Attachment F – Threatened and Endangered Species

- Virginia Department of Wildlife Resources – Wildlife Environmental Review Map Services
- Virginia Department of Conservation and Recreation
- Survey for *Isotria medeoloides* (Small Whorled Pogonia)

Species Observed within Two Miles		
Common Name	**Federal Status**	**State Status**
Bass, largemouth	NT/NE	NT/NE
Bass, striped	NT/NE	NT/NE
Bluegill	NT/NE	NT/NE
Brownsnake, northern	NT/NE	NT/NE
Bullhead, brown	NT/NE	NT/NE
Chubsucker, creek	NT/NE	NT/NE
Cooter, northern red-bellied	NT/NE	NT/NE
Cornsnake, red	NT/NE	NT/NE
Darter, tessellated	NT/NE	NT/NE
Eagle, bald	NT/NE	NT/NE
Earthsnake, eastern smooth	NT/NE	NT/NE
Eel, American	NT/NE	NT/NE
Frog, Coastal Plains leopard	NT/NE	NT/NE
Frog, eastern cricket	NT/NE	NT/NE
Frog, green	NT/NE	NT/NE
Frog, upland chorus	NT/NE	NT/NE
Gartersnake, eastern	NT/NE	NT/NE
Heron, great blue	NT/NE	NT/NE
Kingsnake, northern mole	NT/NE	NT/NE
Lamprey, least brook	NT/NE	NT/NE
Madtom, margined	NT/NE	NT/NE
Madtom, tadpole	NT/NE	NT/NE
Milksnake, eastern	NT/NE	NT/NE
Mosquitofish, eastern	NT/NE	NT/NE
Mudminnow, eastern	NT/NE	NT/NE
Mummichog	NT/NE	NT/NE
Peeper, spring	NT/NE	NT/NE
Perch, pirate	NT/NE	NT/NE
Perch, white	NT/NE	NT/NE
Pickerel, redfin	NT/NE	NT/NE
Pumpkinseed	NT/NE	NT/NE
Racer, northern black	NT/NE	NT/NE
Salamander, eastern mud	NT/NE	NT/NE
Salamander, eastern red-backed	NT/NE	NT/NE
Salamander, marbled	NT/NE	NT/NE
Salamander, spotted	NT/NE	NT/NE
Shiner, golden	NT/NE	NT/NE
Skink, common five-lined	NT/NE	NT/NE
Skink, little brown	NT/NE	NT/NE
Skink, southeastern five-lined	NT/NE	NT/NE
Snake, northern red-bellied	NT/NE	NT/NE
Snake, northern ring-necked	NT/NE	NT/NE
Spadefoot, eastern	NT/NE	NT/NE
Sunfish, bluespotted	NT/NE	NT/NE
Sunfish, redbreast	NT/NE	NT/NE
Toad, eastern American	NT/NE	NT/NE
Treefrog, Cope's gray	NT/NE	NT/NE
Treefrog, green	NT/NE	NT/NE
Turtle, eastern painted	NT/NE	NT/NE
Turtle, spotted	NT/NE	Collection Concern
Turtle, striped mud	NT/NE	NT/NE
Warmouth	NT/NE	NT/NE
Watersnake, northern	NT/NE	NT/NE
Wormsnake, eastern	NT/NE	NT/NE

NT = Non-Threatened, NE = Non-Endangered

Legend

- Project Study Limits - 2,673.5 Acres
- Two Mile Buffer
- NLEB Roost Trees - Not Present
- Trout Streams - Not Present
- Threatened/Endangered Waters - Not Present
- Anadromous Fish Use
- Bald Eagle Concentration Areas and Roosts - Not Present
- Colonial Water Birds
- Bat Hibernacula (0.5 Mile Buffer) - Not Present
- Bat Hibernacula (5.5 Mile Buffer) - Not Present
- Federal or State Listed Observation Area

Federal Status, State Status

- NT/NE, NT/NE
- NT/NE, Collection Concern

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.
1001 Boulders Parkway, Suite 300
Richmond, VA 23225
TEL 804.200.6500
www.timmons.com

PROJECT NAME & LOCATION

WALLER SOLAR
LANCASTER COUNTY - VIRGINIA

DATE 11/7/2022
PROJECT NUMBER 45249.014
PROJECT NAME WALLER SOLAR
DESIGNED BY / DRAWN BY M. HILL

NOTES:
Project Limits are approximate.
WERMS data from DWR.
Bat hibernacula include identifications of Northern long-eared bat, Tri-colored bat, Little-brown bat, Virginia big-eared bat, Gray bat, and Indiana bat.
Aerial imagery from VGIN.

REVISIONS

#	MM/DD/YY	DESCRIPTION

DRAWING DESCRIPTION
WILDLIFE ENVIRONMENTAL REVIEW MAP

SCALE (FEET)
0 2,500 5,000
PLANS PRINTED AS 11X17 ARE HALF SCALE

SCALE H:1 " = 2,500 '
SHEET NUMBER 1

Y:\852\45249.014-Waller_Algonquin\GIS\WERMS.mxd

Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

Web Project ID: WEB0000018857

Client Project Number: 45249.014

PROJECT INFORMATION

TITLE: Waller Solar

DESCRIPTION: The project is a proposed solar facility. Wetlands and streams will be avoided to the extent practicable.

