing a total of 381 reproductive peduncles (maturing fruit, aborted fruit, or browsed fruit), across the 10 subpopulations. While multiple lines of evidence indicate that this species is likely declining regionally, this may be the largest known extant population in Vermont at this time. Given the successional nature of the

habitat, the populations can be expected to fluctuate and shift over time, and more subpopulations could also occur outside the combined PSA to the north and east.

There are multiple lines of evidence that the rare long-headed thimbleweed species has declined significantly in Vermont, New York, and Massachusetts in recent decades, but the reasons are unclear. White-tailed deer (*Odocoileus virginianus*) overbrowse and succession could be factors. Deer sign is abundant, and deer are likely overpopulated, and appear to be overgrazing the population. This could impact the population over time. Morrow Honeysuckle (*Lonicera morrowii*) and common buckthorn (*Rhamnus cathartica*) are two invasive species present sparsely around Subpopulations 1 to 4, where there is enough succession for shrubs and young white pines to establish. Currently the thimbleweeds have ample space, but their habitat may become more restricted by these common shrubs in future decades. Ultimately, succession from trees is a threat if quarrying is entirely abandoned. Occasional cutting back of white pines and northern white cedars will likely keep this area suitable of long-headed thimbleweed for at least a couple decades without creating heavier disturbance, which could at this point encourage more invasive shrub dominance more than Anemone persistence. This may be the largest population reported in Vermont, but the population likely fluctuates and moves to nearby open areas with changing successional conditions.

Though none is known, it would be reasonable for there to be a more natural population nearby in the region if there are dolomite ledges that receive natural light exposure or disturbance on any side of the massive wetland complex.

Black-seeded Clearweed

Black-seeded clearweed (*Pilea fontana* S2S3 G5), a Vermont rare plant species, was likely observed, but would require a follow-up visit in early fall (between mid-September and frost) to confirm. Photographs are provided in the attached Photo Exhibit. The first subpopulation occurs in a small toe slope seep along the southeast edge of the fen, and had a stand of circa 30 genets in early fruit and flower. At the second more westerly patch another 125+ genets were observed in fruit and flower, ranging from one to eight inches tall. Fruit shape already approaches the width and proportions of this species (vs. the narrower and paler seeds of common clearweed (*Pilea pumila*)), and the marly seasonally pooled habitat is classic habitat where black-seeded clearweed would be anticipated over the common clearweed, but this can't be fully assessed outside of the ripe fruiting window. The clearweeds grow associated with smooth alder (*Alnus serrulata*), rough bedstraw (*Galium asprellum*), Canada goldenrod (*Solidago canadensis*), boneset (*Eupatorium perfoliatum*), red-stemmed aster (*Symphyotrichum puniceum*), marsh skullcap (*Scutellaria galericulata*), and crested woodfern (*Dryopteris cristata*).

Butternut (*Juglans cinerea* S3? G3) saplings were rarely found, but this species is only tracked by the state of Vermont when there are healthy, mature, and reproductive trees, which was not the case within the PSA.

Impacts to state and/or federally protected animal and plant species may require a Takings Permit. If a project is going through Section 248 review, then impacts to rare species, such as the long-headed thimbleweed or black-seeded clearweed, also require VT F&W consultation.

Bat Roost Tree Habitat

The field investigation included review of the PSA1 for potential bat roosting trees. Eight old sugar maples (*Acer saccharum*) growing as wolf trees were found to provide potential roosting habitat in the northwestern half of the PSA, all west of the current open quarry. These trees all grow in areas that appear to have been pastured and largely open as of the 1962 aerial imagery shown in Figure 1 above, and are now young forest. These sugar maples range from 26 to 41 inches DBH, grow approximately 35 or more feet tall. Most trees have a full canopy, while several trees are nearly snags or nearing end of life. They display abundant cavities, crevices, and deeply exfoliating bark near a linear river channel, and all these features could have potential to host roosting bats. Individual potential roost trees are shown on the attached Natural Resources Identification Exhibit. VT F&W doesn't map any known rare bat occurrences within 2.5 miles of the combined PSA within its secure data sharing on ArcGIS Online that formerly showed publicly on VT ANR Atlas, so any VT F&W regulations apply to potential habitat, since no known rare bat is shown in the one mile radius.

Field verification was based on guidance provided in the USFWS *Range-Wide Indiana Bat & Northern Long-Eared Bat Survey Guidelines* (2024), which indicate that suitable summer habitat for NLEB consists of:

- Forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches diameter at breast height (dbh) that have exfoliating bark, cracks, crevices, and/or cavities),
- Non-forested habitats adjacent to suitable forests, such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures,
- Linear features such as road and/or stream corridors, fencerows, riparian forests, and other wooded corridors with open tree canopies or canopy height of more than 33 feet, and
- Individual trees exhibiting characteristics of suitable roost trees.

Natural Communities

Calcareous Red Maple-Tamarack Swamp (S2) is a rare natural community type in Vermont. In Wetland A, the example is exceedingly small, and marginally characterizes as this community as it is developing and undergoing succession over approximately six decades. By itself, this 600

square foot community nestled within an Alder Swamp and calcareous Woodland Seep would not be state significant, and it is separated from the mapped B-ranked 4.6 acre occurrence of this type to the northeast downriver by 1.8 kilometers. There is low potential for additional occurrences of this community in the intervening swamp, and the community in Wetland A is to marginal and small to be state significant on its own. In conclusion, this occurrence observed is excessively small, marginally classifies as this rare community, and is unlikely to be part of a larger state significant community. Regardless, the presence of this rare wetland community does add to the functions and values of Wetland A.

Most of the remaining habitats are too disturbed and immature to easily classify as one of Vermont's natural communities, but much of the young forests may historically have been Mesic Red Oak-Northern Hardwood Forest (S4) or Mesic Maple-Ash-Hickory-Oak Forest (S3).

Non-native Invasive Species

Ten non-native invasive species were observed scattered around the PSA1, with some of the species limited to discrete patches mapped in the attached Natural Resources Identification Exhibit, and shown in the Photo Exhibit. Invasive plant species observed in the PSA are listed in Table 3.

Table 3. Invasive Plant Species in PSA

Latin Name	English Name	Frequency across PSA	State Status*	Presence in Wetland A
Acer platanoides	Norway maple	Rare	Class B	N
Alliaria petiolata	Garlic mustard	Local in the floodplain	Class B	N
Berberis vulgaris	Common barberry	Occasional	Class B	Y
Celastrus orbiculatus	Asiatic bittersweet	Occasional	Class B	N
Centaurea stoebe ssp. micranthos	Spotted knapweed	Occasional	Watch List	N
Lonicera morrowii/L. x bella	Morrow honeysuckle	Common	Class B	Y
Pastinaca sativa	Wild parsnip	Frequent	Watch List	N
Phalaris arundinacea	Reed canary-grass	Occasional	Watch List	N
Rhamnus cathartica	Common buckthorn	Very common	Class B	Y
Rosa multiflora	Multiflora rose	Frequent	Watch List	Y
*VT Class B Noxious Weed: transport, sale or purchase of extant species not legal in Vermont VT Watch List: Unofficial invasive species list, but with no legal authority				

Source: D&K

Norway maple and reed canary grass are both local along Route 140, and a short distance north up the gravel pit access road. Only two Norway maple individuals were observed. One is a mature tree along the north edge of Route 140 that shades approximately a 15x20 foot area with 90% cover. The other is a young sapling several feet tall, and thus the species is still eradicable on this parcel, and spread could be prevented into the WMA. Six of the ten species listed in Table 3 are on Vermont's Class B prohibited weed list of the Vermont Noxious Weed Rule (last amended 2012), meaning that the species are known to be present in Vermont, and that transport (including unintentional transport during construction projects), sale or purchase of these species is not legal in the state. Four additional species in the table are on Vermont's invasive species Watch list, which is an unofficial supplementary list with no legal authority.

Habitat Features

Very little of the forest canopy is American beech (*Fagus grandifolia*), and suitable bear scarred beech trees and associated bear habitat are not present. Deer scat, tracks, bedding, bark rubbing, browse, and trails were all observed through the combined PSA, within the wooded areas the more open areas of the quarry area. VT F&W mapping in the VT ANR Atlas (attached) also indicates that the northwest ca. 20% of the combined PSA that contains pines is part of a large extent mapped as Deer Wintering Area. Evidence indicates that deer use this region heavily—likely to the detriment of many native plant species. For rare species such as the long-headed thimbleweed, deer are likely already overly abundant, and overbrowse may be a serious threat to their sustainability and survival. Deer browse was observed to be heavy across the quarry area on northern white cedar (*Thuja occidentalis*). Raccoon (*Procyon lotor*) scat was observed in the active quarry area as well.

The wooded northwesterly part of the combined PSA is identified as a part of a large habitat block displayed in the attached VT ANR Atlas Maps. Out of a score of 1-10 (10 being the largest and highest quality unbroken habitat), this block has an overall score of eight, which is higher than many of the surrounding habitat blocks in the area. Most of the two rare plant species, the potential bat roosting sites, and Wetland A are all within this mapped habitat block.

The site has high plant diversity. In Table 4, the following comprehensive list of exactly 200 vascular plant taxa were documented within the PSA1 on August 21, 2024:

Table 4. PSA Vascular Plant List 8/21/2024

Scientific Name	Common Name
Agrostis gigantea	redtop bentgrass
*Alliaria petiolata**	garlic mustard
Abies balsamea	balsam fir
Acer negundo	box-elder
*Acer platanoides**	Norway maple
Acer rubrum	red maple
Acer saccharum	sugar maple
Achillea millefolium	yarrow
Actaea rubra	red baneberry
Ajuga reptans	carpet bugle
Alnus incana	gray alder
Alnus serrulata	smooth alder
Ambrosia artemisiifolia	common ragweed
Amelanchier cf. laevis	common shadbush
Anaphalis margaritacea	pearly everlasting

Anemone cylindrica S1S2	long-headed thimbleweed
Anemone virginiana	thimbleweed
Angelica atropurpurea	great angelica
Aralia nudicaulis	wild sarsaparilla
Arctium lappa	great burdock
Arisaema triphyllum	Jack-in-the-pulpit
Asclepias syriaca	common milkweed
Athyrium angustum	lady fern
*Berberis vulgaris**	common barberry
Betula alleghaniensis	yellow birch
Betula populifolia	gray birch
Bromus inermis	Hungarian brome
Carex arctata	drooping wood sedge
Carex gracillima	graceful sedge
Carex intumescens	swollen sedge
Carex pedunculata	peduncled sedge
Carex stricta	tussock sedge
Carex tonsa	shaven sedge
Carpinus caroliniana	musclewood
Carya cordiformis	bitternut hickory
*Celastrus orbiculatus**	Oriental bittersweet
*Centaurea stoebe ssp. micranthos**	spotted knapweed
Chelidonium majus	celandine
Chelone glabra	turtlehead
Cichorium intybus	chicory
Circaea alpina	dwarf enchanter's nightshade
Circaea canadensis	tall enchanter's nightshade
Cirsium vulgare	bull thistle
Clematis virginiana	virgin's-bower
Clinopodium vulgare	wild basil
Cornus alternifolia	alternate-leaved dogwood
Cornus racemosa	gray dogwood
Cornus sericea	red-osier dogwood
Crataegus cf. holmesiana	Holmes' hawthorn
Crataegus cf. macrosperma	large-seeded hawthorn
Dactylis glomerata	orchard grass
Danthonia spicata	poverty-oats

