

**STATE OF VERMONT
PUBLIC UTILITY COMMISSION**

Investigation pursuant to 30 V.S.A. §§ 30)
and 209 into whether the petitioner-)
initiated site preparation at Apple Hill in)
Bennington, Vermont, for electric)
generation in violation of 30 V.S.A. §)
248(a)(2))

Case No. 20-1611-INV

FIRST SUPPLEMENTAL PREFILED DIRECT TESTIMONY
OF JIM MCCLAMMER
ON BEHALF OF PETITIONER

February 16, 2021

EXHIBITS

Exhibit AH-JM-7	<i>Symphyotrichum urophyllum</i> Plant Profile and related Data Source
Exhibit AH-JM-8	Seed dispersal by white-tailed deer
Exhibit AH-JM-9	NatureServe's Element Occurrence Data Standard
Exhibit AH-JM-10	NatureServe's Habitat-based Plant Element Occurrence Delimitation Guidance ¹
Exhibit AH-JM-11	NatureServe's Ranking Species Occurrences: Generic Guidelines and Decision Key
Exhibit AH-JM-12	Review of the taxonomy of <i>Aster sensu lato</i> (<i>Asteraceae: Astereae</i>)

¹ This document was initially introduced in these proceedings through the Prefiled Testimony of Jim McClammer dated December 3, 2020 where it was referenced on page 6 and again on page 8 with a link provided to the document in both instances. Mr. McClammer is including the entire document here for the convenience of the parties.

1 **Q1. Please state your name, occupation, and business address.**

2 A1. My name is Jim McClammer. I am an Environmental Consultant and President of
3 Connecticut Valley Environmental Services, Inc. (“CVES”). My business address is 391 River
4 Road, Charlestown, New Hampshire 03603.

5

6 **Q2. What is the purpose of your supplemental testimony?**

7 A2. The purpose of my supplemental testimony is to respond to the issues concerning the
8 *Symphyotrichum urophyllum* (the “Aster”) raised by the January 8, 2021 discovery responses of
9 the Vermont Agency of Natural resources (the “Discovery Responses”) in these proceedings.

10

11 **Q3. Is the Aster at the “very edge of its range” or “very rare” in Vermont?**

12 A3. No, I do not believe the Aster is at the “very edge of its range in Vermont” as claimed by the
13 State Botanist, Mr. Bob Popp in Discovery Responses A.1-13 and A.1-24 nor do I believe it is
14 known only in Vermont (not in other New England states) as claimed by Mr. Popp (see Exhibit
15 PLH-3, page 11, lines 7-8). As demonstrated by the NRCS Plant Profile (**Exhibit AH-JM-7**), the
16 Aster is known in all of the New England States, more than half of the states in the United States
17 of America and Canada. Significantly, John C. Semple, an acknowledged expert on the Aster
18 provided distribution data for New England. As evidence that Mr. Semple is an expert on the
19 genus, Guy Nesom the author of the monograph, Review of the Taxonomy of Aster *sensu lato*
20 (*Asteraceae: Astereae*), in which he places the white arrow-leaved aster in the genus
21 *Symphyotrichum* cites a number of papers by Mr. Semple (see **Exhibit AH-JM-12**, pages 240-