EXISTING SITE CONDITIONS: Agricultural and forested

QUADRANGLES: Lively, Lancaster

COUNTIES: Lancaster, Richmond

Latitude/Longitude (DMS): 37° 48' 48.8443" N / 76° 29' 33.2600" W

Acreage: 2,672 acres

Comments:

REQUESTOR INFORMATION

Priority: N

Tier Level: Tier II Plus

Tax ID: 54-1301413

Contact Name: Jillian Frazier

Company Name: Timmons Group

Address: 1001 Boulders Parkway

City: Chesterfield

State: VA

Zip: 23225

Phone: 804-448-5973

Fax:

Email: jillian.frazier@timmons.com

Conservation Site	Site Type	Brank	Acreage	Listed Species Presence	Essential Conservation Site?
Natural Heritage Screening Features Intersecting Project Boundary					

Site Name	Group Name	Common Name	Scientific Name	GRANK	SRANK	Fed Status	Species of Concern	State Status	EO Rank	Last Obs Date	Precision
Natural Heritage Resources Intersecting Project Boundary											

Intersecting Predictive Models

Predictive Model Results

In addition, the proposed project will impact an Ecological Core(s) C2,C3,C4,C5 as identified in the Virginia Natural Landscape Assessment (https://www.dcr.virginia.gov/natural-heritage/vaconvisvnla). Mapped cores in the project area can be viewed via the Virginia Natural Heritage Data Explorer, available here: http://vanhde.org/content/map.

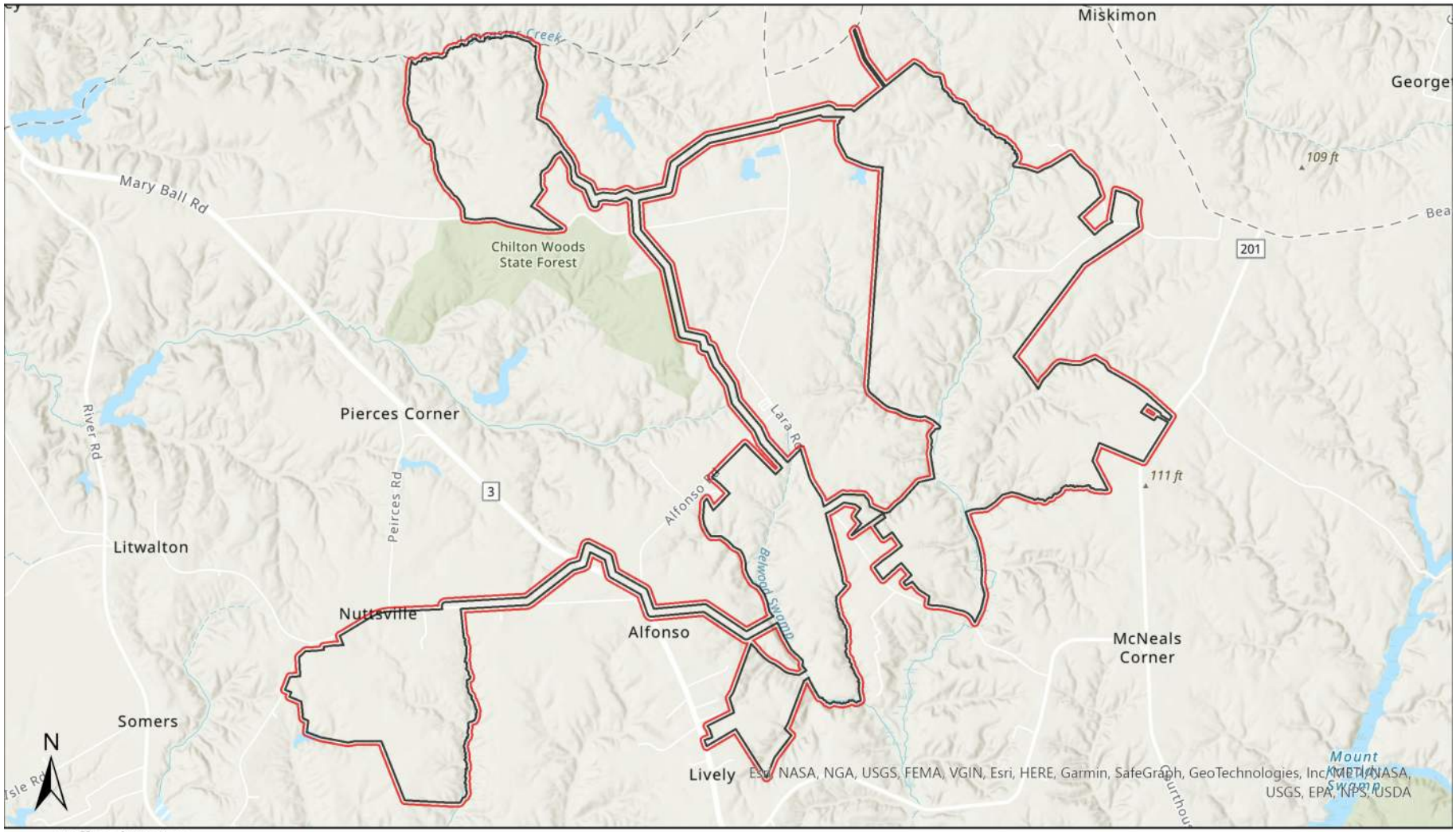
Ecological Cores are areas of at least 100 acres of continuous interior, natural cover that provide habitat for a wide range of species, from interior-dependent forest species to habitat generalists, as well as species that utilize marsh, dune, and beach habitats. Interior core areas begin 100 meters inside core edges and continue to the deepest parts of cores. Cores also provide the natural, economic, and quality of life benefits of open space, recreation, thermal moderation, water quality (including drinking water recharge and protection, and erosion prevention), and air quality (including sequestration of carbon, absorption of gaseous pollutants, and production of oxygen). Cores are ranked from C1 to C5 (C5 being the least significant) using nine prioritization criteria, including the habitats of natural heritage resources they contain.