Dasiphora floribunda	Shrubby cinquefoil
Daucus carota	Queen Anne's lace
Dianthus armeria	deptford pink
Dichanthelium lanuginosum	woolly panic grass
Doellingeria umbellata	tall white aster
Dryopteris carthusiana	spinulose woodfern
Dryopteris clintoniana	Clinton's woodfern
Dryopteris cristata	crested woodfern
Dryopteris intermedia	intermediate woodfern
Dryopteris marginalis	marginal woodfern
Echium vulgare	viper's bugloss
Epilobium ciliatum	ciliate willow-herb
Epipactis helleborine	helleborine
Equisetum arvense	field horsetail
Equisetum hyemale	scouring-rush
Eragrostis pectinacea	tufted love-grass
Erigeron canadensis	horseweed
Erigeron pulchellus	Robin's-plantain
Erigeron strigosus	daisy fleabane
Eupatorium perfoliatum	boneset
Euphorbia maculata	spotted spurge
Euphrasia stricta/nemorosa	eyebright
Eurybia divaricata	white wood aster
Euthamia graminifolia	grass-leaved goldenrod
Eutrochium maculatum	common Joe Pye weed
Fagus grandifolia	American beech
Festuca ovina	sheep fescue
Fragaria vesca	wood strawberry
Fragaria virginiana	wild strawberry
Fraxinus americana	white ash
Fraxinus nigra	black ash
Galium asprellum	rough bedstraw
Galium mollugo	common bedstraw
Geranium robertianum	herb Robert
Geum canadense	white avens
Geum laciniatum S3S4	herb bennet
Glyceria striata	fowl manna grass
Hydrocotyle americana	marsh pennywort

Hypericum perforatum	common St. John's-wort
Hypopitys monotropa	pine-sap
Impatiens capensis	common jewelweed
Juglans cinerea S3?	butternut
Juniperus communis	common juniper
Juniperus virginiana	eastern red cedar
Larix laricina	tamarack
Leucanthemum vulgare	common daisy
Linaria vulgaris	butter-and-eggs
Lobelia spicata	spike lobelia
Lonicera dioica	glaucous honeysuckle
*Lonicera morrowii**	Morrow's honeysuckle
Lotus corniculatus	bird's-foot trefoil
Lycopus uniflorus	common water-horehound
Lysimachia ciliata	fringed loosestrife
Lysimachia terrestris	swamp-candles
Maianthemum canadense	false lily-of-the-valley
Malus pumila	wild apple
Matteuccia struthiopteris	ostrich fern
Melilotus albus	white sweet clover
Menispermum canadense	moonseed
Mitchella repens	partridge-berry
Muhlenbergia mexicana	wirestem muhly
Myosotis scorpioides	common forget-me-not
Oenothera biennis	common evening primrose
Oenothera perennis	sundrops
Onoclea sensibilis	sensitive fern
Origanum vulgare	wild marjoram
Osmunda claytoniana	interrupted fern
Osmunda regalis	royal fern
Osmundastrum cinnamomeum	cinnamon fern
Ostrya virginiana	hop-hornbeam
Oxalis stricta	tall yellow wood-sorrel
Packera aurea	golden ragwort
Panicum capillare	old witch-grass

Parathelypteris noveboracensis	New York fern
Parthenocissus quinquefolia	woodbine
*Pastinaca sativa**	parsnip
*Phalaris arundinacea**	reed canary grass
Pilea cf. fontana S2S3	black-seeded clearweed
Pilosella piloselloides	glaucous king-devil
Pinus strobus	white pine
Plantago lanceolata	buckhorn plantain
Poa compressa	Canada bluegrass
Polystichum acrostichoides	christmas fern
Populus balsamifera	balsam poplar
Populus tremuloides	quaking aspen
Potentilla simplex	old-field cinquefoil
Prunella vulgaris	self-heal
Prunus serotina	black cherry
Prunus virginiana	choke cherry
Quercus rubra	red oak
Ranunculus acris	common buttercup
Ranunculus recurvatus	hooked crowfoot
Rhamnus alnifolia	alder-leaved buckthorn
*Rhamnus cathartica**	buckthorn
Rhus typhina	staghorn sumac
*Rosa multiflora**	multiflora rose
Rosa palustris	swamp rose
Rubus allegheniensis	common highbush blackberry
Rubus idaeus	red raspberry
Rubus occidentalis	black raspberry
Rubus odoratus	flowering raspberry
Rudbeckia hirta var. pulcherrima	common black-eyed susan
Salix bebbiana	Bebb's willow
Salix discolor	pussy willow
Salix eriocephala	wand willow
Sambucus nigra	elder
Schedonorus pratensis	meadow fescue
Scirpus hattorianus	Hattori bulrush
Scutellaria galericulata	marsh skullcap
Setaria pumila	yellow foxtail

Setaria viridis	green foxtail
Sicyos angulatus	bur-cucumber
Silene vulgaris	common bladder campion
Solanum dulcamara	bittersweet nightshade
Solidago bicolor	silver rod
Solidago caesia	blue-stemmed goldenrod
Solidago canadensis	Canada goldenrod
Solidago gigantea	large goldenrod
Solidago juncea	early goldenrod
Solidago nemoralis	gray goldenrod
Solidago rugosa	rough-leaved goldenrod
Spiraea alba	meadowsweet
Sporobolus vaginiflorus	sheathed dropseed
Symphyotrichum cordifolium	heart-leaved aster
Symphyotrichum ericoides	heath aster
Symphyotrichum lanceolatum var. lanceolatum	lance-leaved aster
Symphyotrichum lateriflorum	calico aster
Symphyotrichum novae-angliae	New England aster
Symphyotrichum puniceum	red-stemmed aster
Thalictrum pubescens	tall meadow-rue
Thelypteris palustris	marsh fern
Thuja occidentalis	northern white cedar
Tiarella cordifolia	foam flower
Toxicodendron radicans ssp. radicans	climbing poison-ivy
Trifolium pratense	red clover
Tsuga canadensis	eastern hemlock
Tussilago farfara	colt's-foot
Ulmus americana	American elm
Urtica dioica	stinging nettle
Verbascum blattaria	moth mullein
Verbascum thapsus	common mullein
Viburnum dentatum	arrow-wood
Viburnum lentago	nannyberry
Vicia cracca	cow vetch
Viola cucullata	marsh blue violet
Viola labradorica	dog violet
Vitis riparia	riverbank grape
Total Species:	200
Yellow = VT Invasive Species	
Green = VT Rare Species	
Blue = VT Uncommon Species	

Summary

1. One Class II wetland, identified as Wetland A was delineated in the northwest region of the PSA. The wetland provides seepage water to the Tinmouth Channel, and contains a potential population of rare plant (black-seeded clearweed). Impacts to the wetlands and plants can likely be avoided. Work in any Vermont Class II wetland or its associated 50-foot buffer would potentially require a VT Wetlands Permit.
2. No state or federal jurisdictional waterways were found within the combined PSA.
3. Two rare species and no significant natural communities were identified during the course of field work in the project sites. The state rare long-headed thimbleweed may be the largest known extant population of this species in Vermont, and numbers may fluctuate significantly over time in this early successional habitat. The project has already been redesigned to avoid any overlap of direct impact areas with thimbleweed subpopulations.

Consultation is recommended with VT F&W to avoid indirect impacts to the nearest Subpopulations #1, #4, and #8 as design moves forward.

For the unconfirmed population of state rare black-seeded clearweed, the project, as currently laid out, would avoid Wetland A and its 50-foot buffer entirely. As a result, impacts to this species of calcareous seasonally pooled wetlands wouldn't be anticipated, and identity determination/confirmation is thus not needed. These rare plants are not legally Threatened nor Endangered, but they are still state jurisdictional if the project goes through Section 248 review.

4. No additional RTE plants are indicated on corresponding VT ANR mapping, and the other species known elsewhere in the complex, including the rare Schweinitz's sedge were not found.
5. Eight potential bat roosting trees were observed within PSA1. Work can avoid impacting Threatened or Endangered bats by conducting tree removal during the VT F&W and USFWS time of year restriction. Further coordination with both agencies may be necessary.
6. Work in waters of the United States, including most wetlands and streams, would potentially require a United States Army Corps of Engineers permit.

Attachments

1. Project Location Map
2. Natural Resources Identification Exhibit
3. VT ANR Atlas maps
4. NRCS Custom Soil Resource Report
5. USACE Forms
6. DEC Wetland Verification Correspondences
7. Photo Exhibit
8. IPaC Species List
9. Rare Plant Form: long-headed thimbleweed

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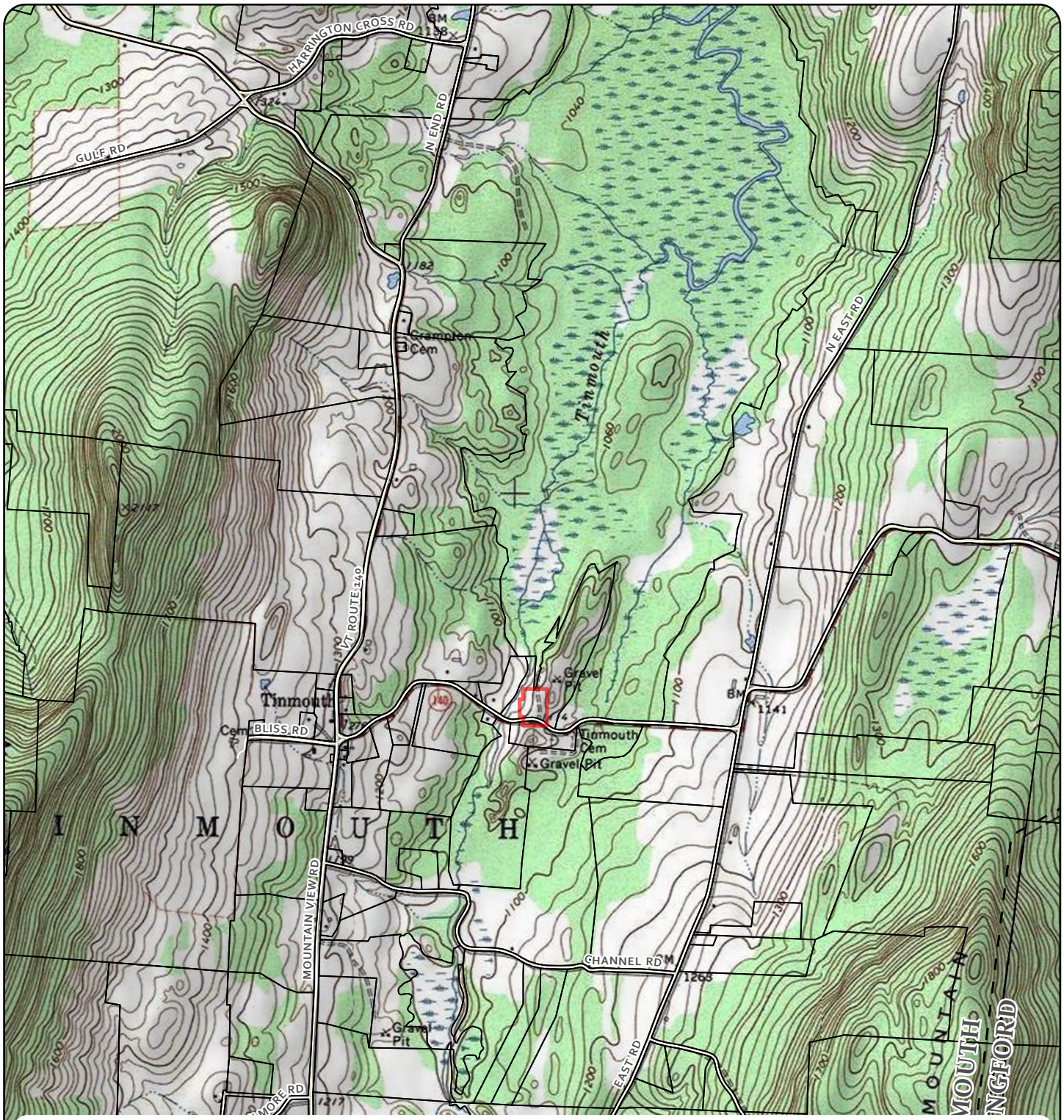