241). The Plant Profile, partly based on personal communications with Mr. Semple, clearly proves the Aster **ranges** into Maine and other New England states, contradicting Mr. Popp's assertions. Nor do I believe that Aster is "very rare" in Vermont as I have previously testified in these proceedings, I believe the Aster is more common on calcareous bedrock throughout the State than the documented occurrences indicate. I think it has been overlooked because it flowers in late Fall, is frequently obscured by foliage of other plants, and is morphologically similar to several other species that flower at the same time. When it is found, I believe it is often simply misidentified. The Aster is extremely difficult to distinguish from related species, as described in **Exhibit AH-JM-12** (page 142) and flowering material is absolutely necessary to make a definitive identification. There is also considerable variation in the morphology of vegetative and floral structures on the same individual. The Flora of North America explains this: "[t]axonomy of *Symphyotrichum* is difficult. Species are usually heterophyllous, some strongly so. Individuals in the spring, with basal rosettes, often have leaf shapes quite different from those with cauline leaves seen later in the season. Phyllary shape on first- and later-formed heads may differ. Individuals may vary considerably in plant size and array development depending upon growing conditions. The genetic diversity within each species also appears considerable. Often, plastic or genetic variation have been ascribed mistakenly to hybridization. Nonetheless, hybridization has played a significant role in the taxonomy and evolution of the genus." (http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=132022, paragraph 6). My testimony on the difficulty in distinguishing aster species in Vermont is consistent with Mr. Popp's Discovery Response A.1-19 in which he explains how he relied on a suite of characteristics that the Aster shares with the common, closely-related heart-leaved aster (*Symphyotrichum cordifolium*).

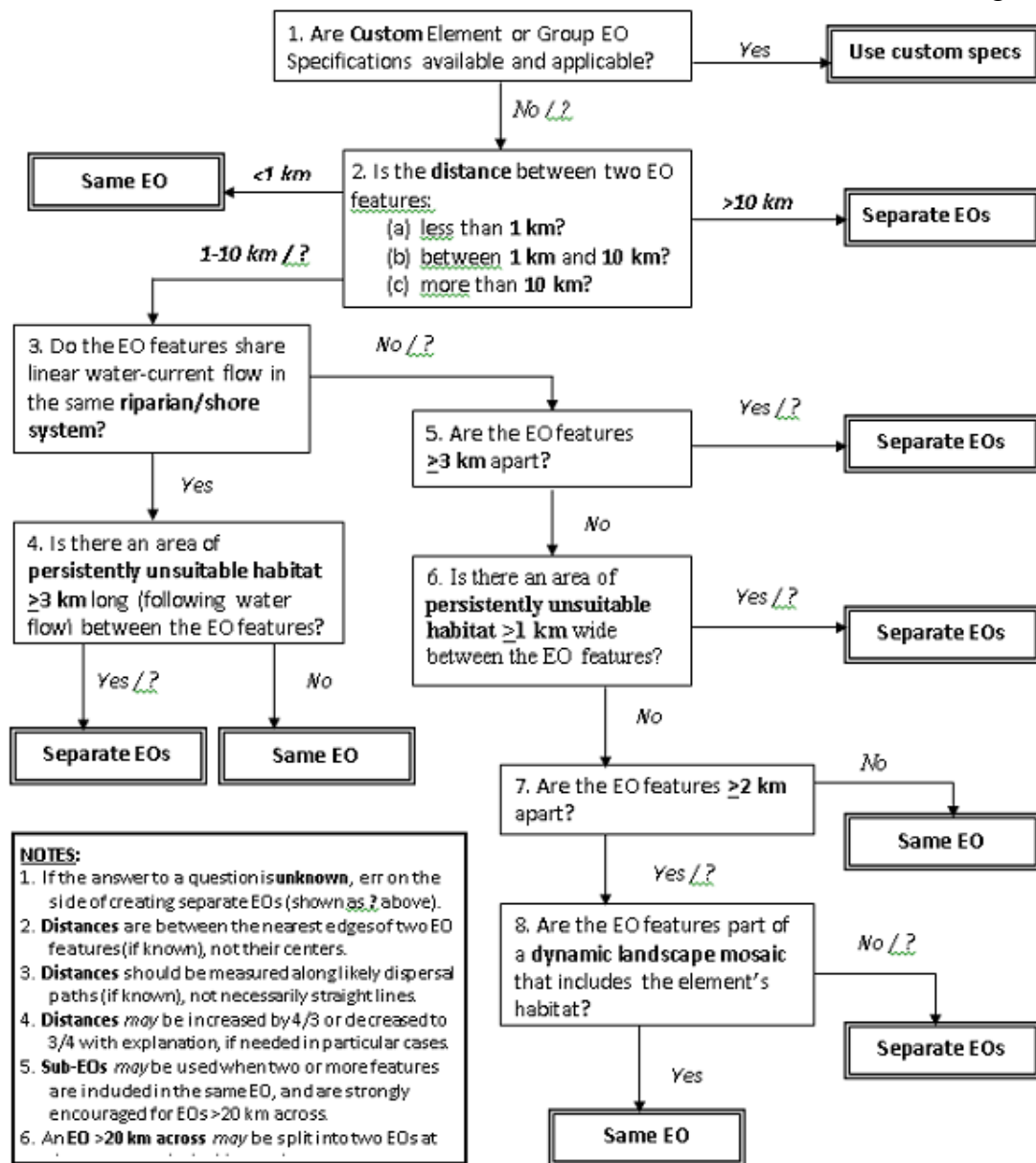
1
2 **Q4. Does the Aster occur along roadsides and railroads as well as in field, meadow, scrub**
3 **and wooded habitats on poorly-drained to excessively-drained soils (i.e., they tolerate broad**
4 **ecological conditions)?**