Impacts to cores occur when their natural cover is partially or completely converted permanently to developed land uses. Habitat conversion to development causes reductions in ecosystem processes, native biodiversity, and habitat quality due to habitat loss; less viable plant and animal populations; increased predation; and increased introduction and establishment of invasive species.

DCR recommends avoidance of impacts to cores. When avoidance cannot be achieved, DCR recommends minimizing the area of impacts overall and concentrating the impacted area at the edges of cores, so that the most interior remains intact.

The proposed project will impact one or more cores with very high (C2) to outstanding (C1) ecological integrity. Further investigation of these impacts is recommended and DCR-DNH can conduct a formal impact analysis upon request. This analyses would estimate impacts to cores and habitat fragments, providing an estimate of the total acreage of direct and indirect impacts of the project. For more information about the analysis and service charges, please contact Joe Weber, DCR Chief of Biodiversity Information and Conservation Tools at Joseph.Weber@dcr.virginia.gov.

Waller Solar



Buffered Project Boundary

Project Boundary

0 0.4 0.8 1.6 Miles

Scale: 1:41,661

Quads: Lancaster; Lively

Counties: Lancaster; Richmond

Company: Timmons Group

Lat/Long: 374848 / -762933

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

The project mapped as part of this report has been searched against the Department of Conservation and Recreation's Biotics Data System for occurrences of natural heritage resources in the vicinity of the area indicated for this project. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in Biotics, natural heritage resources have not been documented within the submitted project boundary including a 100 foot buffer. In addition, the project area does not intersect any of the predictive models identifying potential habitat for natural heritage resources.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

Any absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks additional natural heritage resources. New and updated information is continually added to Biotics. Please revisit this website or contact DCR for an update on this natural heritage information if a significant amount of time passes (DCR recommends no more than six months) before it is utilized.

The Virginia Department of Wildlife Resources maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters, that may contain information not documented in the Natural Heritage Data Explorer. Their database may be accessed from https://services.dwr.virginia.gov/fwis/ or contact Amy Martin (804-367-2211 or amy.martin@dwr.virginia.gov).

Thank you for submitting your project to the Virginia Department of Conservation and Recreation's Natural Heritage Data Explorer Web Service. Based on the preliminary screening results for this project, no further correspondence will be sent from this office. Should you have any questions or concerns about this report, the Data Explorer, or other Virginia Natural Heritage Program services, please contact the Natural Heritage Project Review Unit at 804-371-2708.

Survey for *Isotria medeoloides* (Small Whorled Pogonia), Waller Solar Project, Lancaster County, Virginia.

Rouse Environmental Services

Survey for *Isotria medeoloides* (Small Whorled Pogonia), Waller Solar Project, Lancaster County, Virginia

RES Project # R21001

September 10, 2021

Prepared for:

Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, Virginia 23225
Attn: Mr. Rick Thomas, PWS, PWD

Prepared by:

Rouse Environmental Services
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Garrie D. Rouse, Consulting Botanist
Rouse Environmental Services

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APPENDICES

A) Figure 1 - Vicinity Map
B) Figure 2 - Habitat Suitability Map - Desktop Review
C) Figure 3 - Habitat Suitability Map - Field Verified
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E) Partial Checklist of Plant Species Encountered During *Isotria medeoloides* Surveys

1. INTRODUCTION

The Waller Solar Project (Project) is being planned on several tracts of land and interconnecting easements located in the vicinity of Alfonso, Lancaster County, Virginia, and totaling approximately 2800 acres in extent. The limits of the tracts and their easements were provided to us in CAD file format, sent as an email attachment (*38786.008-R-WETD.dwg*) from the Timmons Group on April 6, 2021. The area of the Project encompasses the headwaters of several different drainages including Lancaster Creek near the northern limits of the Project, Little Creek and Bellwood Swamp along its southern limits, and McMahon Swamp within the interior of several of the larger tracts. The general location of the Project, in relation to surrounding topographic features, is shown on our *Project Location Map* included as Figure 1 in Appendix A.

Small Whorled Pogonia (*Isotria medeoloides*) is a rare orchid which generally occurs within relatively mature, hardwood dominated forests on nearly level to moderate slopes, and has been previously documented from nearby localities, including Gloucester, James City and York Counties, Virginia (VBA 2021). Due to its rarity and loss of potential habitat from development, *I. medeoloides* has been listed as *Threatened* by the US Fish & Wildlife Service (USFWS 1994). The plant has also received formal recognition as *Endangered* by the Virginia Department of Agriculture & Consumer Services under the Commonwealth of Virginia's Endangered Plant & Insect Act (VDACS 1989).

Since the above ground parts of *Isotria medeoloides* die back each year, surveys for actual individuals of this species can only be conducted during certain times of the growing season. For areas south of Caroline County, Virginia the USFWS has specified a search period between May 25th and July 15th to coincide with the full emergence of the species' above-ground, vegetative parts and, coincidentally, when it is most readily observable (USFWS 2012). Alternatively, outside of this peak period, a site can be evaluated as to whether it contains potentially suitable habitat for populations of *Isotria medeoloides*.