Legend

Roads

Town Boundary

Parcels

IC Tinmouth Project Study Area

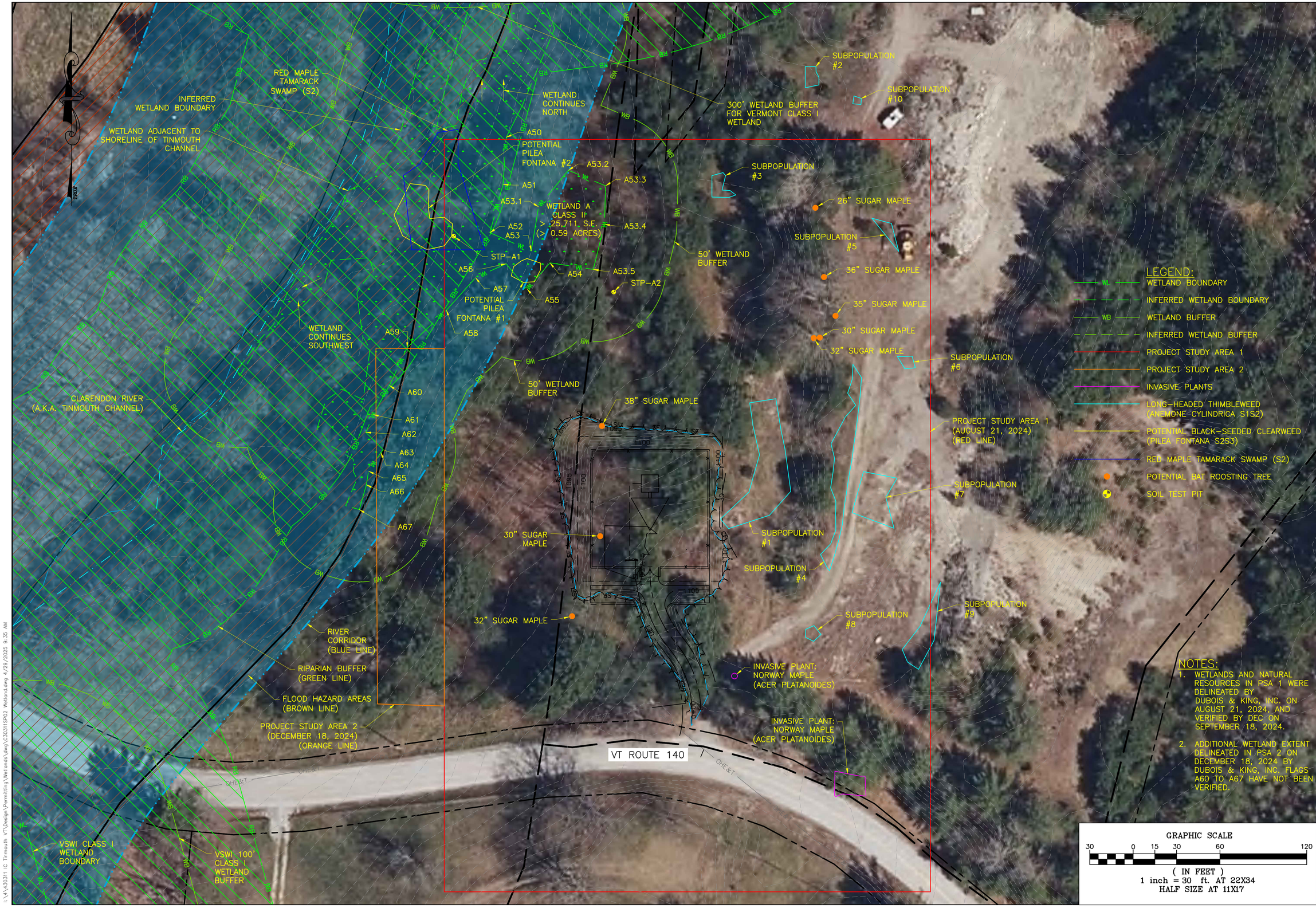
DuBois & King INC.

Scale: 1:24,000

0 0.5 1 Miles

N

Sources: Towns - VCGI; Topographic Map - (c) 2023 National Geographic Society, i-cubed



LEGEND:

- WL — WETLAND BOUNDARY
- WL — INFERRED WETLAND BOUNDARY
- WB — WETLAND BUFFER
- WB — INFERRED WETLAND BUFFER
- PROJECT STUDY AREA 1
- PROJECT STUDY AREA 2
- INVASIVE PLANTS
- LONG-HEADED THIMBLEWEED (ANEMONE CYLINDRICA S1S2)
- POTENTIAL BLACK-SEEDED CLEARWEED (PILEA FONTANA S2S3)
- RED MAPLE TAMARACK SWAMP (S2)
- POTENTIAL BAT ROOSTING TREE
- SOIL TEST PIT

NOTES:

1. WETLANDS AND NATURAL RESOURCES IN PSA 1 WERE DELINEATED BY DUBOIS & KING, INC. ON AUGUST 21, 2024, AND VERIFIED BY DEC ON SEPTEMBER 18, 2024.
2. ADDITIONAL WETLAND EXTENT DELINEATED IN PSA 2 ON DECEMBER 18, 2024 BY DUBOIS & KING, INC. FLAGS A60 TO A67 HAVE NOT BEEN VERIFIED.

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft. AT 22X34
HALF SIZE AT 11X17

DuBois & King inc.
ENGINEERING • PLANNING • MANAGEMENT • DEVELOPMENT
6 GREEN TREE DRIVE
SO. BURLINGTON, VT 05403
TEL: (802) 878-7661
FAX: (866) 783-7101
www.dubois-king.com
RANDOLPH, VT
SPRINGFIELD, VT
BRANDON, VT
BEDFORD, NH
LACONIA, NH

PROFESSIONAL SEAL

NOT FOR CONSTRUCTION PRELIMINARY PLANS

NO.	DESCRIPTION	DATE	BY	CK'D

Industrial Tower and Wireless

ITW TINMOUTH

402 VT ROUTE 140
TINMOUTH, VT
05773

SHEET TITLE

NATURAL RESOURCES IDENTIFICATION EXHIBIT

DRAWN BY	DATE
JWP	APR. 2025
CHECKED BY	D&K PROJECT #
ANR	430311L
PROJ. ENG.	D&K ARCHIVE #
LJH	

SHEET NUMBER

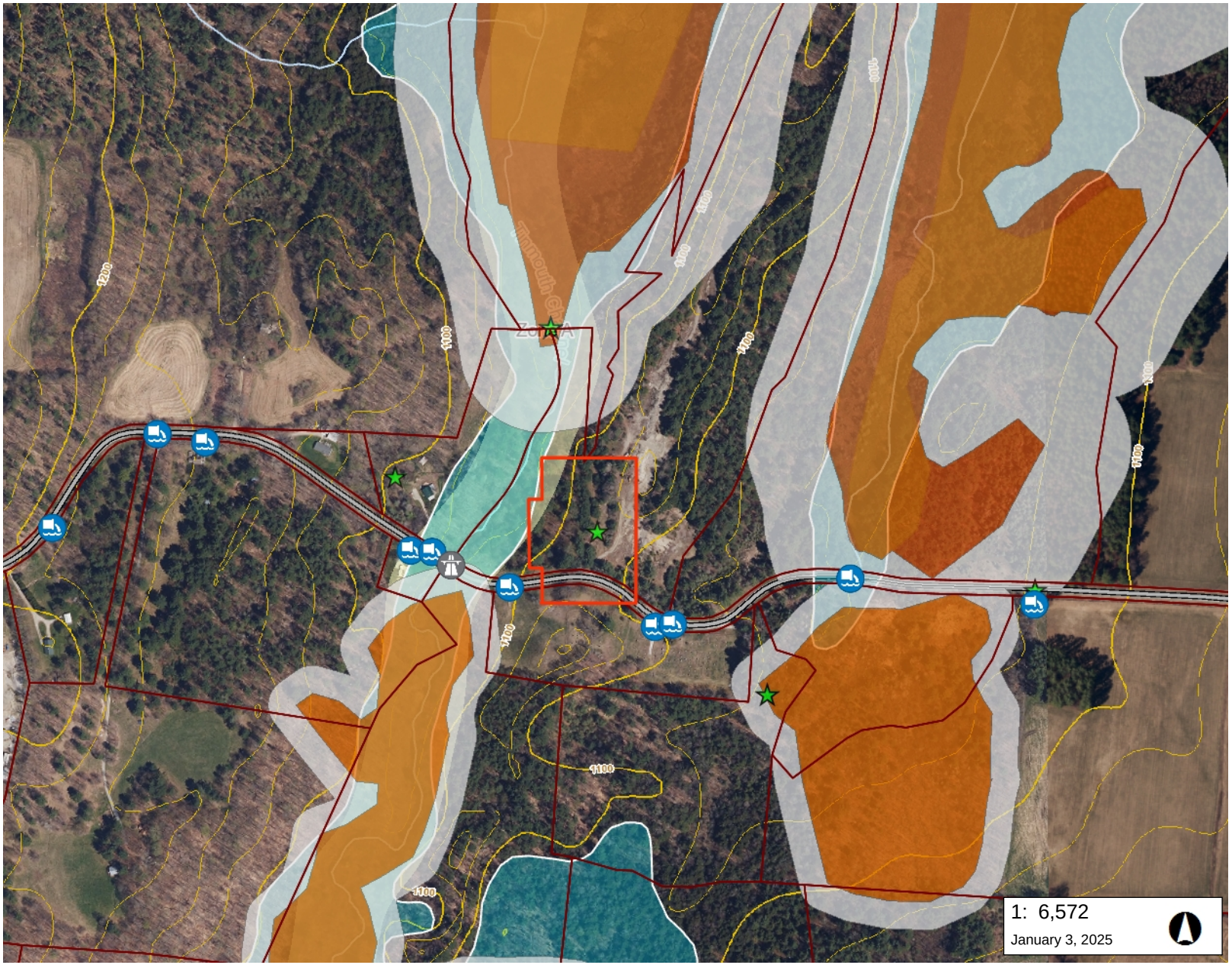
C-1

I:\430311 IC Tinmouth VT\Design\Permitting\Wetlands\dwg\C30311SP02 Wetland.dwg 4/29/2025 9:35 AM