5 A4. Yes. In Discovery Response A.1-15, Mr. Popp states that “I am not aware of any roadside
6 occurrences in Vermont, other than what Arrowwood identified along the interconnection Route
7 for the Apple Hill solar project.” That is not the case as demonstrated by **Exhibit AH-JM-5** which
8 indicates that the Aster is known along the interchange ramps near the project site in Bennington.
9 The Flora of North America (**Exhibit WS-INFO-ANR-8**, p 507) also documents roadsides are
10 suitable habitat for the Aster. Furthermore, Mr. Popp in Discovery Response A.1-13 evades
11 acknowledging the Aster occurs in field, meadow, scrub and wooded habitats on poorly-drained
12 to excessively-drained soils even though this is meticulously documented in my Third
13 Supplemental Prefiled Testimony in Case No. 19-0516 (See **Exhibit AH-JM-3**). The facts in
14 these documents are important as they prove the Aster thrives along roadsides, railroad rights-of-
15 way (even when periodically brush-hogged), and in nearly every cover type in the vicinity the
16 Project. All of which is convincing evidence that many more Aster individuals will be found if
17 these lands are surveyed during the proper time of year.

18
19 **Q5. Are the Asters at the Battle Creek, Warner and Stark Solar Sites (the “Western Asters”)**
20 **part of the same population as the Asters located at the Apple Hill and Chelsea sites (the**
21 **“Eastern Asters”)?**

22 A5. Yes. In Discovery Response Q.1-3, Mr. Popp indicates that in order to know whether 10%
23 or more of the Aster population is impacted, he would have to know how many Aster individuals

1 can be found at the site. The population, however, includes more Aster individuals than just those
2 found at the Chelsea and Apple Hill solar site. To date, the number of confirmed (i.e., minimum
3 number of) Aster individuals in the population is 1,454. However, I believe the actual number of
4 individuals in the population may be as high as 5,000 to 9,000 as explained in my Third
5 Supplemental Prefiled Testimony in Case No. 19-0516 (See **Exhibit AH-JM-3**). The Eastern
6 Asters are part of the same population as the Western Asters as the two locations are less than one
7 kilometer apart. In my Third Supplemental Prefiled Testimony in Case No. 19-0516 (See **Exhibit**
8 **AH-JM-2**), I give the distance from the western edge of the Chelsea/Apple Hill Aster localities to
9 the Warner Aster Locality #33 as 2,118 feet (0.65 kilometer). The currently applicable standard
10 is plant occurrences that are less than one kilometer apart belong to the same population, regardless
11 of the suitability of the intervening habitat (See **Exhibit AH-JM-10**, page 13). This standard
12 comes from NatureServe, the exact same organization that Mr. Popp and ANR rely on to
13 coordinate its rare plant ranking methodology. See **Exhibit PLH-3**, page 12, lines 2-4. This
14 internationally-recognized methodology is set forth in NatureServe's Habitat-based Plant Element
15 Occurrence Delimitation Guidance (**Exhibit AH-JM-10**). This Guidance and the separation
16 distance of 0.65 kilometer is dispositive evidence that the Eastern Asters and the Western Asters
17 are part of the same population as demonstrated in the Plant Element Occurrence Decision Tree:



See Exhibit AH-JM-10, Page 13.