Rouse Environmental Services (RES) was engaged to conduct both a habitat suitability assessment of the Project area, as well as a presence/absence survey for potential populations of *Isotria medeoloides* during the optimal search period on the basis of findings from our desktop assessment of the former. This report represents an accounting of both the preliminary findings of suitable habitat, as well the results of our follow-up presence/absence surveys for *I. medeoloides* during the peak growing period for this species as specified by USFWS.

2. METHODS

2.1 Habitat Suitability Assessment

A desktop review was conducted to preliminarily identify areas of potential habitat for *Isotria medeoloides* and prepare working base maps for use in the field. Our review included the following sources of information:

- Aerial infrared imagery available on US Geological Survey Digital Orthographic Quarter Quadrangles (DOQQs),
- USDA National Agriculture Imagery Program (NAIP) digital orthophotographs flown in 2011 (visible spectrum) and 2018 (multispectral),
- Digital Raster Graphic (DRG) USGS topographic quadrangles covering the areas of study,
- Other site details, including delineated wetlands and other Waters of the United States provided by Timmons in connection with the project.

Information from the above listed sources was incorporated onto working base maps and used to prioritize subsequent ground-truthing efforts and mark-up of field observations within the targeted study areas. Study limits and areas preliminarily identified as potential habitat were also downloaded to GPS receivers for better orientation and accuracy of assessment while in the field.

Ground truthing and revision of our desktop assessment of potential habitat was performed through subsequent field surveys, concurrent with our actual searches for *Isotria medeoloides*. Areas at the site were evaluated with regard to their potential to support populations of the plant on the basis of the following criteria:

1) Potentially Suitable Habitat - Areas supporting mesic, medium-aged to mature stands of mixed hardwoods, with relatively open understories, on nearly level to gentle slopes with colluvial soils.

2) Marginally Suitable Habitat - Areas supporting forest stands that are characterized by either being too xeric, support a preponderance of pine or other evergreens, are located on moderate to steep slopes, have heavy vegetation in the understory, or a combination of the above.

3) Unsuitable Habitat - Areas represented by either impervious cover, open fields or other forms of heavy disturbance/aggressive maintenance, open water, seasonally to permanently saturated or flooded wetlands, pine plantations, or a combination of the above.

2.2 Presence/Absence Surveys

Follow-up field surveys to refine our habitat suitability mapping and conduct searches for potential populations of *Isotria medeoloides* were conducted with teams of two field personnel between June 1 and June 26, 2021, a time of year when the plant has been

deemed by the USFWS as searchable in areas south of Caroline County, Virginia. Field work was led by Garrie Rouse, a botanist recognized by the USFWS as qualified to conduct surveys for this species (USFWS-VFO 2020). All areas of potential habitat identified from our habitat suitability assessment were canvassed for potential populations of *Isotria medeoloides*. Access to these areas was made both by four-wheel drive vehicle and on foot.

We documented vascular plant species as they were encountered during the course of our presence/absence surveys. Confirmations of species identifications were made using the *Flora of Virginia* (Weakley et al. 2012). Nomenclature used for identified vascular plants followed that of *A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland, Second Edition* (Kartesz 1994). Our checklist of vascular plant species included both plants encountered within areas of identified potential habitat as well as within other areas encountered at the Project site while in the process of accessing potentially suitable habitat.

3. FINDINGS

3.1 Habitat Suitability Assessment

As noted in Section 2.1, an initial (preliminary) desktop assessment and mapping of potentially suitable habitat was made using various sources of available information in connection with the Project area. One hundred and eighty-nine discrete areas of potentially suitable habitat were identified, totaling approximately 406 acres in extent. The results of our desktop analysis are shown on our *Habitat Suitability Map - Desktop Review* (Figure 2, Appendix B).

Subsequent ground truthing of the Project area found the site to be largely in a forested state, supporting stands of mostly planted, Loblolly Pine (*Pinus taeda*) in various stages of timber management. There was a network of non-paved access roads throughout these areas, with occasional, relatively small, open, grassed sites that likely represented staging areas from past timber operations (see Photographs 1-4, Appendix D).

Much of the remaining areas of the study site, that did not support active timber management, were restricted to the floodplains of larger drainages within the Project, where mixed hardwoods of various ages, with some scattered pine, were found (see Photographs 5, 6 and 11-17, Appendix D). Forested, scrub-shrub and emergent, nontidal wetlands were also noted from these same drainages (see Photographs 5-8 and 10, Appendix D). Areas of farmland and pastureland were found on four of the tracts within the Project area, as well as within the planned, interconnecting utility easements (see Photograph 9, Appendix D). A power line easement cut in a northwest to southeast direction across two of the parcels making up the project site (see Photograph 10, Appendix D).

The areas of active timber management reflected by stands of planted Loblolly Pine, associated access roads and former staging areas for timber harvesting would represent unsuitable habitat for *Isotria medeoloides*. The identified wetlands and the power line easement cutting across the study area would also represent unsuitable habitat for the plant. Limited areas of young growth hardwoods, hardwoods with heavy understories and hardwoods developed on steep/xeric slopes would represent only marginal habitat for the *I. medeoloides* (see Photographs 11-14, Appendix D).

Relatively mature hardwood dominated forests developed within lower drainages found at various locations at the project site, however, did present some potentially suitable habitat for *Isotria medeoloides*. Potential habitat was especially good for those areas of mature hardwoods that supported open understories near the toe-of-slopes (colluvial bottoms) found within some of these drainages (see Photographs 15-17, Appendix D).