Natural Resources Atlas-Wetlands/Floodplains

Vermont Agency of Natural Resources

vermont.gov



LEGEND

- Bridges
- Culvert
- Wetland Projects
- Wetland - VSWI
  - Class 1 Wetland
  - Class 2 Wetland
  - Wetland Buffer
- Wetlands Advisory Layer
- Flood Hazard Boundaries
  - Limit Lines
  - SFHA / Flood Zone Boundary
  - Flowage Easement Boundary
- Flood Hazard Zones
  - 1% Annual Chance Flood Hazard
  - Regulatory Floodway
  - Special Floodway
  - Area of Undetermined Flood Hazar
  - 0.2% Annual Chance Flood Hazard
  - Future Conditions 1% Annual Chan
  - Area with Reduced Risk Due to Lev
  - Area with Risk Due to Levee
- River Corridors (Aug 27, 2019)
- Parcels (standardized)
- Stream
  - Stream
  - Intermittent Stream
- Roads

NOTES

Map created using ANR's Natural Resources Atlas

334.0 0 167.00 334.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 548 Ft. 1cm = 66 Meters

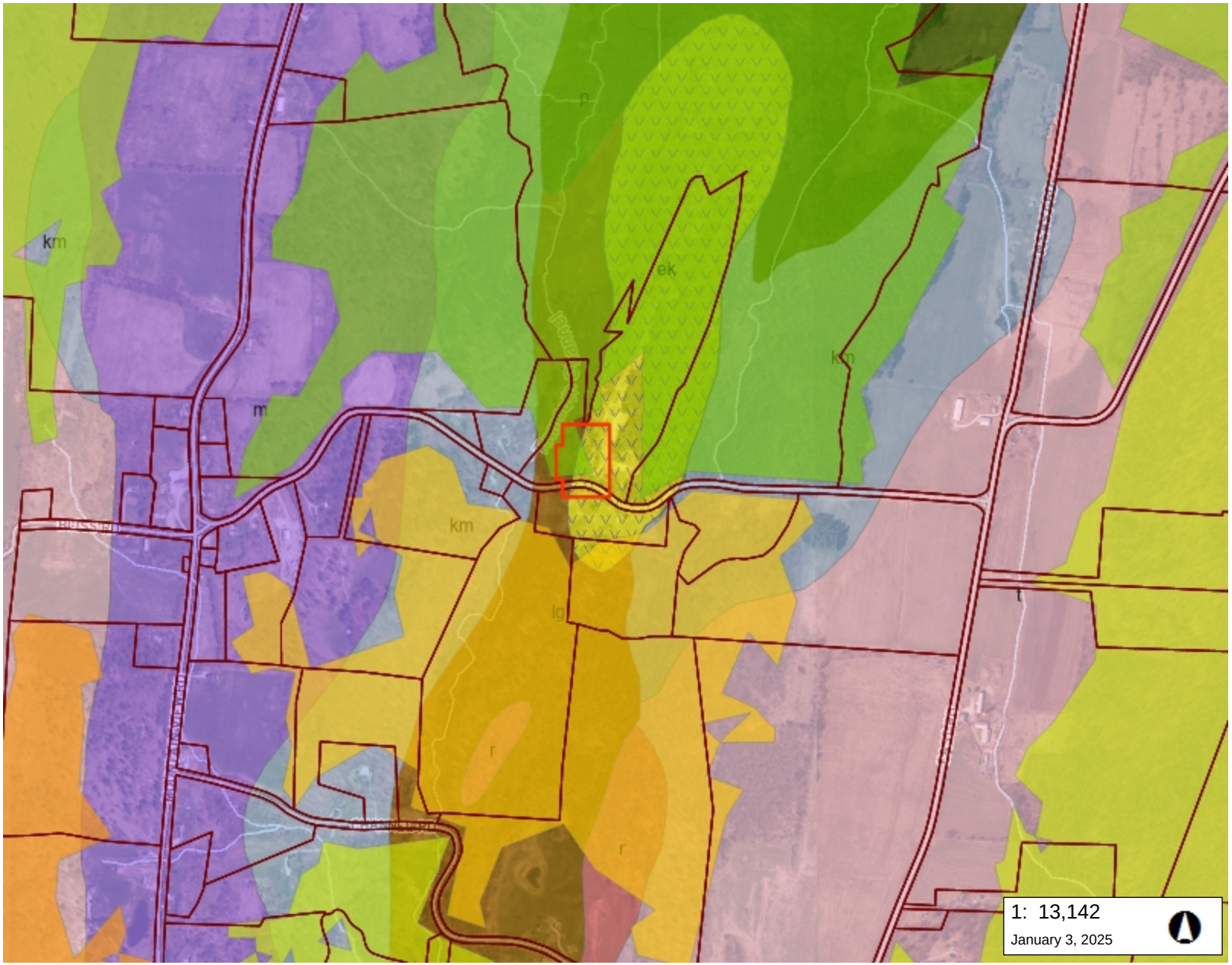
THIS MAP IS NOT TO BE USED FOR NAVIGATION

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

Natural Resources Atlas-Glacial Geo/Habitat

Vermont Agency of Natural Resources

vermont.gov



LEGEND

Habitat Blocks

- 10 - Higher Priority
- 9
- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1 - Lower Priority
- 0

Surficial Geology (Lithology)

- till
- terminal moraine
- moraine
- isolated kame
- kame terrace
- kame moraine
- outwash
- esker
- eolian sand
- lake gravel
- beach gravel
- delta gravel
- delta
- lake sand

NOTES

Map created using ANR's Natural Resources Atlas

668.0 0 334.00 668.0 Meters

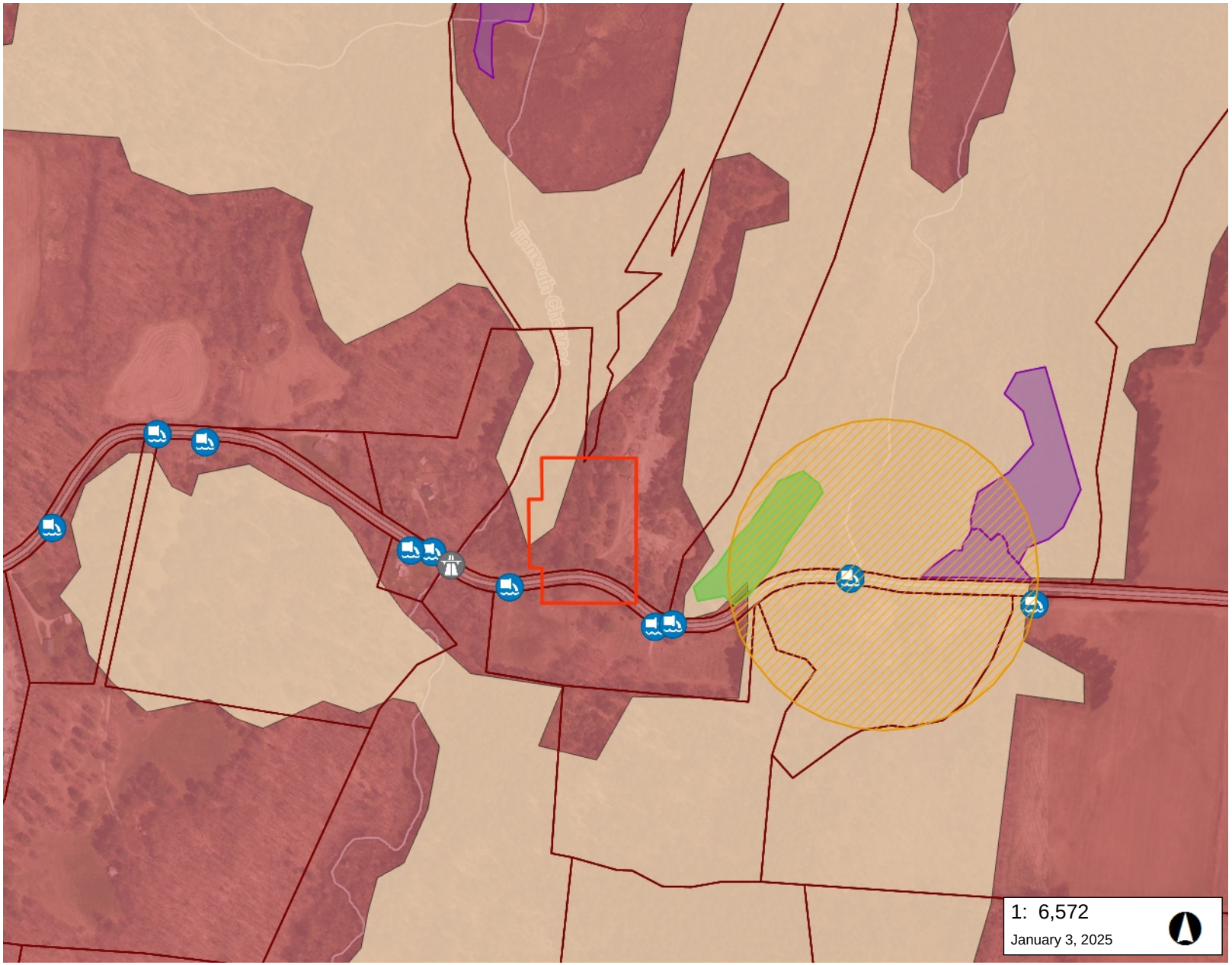
WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 1095 Ft. 1cm = 131 Meters

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Natural Resources Atlas-Fish/Wildlife

Vermont Agency of Natural Resources

vermont.gov



LEGEND

- Uncommon Species and other
  - Plant
  - Animal
  - Natural Community
- Rare Threatened and Endange
  - RTE Animal
  - RTE Plant
- Significant Natural Communitie
- Bridges
- Culvert
- Deer Wintering Areas
- Brook Trout Waters
- Parcels (standardized)
- Stream
  - Stream
  - Intermittent Stream
- Roads
  - Interstate
  - US Highway; 1
  - State Highway
  - Town Highway (Class 1)
  - Town Highway (Class 2,3)
  - Town Highway (Class 4)
  - State Forest Trail
  - National Forest Trail
  - Legal Trail
  - Private Road/Driveway
  - Proposed Roads

334.0 0 167.00 334.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 548 Ft. 1cm = 66 Meters

THIS MAP IS NOT TO BE USED FOR NAVIGATION

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

NOTES

Map created using ANR's Natural Resources Atlas

Vermont Natural Heritage Inventory
Vermont Fish & Wildlife Department
Element Occurrence Report

DATA USE AGREEMENT
By using or retaining this report, the user agrees to abide by the *Data Sharing Guidelines* found at https://vtfishandwildlife.com/data-sharing-guidelines.