- 1
- 2 **Q6. Does the Aster have similar dispersal mechanisms that are found in its closely related**
- 3 **aster species?**
- 4 **A6. Yes.** In Discovery Response A.1-17, Mr. Popp indicates he has no first-hand knowledge
- 5 nor has he read studies concerning the similarity between the dispersal mechanism of the Aster

1 and its closely related species, *Symphyotrichum cordifolium*. However, *Symphyotrichum* species
2 are commonly known to have similar dispersal mechanisms. White arrow-leaved aster and related
3 species have a tuft of fine bristles, called pappi, at the tip of their seeds which enable them to be
4 dispersed by wind (much like a dandelion). Asters are also dispersed by deer, and *Symphyotrichum*
5 *lanceolatum* seed has been documented to be dispersed long distances by deer (See **Exhibit AH-**
6 **JM-8**). Consequently, the Eastern Asters and the Western Asters are able to freely exchange genes
7 by seed dispersed by wind and deer, and pollen dispersed by bees (See **Exhibit ANR-RP-5** at 3).
8 The movement of all of these vectors is not restricted by Route 7 which is neither an “isolating
9 barrier” nor a wide enough span of unsuitable habitat to restrict gene flow. This is why
10 NatureServe’s Habitat-based Plant Element Occurrence Delimitation Guidance now concludes
11 that (i) a one kilometer minimum separation distance between two element occurrences (previously
12 promulgated in the Element Occurrence Data Standard) is inappropriately small for plants
13 scattered in large areas of apparently suitable habitat (See **Exhibit AH-JM-10**, p. 2), as is the case
14 here; and, (ii) “[n]arrow dispersal barriers are important for many animals, but for vascular plants,
15 there seem to be few cases in which narrow barriers would justify treatment of quite nearby plants
16 in different EOs” (See **Exhibit AH-JM-10**, p. 4). This directly contradicts Discovery Response
17 A.1-9 in which Mr. Popp states that Routes 7 and 279 would constitute isolating barriers.
18 NatureServe’s “internationally accepted methodology” unequivocally demonstrates that Routes 7
19 and 279 are not isolating barriers and that the Eastern Asters and the Western Asters are part of
20 the same population.

21
22 **Q7. Could the area containing the Aster population found at the Project site be reasonably**
23 **estimated?**

1 A7. Yes. In Discovery Response A.1-16 and A.1-25, Mr. Popp indicates that any attempt at
2 measuring the acreage of the local Aster population would be purely speculative. In fact, the area
3 containing the Aster population can be reasonably estimated using ANR's own Guidance (**Exhibit**
4 **ANR-RP-3**)² which sets an upward limit on the size of a population by defining a population "as
5 all of the individuals of a given species that occur within one kilometer unless separated by an
6 isolating barrier" which would indicate that the area is as large as 776.28 acres (The 776.28-acre
7 threshold is the area within a circle with a radius of one kilometer ($A=\pi r^2$)). In my mind, this
8 definition is vague, arbitrary, and ambiguous. For example, the phrase "within one kilometer" can
9 also be interpreted to mean within a square kilometer which contains 247 acres, and these acres
10 can be located at a number of different locations (e.g., with its center in the middle of the project
11 site, or with one of its sides along one of the boundaries of the site). The ANR definition clearly
12 limits a population area to no more than 776.28 acres, which is more appropriate for a bog turtle
13 than a vascular plant like an aster. More importantly, ANR's population definition is inconsistent
14 with NatureServe's methodologies. NatureServe's Element Occurrence Data Standard (See
15 **Exhibit AH-JM-9**, p. 44) states "[for] species, (population) size of an EO can be determined in
16 several ways. Most commonly, information on both population abundance and the **area of**
17 **occupancy** [emphasis mine] is used to calculate population size". In this instance, the area of
18 occupancy extends from known Aster locations on the eastern side of the Apple Hill solar site to
19 the known Asters locations on the western side of the Battle Creek solar site. And if the Aster is
20 found in adjacent areas, which have not been surveyed, the area of the population will increase