The extents of suitable habitat for *Isotria medeoloides*, as discussed above, were noted and refined on our field mapping during the course of our survey efforts. In general, revisions to the original desktop assessment resulted in reductions in the areas identified as potential habitat due to the presence of too steep a slope, too xeric a soil moisture condition, too thick an understory of vegetative growth, or a combination of the above. Some, small additional areas of potentially suitable habitat were added to our original desktop

assessment. These generally occurred at the heads of small drainageways, where the canopy on surrounding slopes presented on aerial imagery used for our desktop review obscured the actual conditions within these locations

Revisions to our desktop assessment through ground truthing efforts in the field revealed a total of 101 distinct areas of potentially suitable habitat within the project limits, totaling approximately 199 acres in extent. The approximate extents of the revised, potentially suitable habitat identified within the Project are depicted on our *Habitat Suitability Map - Field Verified* (Figure 3, Appendix C).

3.2 Presence/Absence Field Surveys

All of the tracts and interconnecting easements identified to us by Timmons in connection with the Project were canvassed during our field visits between June 1 and June 26, 2021. Despite our systematic searching all areas of potential habitat identified from our habitat suitability assessment, no individuals of *Isotria medeoloides* were observed.

3.3 Incidental Observations

Six other orchid species, *Cypripedium acaule* (Moccasin Flower), *Galearis spectabilis* (Showy Orchid), *Goodyera pubescens* (Downy Rattlesnake Plantain), *Isotria verticillata* (Large Whorled Pogonia), *Platanthera clavellata* (Small Green Wood Orchid) and *Platanthera lacera* (Green Fringed Orchid) were observed at the project site during our field investigations. *C. acaule, Ga. Spectabilis, Go. pubescens, P. clavellata* and *P. lacera* are easily distinguished from *Isotria medeoloides* by their very different vegetative and reproductive morphologies. None of these orchids are listed as *Threatened* or *Endangered* at either the federal or state level.

Isotria verticillata is closely related to *I. medeoloides* and superficially similar to the latter, but can be distinguished, vegetatively, by its larger stature and the color of its lower stems which are suffused with purple. Sexually reproductive individuals are even more readily distinguished by their flowers and fruits, which are stalked in the former and sessile in the latter. Three populations of *I. verticillata* were ultimately observed (and confirmed as such) during our field investigations. A photograph of a representative individual (with fruit) is provided as an and appendix to this report (Photograph 18, Appendix D). *I. verticillata*, has not legal status as *Threatened* or *Endangered* at either the federal or state level.

Individuals of the lily, *Medeola virginiana* (Indian Cucumber Root), were also observed at the site. Vegetative portions of this plant are superficially similar to *Isotria medeoloides*, but can be differentiated by the thinner, firmer stem, cobwebby pubescence and presence of a node near the base of the stem (absent in *I. medeoloides*). *M. virginiana* is not listed as *Threatened* or *Endangered* at either the federal or state level.

A total of 297 vascular plant species were documented during the course of our presence/absence surveys. A checklist of these plants, in alphabetical order by scientific name, is provided in Appendix E.

4. SUMMARY

A desktop assessment of potential habitat for *Isotria medeoloides* within the Project area was conducted early in the 2021 growing season. Areas of potentially suitable habitat, totaling approximately 406 acres, were identified and mapped as a result of this assessment. Subsequent ground truthing efforts reduced the total area of potential habitat to approximately 99 acres. A presence/absence survey for potential populations of *I. medeoloides*, within areas previously identified as potentially suitable habitat, were subsequently conducted during the optimal search period for the plant as specified by the USFWS. Although areas of potentially suitable habitat were documented and surveyed, identified, no individuals of *I. medeoloides* were found.

Ecological conditions and species distributions represent dynamic processes. For this reason, the Virginia Field Office of the USFWS has designated a time period for which a presence/absence survey is valid for each federally listed plant species found within Virginia (USFWS-VFO 2004). According to USFWS guidelines, the findings of our presence/absence survey for *Isotria medeoloides* at the project site are valid for two years from the time our field investigations, which would equate to a date of June 26, 2023.

REFERENCES

1. Kartesz, J.T. 1994. A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland, Second Edition. Timber Press, Portland.

2. U.S. Fish and Wildlife Service (USFWS). 1994. Final rule to reclassify the plant *Isotria medeoloides* (Small Whorled Pogonia) from Endangered to Threatened. Federal Register 59(193) 50852-50857.

3. US Fish and Wildlife Service - Virginia Field Office (USFWS-VFO). 2004. Guidelines for how long a plant survey in Virginia is valid. Retrieved from website at https://www.fws.gov/northeast/virginiafield/pdf/endangeredspecies/plantsurveysexpire.pdf

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5. US Fish and Wildlife Service - Virginia Field Office (USFWS-VFO). 2020. Approved Surveyors in Virginia for: Small Whorled Pogonia (*Isotria medeoloides*). Retrieved from website at https://www.fws.gov/northeast/virginiafield/pdf/endspecies/Surveyor_Lists/PDF%20Format/SURVEYOR%20LIST%20-%20Small%20whorled%20pogonia.pdf

6. Virginia Botanical Associates. 2021. Digital Atlas of the Virginia Flora (http://www.vaplantatlas.org). c/o Virginia Botanical Associates, Blacksburg.

7. Virginia Department of Agriculture and Consumer Services (VDACS). 1989. Rules and Regulations for the Enforcement of the Endangered Plant and Insect Species Act – Final Rule. The Virginia Register. VR 115-04-01:3470-3471.