***Field definitions for Natural Heritage Data Reports* can be found at https://vtfishandwildlife.com/natural-heritage-metadata.**

Scientific Name Calcareous Red Maple-Tamarack Swamp

NVC CEGL006009

EO ID 8608 **EO #** 19

State Rank S2 N/A

ID Confirmed Y

TINMOUTH CHANNEL MARSH

County
Rutland

Town
Tinmouth

USGS Topo Quad Middletown Springs **Latitude (DD)** 43.4669 **Longitude (DD)** -73.0279

Directions
Tinmouth. Wetlands associated with Tinmouth Channel north of Route 140 and south of End Road.

General Site Description
Tinmouth Channel is one of the most significant natural areas in Vermont. Tinmouth Channel Wetlands were designated as Class One wetlands by the Natural Resources Board in December 2001. The northern portion of Tinmouth Channel (between Route 140 and End Road) is primarily public land and wetland, owned and managed by Vermont Fish and Wildlife Department. Approximately 700 acres of wetland occur here, all associated with the sluggish Tinmouth Channel. Channel flow is to the north and becomes the Clarendon River. Tinmouth Channel occurs in a narrow (0.5 mile), steep-sided valley. Calcium-rich bedrock dominates in this area, including Winooski dolomite and Monkton quartzite. There are numerous springs and seeps in the hills and on the margins of the Tinmouth Channel wetlands. The abundance of this calcium-rich ground water plays an important role in determining the wetland natural communities present. These include Northern White Cedar Swamp, Red Maple-Northern White Cedar Swamp, Sweet Gale Shoreline Swamp, Rich Fen, and Cattail Marsh. These communities have been described in earlier reports by Nongame and Natural Heritage Program on Rutland County, fens, and cedar swamps and are not included here. A small (4.6 acres), but high-quality example of a Calcareous Red Maple-Tamarack Swamp occurs on the eastern side of Tinmouth Channel between the larger Northern White Cedar Swamp to the east and the shrub and marsh wetlands to the west.

Minimum Elevation (ft) 1040 **Maximum Elevation (ft)** 1040

Survey Date 2005-06-16 **Last Observation** 2005-06-16 **First Observation** 2005-06-16

Element Occurrence Data
2005: The Calcareous Red Maple-Tamarack Swamp has an open canopy (50 percent closure) with a sparse emergent tree layer of white pine (*Pinus strobus*) and tamarack (*Larix laricina*). The stunted main canopy is only about 35 feet tall and dominated by tamarack, with some northern white cedar (*Thuja occidentalis*) and lesser amounts of white pine, red maple (*Acer rubrum*), and black ash (*Fraxinus nigra*). Tamarack is also common in the subcanopy, with lesser amounts of cedar and red maple. Tamarack also dominates in the tall shrub layer, along with cedar, speckled alder (*Alnus incana*), and some highbush blueberry (*Vaccinium corymbosum*). The short shrub layer is diverse, with tamarack, alder, alder-leaved buckthorn (*Rhamnus alnifolia*), shrubby cinquefoil (*Potentilla fruticosa*), red-osier dogwood (*Cornus sericea*), cedar, balsam fir (*Abies balsamea*), and velvet-leaf blueberry (*Vaccinium myrtilloides*). Herbaceous growth is lush (60 percent cover) and species rich: lakeshore sedge (*Carex lacustris*), inland sedge (*Carex interior*), yellow sedge (*Carex flava*), delicate-stemmed sedge (*Carex leptalea*), spreading goldenrod, cinnamon fern (*Osmunda cinnamomea*), marsh fern (*Thelypteris palustris*), slender mannagrass (*Glyceria melicaria*), crested wood fern (*Dryopteris cristata*), and the state-threatened pink pyrola. Bryophyte cover is about 80 percent and is dominated by the calcium-loving *Sphagnum warnstorfii*, with *Sphagnum centrale*, *Sphagnum girgensohnii*, *Campylium stellatum*, and *Calliergon cordifolium*. Hummocks are large and up to 20 inches tall. Hollows are small and water-filled, with the moss *Calliergon cordifolium* growing in the pools. Surface water conductivity was measured as 230µ pH as 7.5 these high values reflect the high levels of mineral enrichment from the underlying limy bedrock. The well-decomposed woody peat is greater than four feet deep (actual depth is not known).

Element Occurrence Rank B **EO Rank Date** 2013-01-14

Size C

Natural Community Condition A

Probably B-ranked.

Landscape Condition B

Anthropogenic Disturbance

2005: There is no sign of recent logging disturbance in this tamarack fen, although the trees are generally young (75 years old). The history of Tinmouth Channel is not known and there may have been hydrologic changes in the past 100 years that has led to the current distribution of forested wetlands. Alternatively, past logging that removed cedar may have led to this "successional" tamarack fen.

Management Comments

Softwood Swamp Inventory, 2010: It is recommended that there be no logging in this Calcareous Red Maple-Tamarack Swamp or in other cedar swamps on the Wildlife Management Area. The cedar swamp at Tinmouth Channel is one of the
southernmost examples in Vermont and the tamarack swamp is a high quality example both are significant natural communities and deserve high levels of protection. Limiting logging in the 100 foot upland buffer will further protect these important wetlands.

Managed Area

TINMOUTH CHANNEL WMA

Reference Code	Citation
U10SOR01VTUS	Sorenson, E. et al. 2010. Softwood swamps of Vermont: distribution, ecology, classification, and some sites of ecological significance. Natural Heritage Information Project, Vermont Fish and Wildlife Department, Agency of Natural Resources. Waterbury, Vermont. 259 pp.

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Rutland County, Vermont

IC Tinmouth Project Study Area

January 3, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

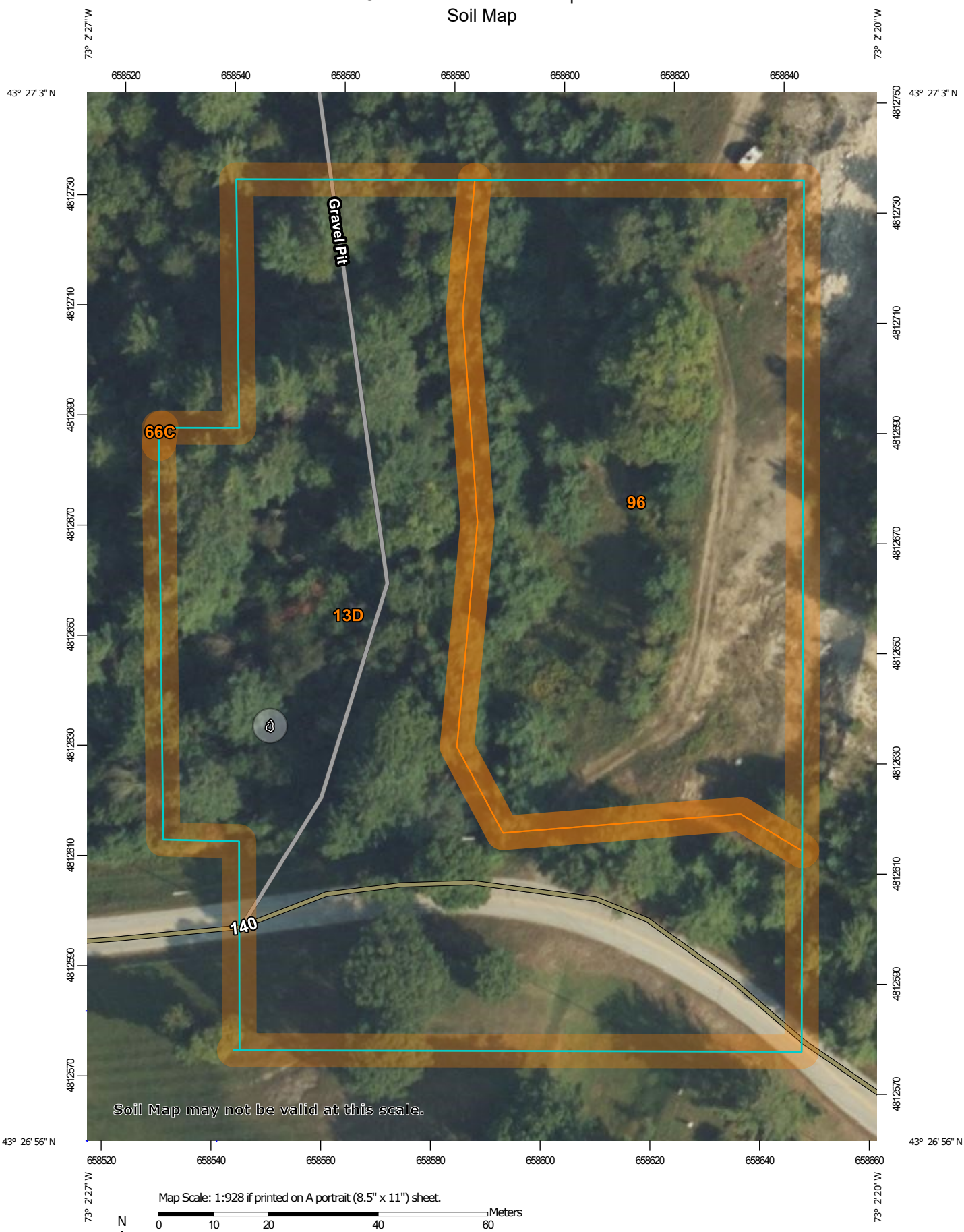
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:928 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 10 20 40 60

Feet
0 45 90 180 270

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rutland County, Vermont
Survey Area Data: Version 29, Aug 28, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 1, 2020—Oct 1, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
13D	Hinckley gravelly loamy fine sand, 15 to 25 percent slopes	2.5	58.9%
66C	Georgia and Amenia soils, 8 to 15 percent slopes	0.0	0.0%
96	Udipsamments, nearly level	1.8	41.1%
Totals for Area of Interest		**4.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Rutland County, Vermont

13D—Hinckley gravelly loamy fine sand, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9gmj
Elevation: 90 to 1,000 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 120 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Concave, convex
Across-slope shape: Concave, convex
Parent material: Sandy and gravelly glaciofluvial deposits

Typical profile

H1 - 0 to 5 inches: gravelly loamy fine sand
H2 - 5 to 23 inches: gravelly loamy fine sand
H3 - 23 to 60 inches: very gravelly coarse sand

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F142XB002VT - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 7 percent
Hydric soil rating: No

Paxton
Percent of map unit: 7 percent
Hydric soil rating: No

Windsor
Percent of map unit: 6 percent
Landform: Terraces
Hydric soil rating: No

66C—Georgia and Amenia soils, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 9gw2
Elevation: 90 to 600 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 120 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Georgia and similar soils: 41 percent
Amenia and similar soils: 39 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Georgia

Setting
Landform: Ridges, knolls, hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Coarse-loamy till

Typical profile
H1 - 0 to 9 inches: loam
H2 - 9 to 30 inches: gravelly loam
H3 - 30 to 60 inches: gravelly loam

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F142XB013NY - Moist Till Upland
Hydric soil rating: No

Description of Amenia

Setting

Landform: Ridges, knolls, hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Coarse-loamy till

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 24 inches: gravelly loam
H3 - 24 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F142XB013NY - Moist Till Upland
Hydric soil rating: No

Minor Components

Lyons

Percent of map unit: 7 percent
Landform: Depressions
Hydric soil rating: Yes

Massena

Percent of map unit: 7 percent
Hydric soil rating: No

Paxton

Percent of map unit: 6 percent

Hydric soil rating: No

96—Udipsamments, nearly level

Map Unit Setting

National map unit symbol: 9gyx
Elevation: 90 to 1,000 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 120 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Udipsamments and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udipsamments

Setting

Down-slope shape: Concave
Across-slope shape: Concave

Typical profile

H1 - 0 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (20.00 to 99.90 in/hr)
Depth to water table: About 24 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: A
Ecological site: F142XB002VT - Dry Outwash
Hydric soil rating: No

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: IC TINMOUTH City/County: TINMOUTH/RUTLAND Sampling Date: 2024-08-21

Applicant/Owner: State: Vermont Sampling Point: STP A1

Investigator(s): Aaron Marcus and Lee Toomey Section, Township, Range:

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR or MLRA): R 144B Lat: 43.4506122 Long: -73.0404789 Datum: WGS 84

Soil Map Unit Name: 13D - Hinckley gravelly loamy fine sand, 15 to 25 percent slopes NWI classification: PSS1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No ____	**Is the Sampled Area within a Wetland?** Yes ✔ No ____
Hydric Soil Present?	Yes ✔	No ____	
Wetland Hydrology Present?	Yes ✔	No ____	If yes, optional Wetland Site ID: A

Remarks: (Explain alternative procedures here or in a separate report.)