² Population definition from "Guidance for Conducting Rare, Threatened, and Endangered Plant Inventories in Connection with Section 248 Projects" dated October 5, 2016.
<https://anr.vermont.gov/sites/anr/files/co/planning/documents/guidance/Guidance%20for%20Conducting%20RTE%20Plant%20Inventories%20248%20Projects.pdf>

1 and, I believe, will eventually exceed 776.28 acres. This conclusion is based on the presence of
2 extensive areas of suitable habitat in the immediate vicinity of the known population and applying
3 the methodologies in NatureServe's Habitat-based Plant Element Occurrence Delimitation
4 Guidance (**Exhibit AH-JM-10**), the Plant Element Occurrence Decision Tree (See **Exhibit AH-**
5 **JM-10**, p13) and the Element Occurrence Data Standard (See **Exhibit AH-JM-9**, p. 44).

6 Population size (acreage and number of individuals) is important current status information that is
7 used for ranking a population and should not be arbitrarily restricted by ANR's criterion that
8 individuals be "within one kilometer". NatureServe's Ranking Species Occurrences: Generic
9 Guidelines and Decision Key relate problems with previous occurrence rank specifications and
10 states "past efforts to establish useful, reliable, and stable occurrence rank criteria were largely
11 unsuccessful" (**Exhibit AH-JM-11**, pages 11-12). Their current Ranking Key (p. 14-15) uses
12 population size in order to predict the probability of the persistence of a population into the
13 foreseeable future. A population that occupies a larger area and has more individuals will have a
14 greater viability rank (i.e., be less likely to be extirpated) than a population that occupies a smaller
15 area and has fewer individuals. Using this Key for the current Aster population it is safe to predict
16 the Aster population has Excellent to Good viability, which contradicts Mr. Popp's answer in
17 Discovery Response A.1-24 that "[t]he Aster is at the edge of its range in Vermont [refuted in A3
18 above] and as such its "persistence in our flora remains uncertain."

19
20 **Q8. In determining the number of Aster individuals in the population, should the number**
21 **of Aster individuals (including basal rosettes) in the conservation area be included?**

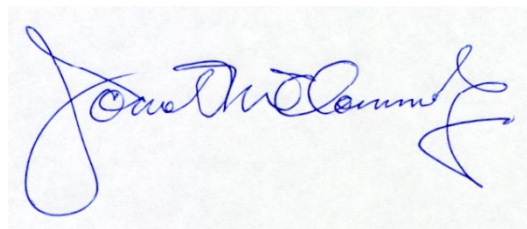
22 A8. Yes, absolutely! In Discovery Response A.1-3, Mr. Popp indicates that the survival of
23 transplants needs to be monitored yearly for a minimum of five growing seasons. In my opinion,

1 this monitoring is pertinent for the purpose of establishing the number of transplants that survive
2 transplanting, but is immaterial to the question as to how many individuals are currently in the
3 population. The Aster population will likely vary from year to year, and based on recorded
4 observations the population is increasing within the conservation area. Basal rosettes are young
5 plants (having either recently germinated in place or recruited to the conservation area) that are
6 clearly individuals of the population. There is no scientific basis for Mr. Popp's arbitrary
7 monitoring requirement. For the purpose of determining the size of the current population, if Aster
8 plants (including basal rosettes) are alive at the time of the census there is no practicable reason
9 they should be omitted from the count. The censuses of human populations include young children!

11 **Q9. Does this conclude your testimony?**

12 A9. Yes.

14 I declare that the above statement is true and accurate to the best of my knowledge and belief. I
15 understand that if the above statement is false, I may be subject to sanctions by the Commission
16 pursuant to 30 V.S.A. § 30.



Jim McClammer