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Appendix A

FIGURE 1 - VICINITY MAP
(USGS Topographic Quadrangles)

N

Source: Digital Raster Graphic USGS 7.5' Topographic Mapping - Lancaster & Lively Quadrangles (1968)

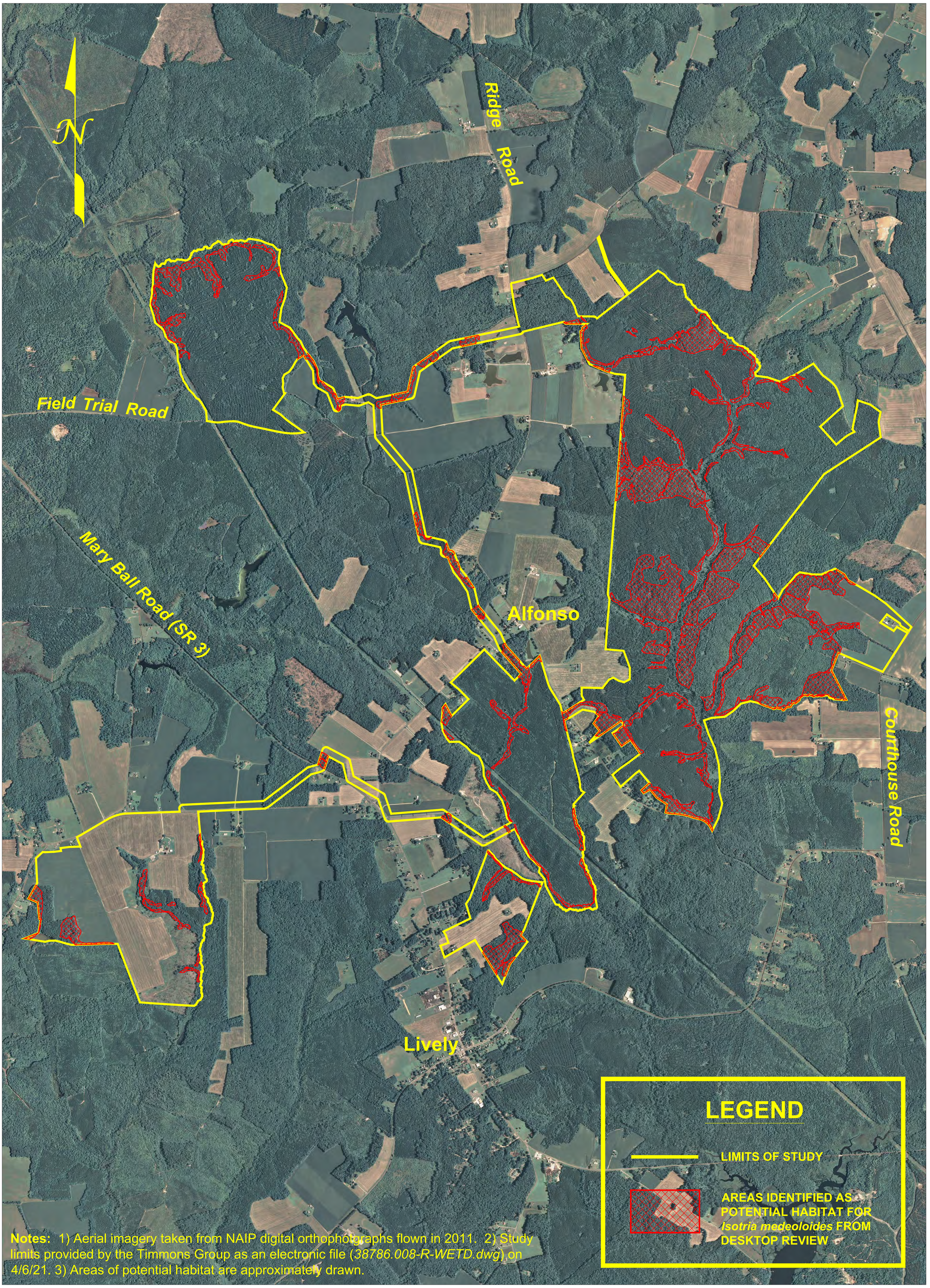
LEGEND

STUDY LIMITS

Rouse Environmental Services	**Project Location Map** Waller Solar Project, Lancaster County, Virginia	**Figure 1** SCALE: 1" = 3000' DRAWN BY: G. Rouse DATE: 8/31/21

Appendix B

FIGURE 2 - HABITAT SUITABILITY MAP (Desktop Review)