Wetland appears to be maturing from former agricultural condition. While Wetland A is currently alder dominated, there are tall American tamaracks (Larix laricina) that are beginning to establish greater dominance. The wetland may soon become a PFO1. In the middle of the wetland is a small particularly wet area with less shading and dominance from shrubs and small trees, which is an example of a Red Maple-Tamarack Swamp (S2). This type of community is already known to occur in the much broader Tinmouth Channel wetland complex. This wetland was determined by VT DEC to be a Class II wetland, however to both the north, south, and east are Tinmouth Channel Class I wetlands.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	✔ Water-Stained Leaves (B9)	___ Surface Soil Cracks (B6)
✔ High Water Table (A2)	___ Aquatic Fauna (B13)	✔ Drainage Patterns (B10)
✔ Saturation (A3)	___ Marl Deposits (B15)	___ Moss Trim Lines (B16)
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	___ Dry-Season Water Table (C2)
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	___ Crayfish Burrows (C8)
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)	___ Saturation Vis ble on Aerial Imagery (C9)
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	✔ Stunted or Stressed Plants (D1)
✔ Iron Deposits (B5)	___ Thin Muck Surface (C7)	✔ Geomorphic Position (D2)
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)	___ Shallow Aquitard (D3)
___ Sparsely Vegetated Concave Surface (B8)		___ Microtopographic Relief (D4)
		✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✔	Depth (inches): ____
Water Table Present?	Yes ✔	No ____	Depth (inches): 11
Saturation Present? (includes capillary fringe)	Yes ✔	No ____	Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

White pines are dwarfed and stressed within the wetland.

VEGETATION – Use scientific names of plants. Sampling Point: STP A1

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ulmus americana	2		FACW
2. Larix laricina	1		FACW
3.			
4.			
5.			
6.			
7.			
	3 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Alnus incana	80	✔	FACW
2. Cornus racemosa	10		FAC
3. Ulmus americana	10		FACW
4. Rubus idaeus	5		FACU
5. Dasiphora fruticosa	1		FACW
6.			
7.			
	106 = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Pilea	10	✔	FACW
2. Scutellaria galericulata	5	✔	OBL
3. Eupatorium perfoliatum	2		FACW
4. Solidago canadensis	2		FACU
5. Arisaema triphyllum	1		FAC
6. Dryopteris cristata	1		OBL
7. Lysimachia terrestris	1		OBL
8. Solidago rugosa	1		FAC
9.			
10.			
11.			
12.			
	23 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1. Clematis virginiana	1		FAC
2.			
3.			
4.			
	1 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	7	x 1 =	7
FACW species	106	x 2 =	212
FAC species	13	x 3 =	39
FACU species	7	x 4 =	28
UPL species	0	x 5 =	0
Column Totals:	133 (A)		286 (B)

Prevalence Index = B/A = 2.15

Hydrophytic Vegetation Indicators:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Pilea seeds are too immature for confident identification, but they may be Pilea fontana (S2S3) or Pilea pumila (S5).

SOIL

Sampling Point: STP A1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 19	5Y 3/1	100					Muck	Deep mucks
19 - 24	5Y 3/1	100					Mucky Loam/Clay	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ✔ Histosol (A1)
- ✔ Histic Epipedon (A2)
- ✔ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:

Elsewhere in wetland, the soil is very shallow before hitting dense till or outwash boulders. Wetland is highly calcareous, and could contain rich fens if there were areas that were a bit more open.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: IC TINMOUTH City/County: TINMOUTH Sampling Date: 2024-08-21

Applicant/Owner: _____ State: Vermont Sampling Point: STP A2

Investigator(s): Lee Toomey Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 30

Subregion (LRR or MLRA): _____ Lat: 43.450447 Long: -73.0401404 Datum: WGS 84

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks: (Explain alternative procedures here or in a separate report.)

upland

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: STP A2

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus strobus	40	✔	FACU
2. Fraxinus americana	6		FACU
3. Acer saccharum	5		FACU
4. Alnus incana	5		FACW
5.			
6.			
7.			
	56	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Frangula alnus	30	✔	FAC
2. Acer saccharum	20	✔	FACU
3. Berberis vulgaris	5		FACU
4. Fraxinus americana	5		FACU
5. Lonicera morrowii	5		FACU
6. Prunus serotina	2		FACU
7.			
	67	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Onoclea sensibilis	70	✔	FACW
2. Carex gracillima	3		FACU
3. Parathelypteris noveboracensis	2		FAC
4. Fraxinus americana	1		FACU
5. Rosa multiflora	1		FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	77	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1. Vitis riparia	10	✔	FAC
2.			
3.			
4.			
	10	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	75	x 2 =	150
FAC species	42	x 3 =	126
FACU species	93	x 4 =	372
UPL species	0	x 5 =	0
Column Totals:	210 (A)		648 (B)

Prevalence Index = B/A = 3.08

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: STP A2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 12	7.5YR 2.5/2	100					Silt Loam	silly loam under 1 inch white pine needle duff
12 - 14	10YR 3/3	100						
14 - 16	10YR 3/3	80					Silt Loam	small stones begin at this layer. beneath is gravelly
14 - 16	10YR 3/4	20					Silt Loam	small stones begin at this layer. beneath is gravelly
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

silly loam with some gravel <10% but layer below is impenetrable

Fwd: 402 VT Rte 140-cell-Tinmouth #2024-0961

Louis Hodgetts <lhodgetts@dubois-king.com> Thu, Sep 19, 2024 at 12:24 PM
To: Aaron Marcus <amarcus@dubois-king.com>

Aaron,

It looks like Zapata visited the Tinmouth site and confirmed the wetland delineation as class 2 with a 50' buffer. I'm not sure who invited her to visit the site but now that it is done can you incorporate her confirmation into the Natural Resources report?

Thank you,

Louis

Office: 802-878-7661

Direct: 802-728-7211

Cell: 802-578-6081

From: Aimee Rutledge <arutledge@dubois-king.com>
Sent: Wednesday, September 18, 2024 2:42 PM
To: Louis Hodgetts <lhodgetts@dubois-king.com>
Subject: Fwd: 402 VT Rte 140-cell-Tinmouth #2024-0961

FYI - see Zapata's email below. I'm not sure who George and Paul are?

Aimee N Rutledge (she/her) *Senior Environmental Technical Lead*

Phone: 802-728-7242 (O) / 401-529-5034 (C)
Email: arutledge@dubois-king.com
Website: https://www.dubois-king.com
Address: 6 Green Tree Drive
South Burlington, VT 05403

---------- Forwarded message ---------
From: **Courage, Zapata** <Zapata.Courage@vermont.gov>
Date: Wed, Sep 18, 2024 at 10:44 AM
Subject: 402 VT Rte 140-cell-Tinmouth #2024-0961
To: tinmouthtown@vermontel.net <tinmouthtown@vermontel.net>
Cc: Aimee Rutledge <arutledge@dubois-king.com>

Hello Gail, I failed to get Paul and/or George Herricks contact info, So I am hoping you can pass this along to them. Thank you!

Hello George, and Paul,

I have confirmed the wetland delineation as shown on the Dubois & King site plan (attached). It is a Class II wetland. The delineation and classification is valid for 5-years. Both it and its 50-ft buffer are regulated by the VT Wetlands Program. Any activity proposed within the wetland or its buffer typically requires a wetland permit.

As we discussed, the light blue polygons on your map are outlining where a rare plant is occurring, the thimbleweed. It is not a wetland plant. If you have questions about the plant, you need to get in touch with Grace Glynn at F&W. Grace.glynn@vermont.gov .

Let me know if you have any questions and I have copied Aimee of Duboise and King who typically supervises the natural resources work that is done for a project, such as wetland delineations, plant surveys, stream locations etc. In this way, everyone has my comments for their records moving forward.

Cheers,

Zapata

Zapata Courage | District Wetland Ecologist

Addison & Rutland Counties and the Towns of Rupert, Peru, Dorset, Landgrove, Manchester, Winhall, Sandgate of Bennington Co. and Stockbridge and Rochester of Windsor Co.

The Department of Environmental Conservation supports telework, and there are times when I may be working from another office location or out in the field. I am available to connect by phone and email. I am also available to connect in-person upon request.

Vermont Department of Environmental Conservation

Watershed Management Division | Wetlands Program

Rutland Regional Office

802-490-6179 (cell)

https://dec.vermont.gov/watershed/wetlands

IMG_3888.JPG
2679K

DuBois & King, Inc.

PHOTOGRAPHIC LOG

Project Name: IC Tinmouth

Site Location: Tinmouth, VT

Project No.: 430311

Photo No.:	Date:
1	08/21/2024

Description:

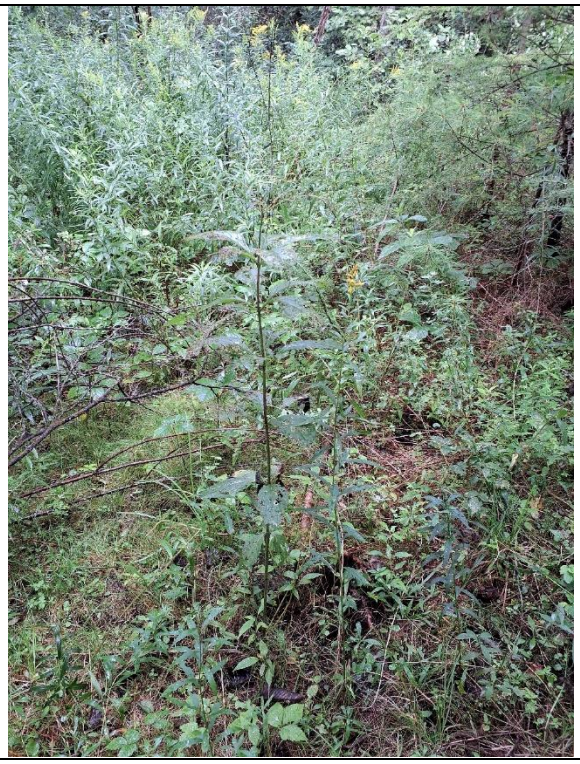
View of Wetland A facing north. Much of the swamp is dominated by speckled alder with a sparse canopy of tamarack.

Photo No.:	Date:
2	08/21/24

Description:

Small interior area in Wetland A that approaches description for Calcareous Red Maple-Tamarack Swamp (S2), facing south. Large exemplary stands of this community type are known to occur approximately 2 miles upstream of this location.

Wetland A, beaver chew in Wet A, Bat Trees, Anemone, Pilea, NNIP, Quarry, upland woods, deer sign, other scat



DuBois & King, Inc.

PHOTOGRAPHIC LOG

Project Name: IC Tinmouth

Site Location: Tinmouth, VT

Project No.: 430311

Photo No.:	Date:
3	08/21/24

Description:

Clearweed (*Pilea* sp.) plant likely to be black-seeded clearweed (*Pilea fontana*) at Subpopulation 2, in the center of Wetland A.

The translucent stems can be observed which give clearweed its name. The fruits are immature, and plants will only be confirmable as the fruits ripen between mid-September and frost.

Photo No.:	Date:
4	08/21/2024

Description:

Likely stand of Black-seeded clearweed (*Pilea* cf. *fontana*) at Subpopulation 2 to the west, in the center of Wetland A.

These annual plants are most concentrated in the area circled in orange.

DuBois & King, Inc.

PHOTOGRAPHIC LOG

Project Name: IC Tinmouth
Site Location: Tinmouth, VT

Project No.: 430311

Photo No.: 5	Date: 08/21/2024

Description:

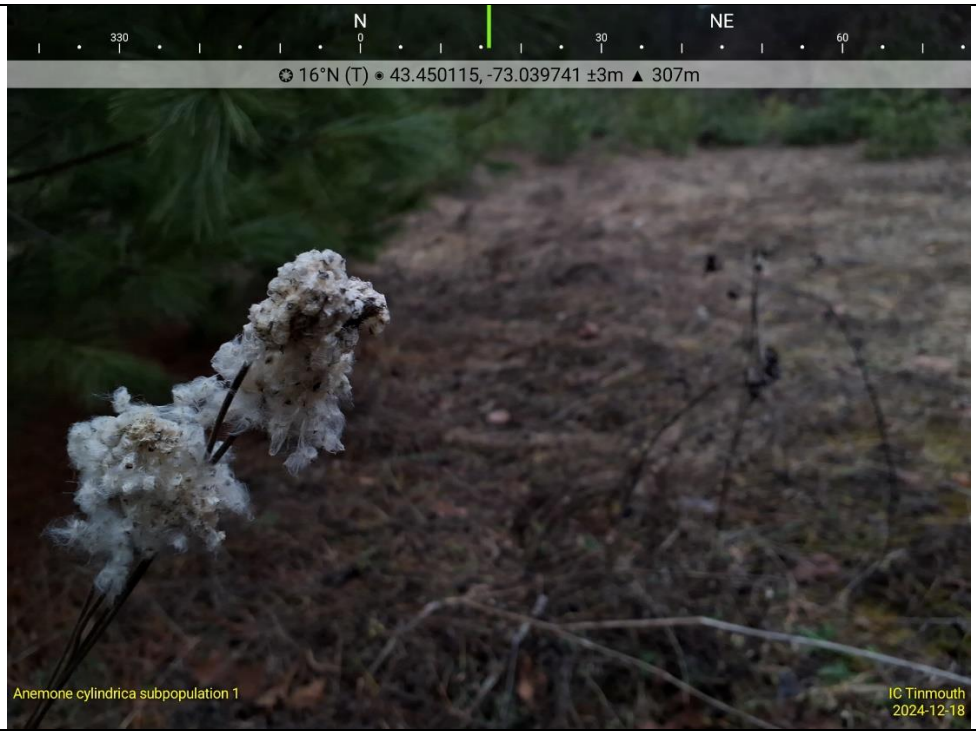
Long-headed thimbleweed (*Anemone cylindrica* S1S2) Subpopulation 1, along west edge.

Seeds are ripe and dispersing on the lowest peduncle. Note dark styles, and the fruiting heads, which are consistently under 1cm broad, and mostly 2.5-3cm long. The pinky nail in photo is exactly 1cm broad.

Photo No.: 6	Date: 12/18/2024

Description:

long-headed thimbleweed (*Anemone cylindrica*) facing north across Subpopulation 1, after dormancy, showing dispersing ripe seeds.



DuBois & King, Inc.

PHOTOGRAPHIC LOG

Project Name: IC Tinmouth

Site Location: Tinmouth, VT

Project No.: 430311

Photo No.: 7	Date: 08/21/2024

Description:

Long-headed thimbleweed (*Anemone cylindrica*) Subpopulation 1 habitat, from northwest corner of subpopulation, facing east.

Photo No.: 8	Date: 08/21/24

Description:

Potential hybrid of the rare long-headed thimbleweed (*Anemone cylindrica*) and the common thimbleweed (*Anemone virginiana*), both of which occur within a few feet of this plant. A few plants at this spot have intermediacy across multiple character states, likely best explained by hybridization.

DuBois & King, Inc.

PHOTOGRAPHIC LOG

Project Name: IC Tinmouth

Site Location: Tinmouth, VT

Project No.: 430311

Photo No.: 9	**Date:** 08/21/24

Description:

Comparison of thimbleweed (*Anemone virginiana*) (Left blue rectangles) and long-headed thimbleweed (*Anemone cylindrica*) (Right orange rectangles), facing north at Subpopulation 1.

Note the differences in fruiting head dimensions, coloration, texturing, and leaf arrangement on stems, leaf shape, and leaf and stem coloration.

DuBois & King, Inc.

PHOTOGRAPHIC LOG

Project Name: IC Tinmouth

Site Location: Tinmouth, VT

Project No.: 430311

Photo No.:	Date:
10	08/21/24

Description:

long-headed thimbleweed (*Anemone cylindrica*) Subpopulation 5 facing northwest.

Red stems of the plants are visible in lower left quadrant of the photograph.

Photo No.:	Date:
11	08/21/24

Description:

long-headed thimbleweed (*Anemone cylindrica*) Subpopulation 7 habitat in less vegetated quarry sands, facing west. Plants extend uphill to access road at the top of bank, and then restart on the west side of this same access road as Subpopulation 4..

Red stems of one mature plant are visible in the lower left corner of the photograph.

DuBois & King, Inc.

PHOTOGRAPHIC LOG

Project Name: IC Tinmouth

Site Location: Tinmouth, VT

Project No.: 430311

Photo No.: 12	Date: 08/21/24

Description:

Potential bat roosting tree; one of eight such sugar maple (*Acer saccharum*) wolf trees ranging from 26-41 inches DBH, most abundant exfoliating bark, cavities and crevices.

Photo No.: 13	Date: 12/18/24

Description:

Beaver-chewed stump within northwest region of Wetland A

DuBois & King, Inc.

PHOTOGRAPHIC LOG

Project Name: IC Tinmouth

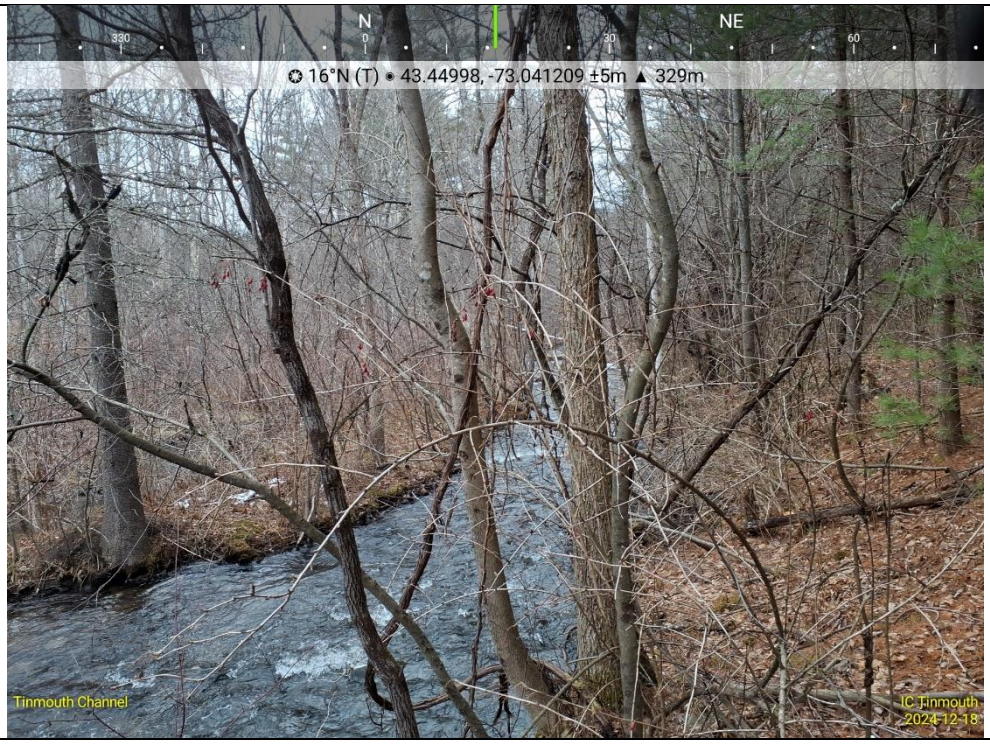
Site Location: Tinmouth, VT

Project No.: 430311

Photo No.:	Date:
14	12/18/2024

Description:

Tinmouth Channel, looking in direction of flow, west of the Project Study Area. Wetland A joins the stream approximately 100 feet downstream of this location.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To: 12/26/2024 16:18:54 UTC
Project Code: 2025-0035712
Project Name: IC TInmouth

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Updated 4/12/2023 - Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

About Official Species Lists

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested by returning to an existing project's page in IPaC.

Endangered Species Act Project Review

Please visit the "**New England Field Office Endangered Species Project Review and Consultation**" website for step-by-step instructions on how to consider effects on listed

species and prepare and submit a project review package if necessary:

https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review

NOTE Please do not use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

Northern Long-eared Bat - (**Updated 4/12/2023**) The Service published a final rule to reclassify the northern long-eared bat (NLEB) as endangered on November 30, 2022. The final rule went into effect on March 31, 2023. You may utilize the **Northern Long-eared Bat Rangewide Determination Key** available in IPaC. More information about this Determination Key and the Interim Consultation Framework are available on the northern long-eared bat species page:

https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis

For projects that previously utilized the 4(d) Determination Key, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective. If your project was not completed by March 31, 2023, and may result in incidental take of NLEB, please reach out to our office at newengland@fws.gov to see if reinitiation is necessary.