Rouse Environmental Services

Habitat Suitability Map - Desktop Review

Waller Solar Project,
Lancaster County, Virginia

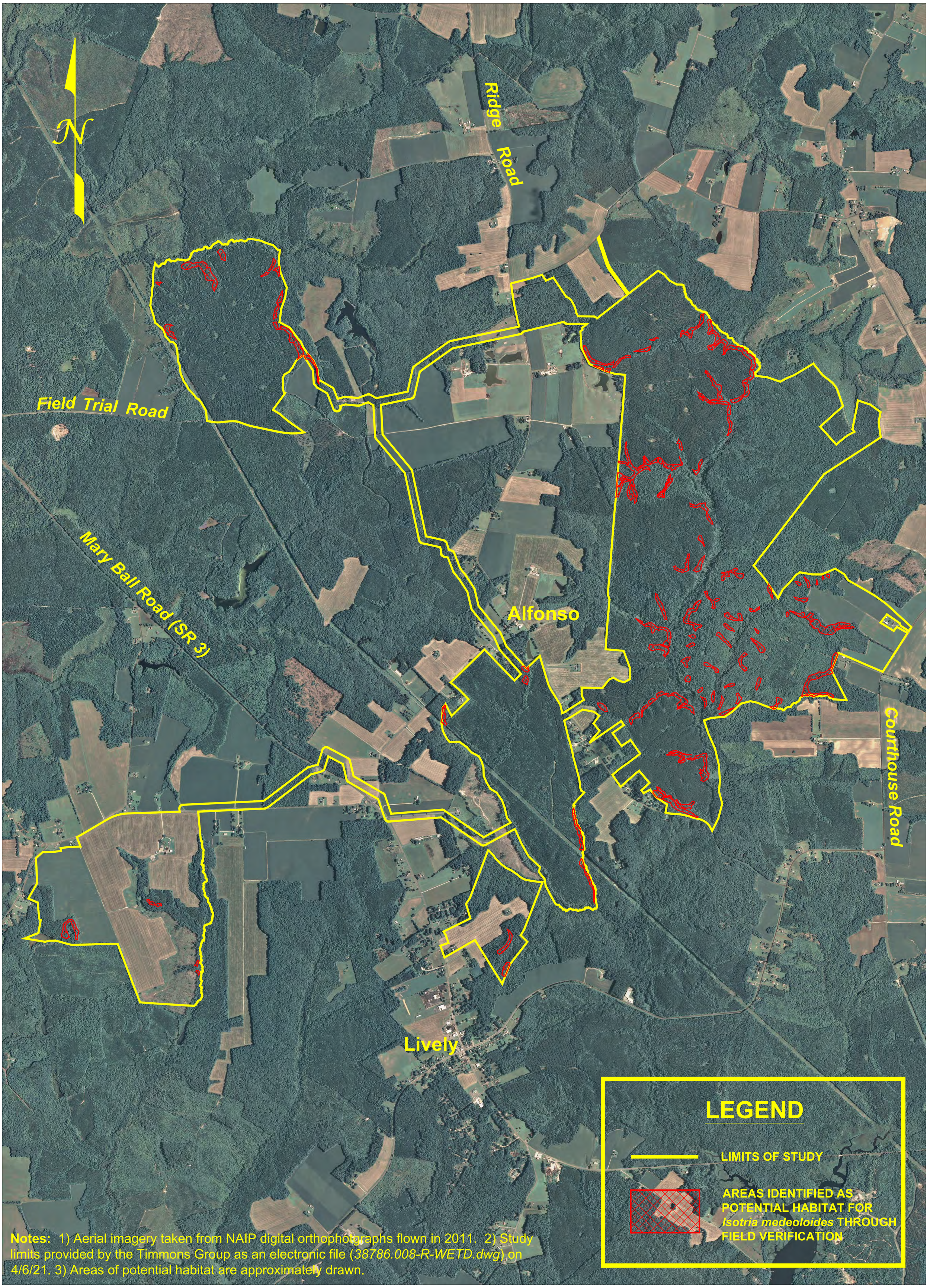
Figure 2

SCALE: 1" ~ 1000'

DRAWN BY: G. Rouse DATE: 9/3/21

Appendix C

FIGURE 3 - HABITAT SUITABILITY MAP (Field Verification)



Rouse Environmental Services

Habitat Suitability Map - Field Verified (refined)

Waller Solar Project,
Lancaster County, Virginia

Figure 3

SCALE: 1" ~ 1000'

DRAWN BY: G. Rouse DATE: 9/7/21

Appendix D

PHOTOGRPAHIC DOCUMENTATION
(Photographs 1-18)

Photograph 1. Recent clear cut, Tanger Tract, northwestern area of the Project. Unsuitable habitat for *Isotria medeoloides*. Photograph taken 6/3/21.

Photograph 2. Erosional gully flanked by young planted pine, Barrack 267-ac Tract, near center of Project in the vicinity of the community of Alfonso. Unsuitable habitat for *Isotria medeoloides*. Photograph taken 6/9/21.

Photograph 3. Young growth (planted) Loblolly Pines with access road, K-F Associates 254-ac Tract, northeastern area of the Project. Unsuitable habitat for *Isotria medeoloides*. Photograph taken 6/21/21.

Photograph 4. Planted Loblolly Pine forest with logging road, Barrack 267-ac Tract, near center of Project in the vicinity of the community of Alfonso. Unsuitable habitat for *Isotria medeoloides*. Photograph taken 6/10/21.

Photograph 5. Forested, semi-permanently saturated, spring-fed wetland developed near the head of an unnamed drainageway, Barrack 167-ac Tract, central area of Project. Unsuitable habitat for *Isotria medeoloides*. Taken 6/10/21.

Photograph 6. Beaver influenced, bottomland swamp along Little Branch of the Corrotoman River, Haynie Tract, southwestern area of the Project. Unsuitable habitat for *Isotria medeoloides.* Photograph taken 6/15/21.

Photograph 7. Emergent and scrub-shrub wetlands developed along McMahon Swamp, Tranz America Tract, southeastern area of the Project. Unsuitable habitat for *Isotria medeoloides*. Photograph taken 6/17/21.

Photograph 8. Old pond (likely beaver influenced) with emergent wetland vegetation, Swann Tract, southwestern area of the Project. Unsuitable habitat for *Isotria medeoloides*. Photograph taken 6/15/21.