Additional Info About Section 7 of the Act
Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/service/section-7-consultations

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Please contact NEFO if you would like more information.

Candidate species that appear on the enclosed species list have no current protections under the ESA. The species' occurrence on an official species list does not convey a requirement to

consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see:

https://www.fws.gov/program/migratory-bird-permit

https://www.fws.gov/library/collections/bald-and-golden-eagle-management

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

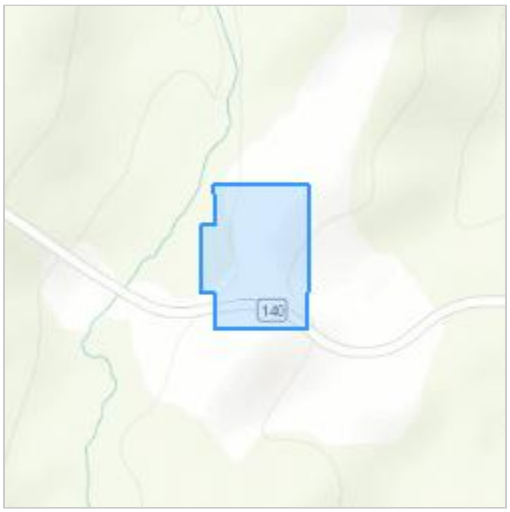
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

PROJECT SUMMARY

Project Code: 2025-0035712
Project Name: IC TInmouth
Project Type: Communication Tower New Construction
Project Description: This is the study area for a proposed unmanned 80 x 80 foot telecommunications compound to be constructed on a 32.35 acre parcel at 402 VT Route 140, Tinmouth, Vermont. The parcel contains an existing gravel pit. The location is sited in an undeveloped wooded area to the west of the gravel pit. Access to the compound starts at the existing entrance to the parcel, and runs north to the compound site. Proposed underground utilities will connect to the existing utility pole next to the existing entrance. Tree clearing will be minimized to the minimum area necessary for site improvements and construction vehicle access. Following construction, all disturbed areas outside the access compound will be seeded and mulched and allowed to naturally revegetate.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.4500074,-73.04000048716719,14z



Counties: Rutland County, Vermont

ENDANGERED SPECIES ACT SPECIES

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Aaron Marcus
Address: 6 Green Tree Drive
City: South Burlington
State: VT
Zip: 05403
Email amarcus@dubois-king.com
Phone: 8024248282

VERMONT RARE PLANT FORM
Vermont Natural Heritage Inventory

rev. Nov.2013.

Latin Name: Anemone cylindrica EO# (if known): NEW New: NEW Update:

Surveyor(s)**:** Aaron Marcus & Lee Toomey
Mailing address (phone, email): amarcus@dubois-king.com

Survey Date(s)**:** 8/21/2024 and 12/18/2024 Report Date: 12/23/2024

Survey Site: IC Tinmouth (Tinmouth Channel-North) **Town**(s)**:** Tinmouth

Directions to location(s) of plants:
Go to 402, VT Route 140. This is the gravel pit access road along the north side of Rte 140, across the road from the Tinmouth Cemetery. Plants are found along both sides of this access road through the old gravel pit, and also in the openings and road edges in the more vegetated terrace just west down the slope. Ten subpopulations were mapped.

Are plants in same location(s) as previously observed?

LANDOWNER(S) / CONTACT(S) (**Name**, **Telephone, Address, Email—**if not in a Site Summary Form) Permission?
Telecommunications project working with parcel owner ☒
☐

BIOLOGY

Approximate #	**Population Area**(s)	Phenology (% or #)
205-206 ramets	(e.g. 30x10ft; 1m²; 0.5 acre, 1ha)	X in leaf
(Stems originating separately from ground)	0.91 acre (as shape that encompasses all subpopulations)	in bud
		in flower
205-206 genets		X immature fruit
(Presumed genetic individuals, e.g. clumps, patches, stems)		X mature fruit
		dormant

Verbal synopsis of above biological data and evidence of reproduction (if not found, discuss search effort)**:**
Total of 205-206 genets, of which 180 are reproductive, bearing a total of 381 reproductive peduncles (maturing fruit, aborted, or browsed) across 10 subpopulations. The fruiting genet count is accurate, but the vegetative plants are undercounted, as leaves can hide effectively in denser vegetation in the vicinity of Subpopulations 1 through 4.
Subpopulation 1: Total of 66 genets in 80x27ft. 8 are strictly vegetative rosettes, and the remaining are 58 reproductive genets, comprising 105 fruiting/reproductive peduncles. About 30% of peduncles are browsed (presumably by deer) or aborted, and the remaining ones are in nearly ripe, and sometimes ripe,sdd fruit. Plants at the south end of this subpopulation cooccur with Anemone virginiana, and 1 to 6 of these Anemone cylindrica plants are likely hybrids of the two species.
Subpopulation 2: Total of 16 genets, in 8x27ft, all reproductive, comprising 66 reproductive peduncles along middle of access road.
Subpopulation 3: Total of 6 genets in 20x12 feet, of which 2 are strictly vegetative, and 4 are reproductive, comprising 9 reproductive peduncles. Plants are along and near the access road just south of where it enters a woodland.
Subpopulation 4: Total of 73 genets in 15x140ft, all reproductive, comprising 113 reproductive peduncles.
Subpopulation 5: Total of 4 genets across 30x10ft, of which 1 is vegetative and 3 are reproductive, comprising 11 reproductive peduncles.
Subpopulation 6: 1 small reproductive genet comprising 1 nearly ripe reproductive peduncle.
Subpopulation 7: Total of 24 genets, in 31x31ft, of which 4 are vegetative, and 15 are reproductive, comprising 56 reproductive peduncles.
Subpopulation 8: Total of 2 diminutive genets, reproductive, comprising 2 nearly ripe fruiting peduncles.
Subpopulation 9: Total of 14-15 genets in 60x15ft, of which 5-6 are vegetative, and 9 are reproductive, comprising 17 fruiting stems, along the southeast corner of the open quarried area against the treeline where the drop in slope starts.
Subpopulation 10: 1 genet bearing 1 fruiting head along west side of main quarry access road to north..

SURVEY SITE & HABITAT INFORMATION (if not provided in a Site Summary Form or previous form)

Survey site description:

Quarry in upland gravel esker ridge perched between two arms of the Tinmouth Channel wetland complex. The gravels of the esker are extremely calcareous, as evidenced by the dominance of shrubby cinquefoil throughout the quarry, and these gravels appear to be made up largely of the dolostones and limestones that underlay this surrounding entire valley. The anemones grow in areas of the quarry that were formerly excavated in the last few years or decades, and they also favor areas that are currently along the edges of dirt access roads, but they were not observed to grow in any areas that appear to be actively quarried at the time of survey, as they likely take a few years to get established.

Substrate: Xeric calcareous gravels

Topographic position: Excavated/quarried level depressions in esker ridge

Aspect: East, south, west Slope: 0-10% Elevation (in feet): minimum _____ maximum _____

Light: Full sun to part shade Moisture: Xeric

Associated plant species observed (immediate vicinity):

Dasiphora floribunda (common), Solidago nemoralis, Symphyotrichum ericoides, Echium vulgare, Pinus strobus (saplings to 12-foot tall trees), Achillea millefolium, Daucus carota, Danthonia spicata, Oreganum vulgare, Occasionally mixed with Anemone virginiana, such as at Subpopulation 1.

IDENTIFICATION Characteristics used for plant ID. Photos taken: ☒

Plants are largely distinctive from Anemone virginiana, which cooccurs at the site, but mostly occurs in different less specialized areas, and is much more scarce overall at site. The two species grow together in a couple places at Subpopulations 1 and 8, and at that location 1 to 6 small plants are likely to be hybrids of the two (plants are most distinctive to identify when they are older and bear multiple receptacles). The fruiting heads of A. cylindrica are consistently narrower (approximately 7mm, and always less than 1cm) and usually longer to 2.5-3cm (less reliable length comparison on presumably younger plants with few flowers). The beaks are notably darker, contrasting more with the fruiting heads. The leaves have a distinctive shape that has narrow and more lobes. The bract leaves below the flowers are typically condensed to essentially arise from one node, with 5-9 densely crowded leaves, and no additional pairs of leaves above.

Specimen collected? ☐ Collection #: _____ Collector (s): _____ Repository: _____

(A permit is required to collect Threatened & Endangered species)

CONSERVATION SUMMARY

Is the habitat likely to persist? Yes, if current diverse quarry management continues. If quarry management stops, habitat will be reduced, but it will take at least several decades

Explain any threats: Invasive shrubs, succession

Conservation, management, and inventory needs:

There are multiple lines of evidence that this species has declined significantly in Vermont, New York, and Massachusetts in recent decades, but the reasons are unclear. Deer overbrowse and succession could be factors. Deer sign is abundant, and deer are likely overpopulated, and appear to be overgrazing the population. This could impact the population over time. This species is reported to be are overly abundant Morrow Honeysuckle (Lonicera morrowii) and common buckthorn (Rhamnus cathartica) are two invasive species present sparsely around subpopulations 1 to 4, where there is enough succession for shrubs and young white pines to establish. Adjacent young invasive shrubs were removed. Ultimately, succession from trees is a threat if quarrying is abandoned. Occasional cutting back of white pines and northern whitecedars will keep likely this area suitable of long-headed thimbleweed for at least a couple decades without creating heavier disturbance which could at this point encourage more invasive shrub dominance more than Anemone persistence. This may be the largest population reported in Vermont, but the population likely fluctuates and moves to nearby open areas with changing successional conditions.

Though none is known, it would be reasonable for there to be a more natural population nearby in the region if there are dolomite ledges that receive natural light exposure or disturbance on any side of the massive wetland complex.

Full extent of population known? Amount or percent of habitat searched:

Comprehensive survey within the Project Study Area. But population may extend further north or east in quarries, or may also be present beyond this area.

Comments that do not fit in another field:

MAPPING (required if not provided in a Site Summary)
Attach a copy of Map or Aerial Image showing the rare plant location(s): ☒
(Keep in mind that if an area occupied is longer or wider than 12.5 meters, we prefer to map a polygon or line)

AND/OR: Attach shapefile (must be *NAD83 State Plane*) ☐; GPS point printout ☐; or write out GPS coordinates below:

GPS Points:	**See map. GPS includes subpopulation 1 at:**	Datum (required; NAD83 preferred): NAD83
	N43.0500568 / E-73.0397581	Accuracy (if known): +/- meters☐/feet☐

Optional: Sketches with rare plant location(s), direction & scale: 1) Cross-section of local topography; 2) Diagram of site with survey route

In Word 2007/2010, to unlock the form to draw a diagram or insert pictures or maps, click on the padlock in the "Review" or "Developer" tab/ribbon, select "Restrict Formatting and Editing," then click the "Stop Protection" button. When finished, click, "Yes, Start Enforcing Protection," and then click "OK."

Please send completed forms to Grace Glynn: Grace.Glynn@vermont.gov / Vermont Natural Heritage Inventory, Vermont Fish & Wildlife Department, 5 Perry St., Suite 40, Barre, VT 05641 / (802)-476-0127