Photograph 9. Farm field (soybeans), Haynie Tract, southeastern area of the Project. Unsuitable habitat for *Isotria medeoloides*. Photograph taken 6/15/21.

Photograph 10. Emergent/scrub-shrub wetlands and upland slopes along power line right-of-way, Barrack 267-ac Tract, near center of Project. Unsuitable habitat for *Isotria medeoloides*. Photograph taken 6/10/21.

Photograph 11. Xeric soil moisture conditions on well-drained soils with heavy mid-story of Mountain Laurel (*Kalmia latifolia*), Barrack 267-ac Tract, central area of Project. Marginal habitat for *Isotria medeoloides*. Photograph taken 6/9/21.

Photograph 12. Steep, xeric slopes, Harding Tract, central area of the Project. Marginal habitat for *Isotria medeoloides*. Photograph taken 6/24/21.

Photograph 13. Partially open woodland with heavy understory, designated easement, northwestern area of the Project. Marginal to unsuitable habitat for *Isotria medeoloides*. Photograph taken 6/8/21.

Photograph 14. Woodlands with heavy understory due to light penetration from nearby logging, Tanager Tract, northwestern area of the Project. Marginal habitat for *Isotria medeoloides*. Photograph taken 6/2/21.

Photograph 15. Mature hardwoods on upland terrace along unnamed tributary to Bellwood Swamp, Barrack 267-ac Tract, southern area of the Project. Potential habitat for *Isotria medeoloides*. Photograph taken 6/9/21.

Photograph 16. Medium-aged, mixed hardwoods developed at the head of an unnamed drainage to Callahan Swamp, Harding Tract, central area of the Project. Potential habitat for *Isotria medeoloides*. Photograph taken 6/24/21.

Photograph 17. Medium-aged, mixed hardwoods with open understory, on terrace above unnamed tributary to McMahon Swamp, Tranz America Tract, southern end of the Project area. Potential habitat for *Isotria medeoloides*. Photograph taken 6/17/21.

Photograph 18. Individual of *Isotria verticillata* (Large Whorled Pogonia) bearing mature capsule on a relatively elongated pedicel (stalk) above the whorl of leaves, Seneca Corp of Virginia Tract, eastern area of the Project. Photograph taken 6/18/21.

Appendix E

PARTIAL CHECKLIST OF PLANT SPECIES ENCOUNTERED DURING *ISOTRIA MEDEOLOIDES* SURVEYS, WALLER SOLAR PROJECT, LANCASTER COUNTY, VIRGINIA (June 1-26, 2021)

Rouse Environmental Services

PARTIAL CHECKLIST OF PLANT SPECIES ENCOUNTERED DURING *ISOTRIA MEDEOLOIDES* SURVEYS, WALLER SOLAR PROJECT, LANCASTER COUNTY, VIRGINIA (June 1-26, 2021)

Scientific Name:	**Common Name**:
Acer rubrum L.	red maple
Adiantum pedatum L.	northern maidenhair
Ailanthus altissima (P. Mill.) Swingle	tree of heaven
Albizia julibrissin Durazz.	silktree
Alisma subcordatum Raf.	American water plantain
Allium vineale L.	wild garlic
Alnus serrulata (Ait.) Willd.	hazel alder
Ambrosia artemisiifolia L.	annual ragweed
Amelanchier sp.	a serviceberry
Amphicarpaea bracteata (L.) Fern.	American hogpeanut
Andropogon glomeratus (Walt.) B.S.P.	bushy bluestem
Andropogon virginicus L.	broomsedge bluestem
Antennaria parlinii Fern. ssp. fallax	Parlin's pussytoes
Anthoxanthum odoratum L.	sweet vernalgrass
Apios americana Medik.	groundnut
Apocynum cannabinum L.	Indianhemp
Aralia spinosa L.	devil's walkingstick
Arisaema triphyllum (L.) Schott	Jack in the pulpit
Asclepias syriaca L.	common milkweed
Asclepias tuberosa L.	butterfly milkweed
Asimina triloba (L.) Dunal	pawpaw
Asplenium platyneuron (L.) B.S.P.	ebony spleenwort
Athyrium filix-femina (L.) Roth	common ladyfern
Aureolaria virginica (L.) Pennell	downy yellow false foxglove
Baccharis halimifolia L.	eastern baccharis
Baptisia tinctoria (L.) R. Br. ex Ait. f.	horseflyweed
Boehmeria cylindrica (L.) Sw.	smallspike false nettle
Botrychium virginianum (L.) Sw.	rattlesnake fern
Brassica rapa L.	field mustard
Bromus japonicus Thunb. ex Murr.	Japanese brome
Broussonetia papyrifera (L.) L'Hér. ex Vent.	paper mulberry
Caltha palustris L.	yellow marsh marigold
Campsis radicans (L.) Seem. ex Bureau	trumpet creeper
Carex amphibola Steud.	eastern narrowleaf sedge
Carex atlantica Bailey	prickly bog sedge
Carex blanda Dewey	eastern woodland sedge
Carex cephalophora Muhl. ex Willd.	oval-leaf sedge
Carex collinsii Nutt.	Collins' sedge
Carex crinita Lam.	fringed sedge
Carex debilis Michx.	white edge sedge
Carex folliculata L.	northern long sedge
Carex intumescens Rudge	greater bladder sedge
Carex laevivaginata (Kükenth.) Mackenzie	smoothsheath sedge

PARTIAL CHECKLIST OF PLANT SPECIES ENCOUNTERED DURING *ISOTRIA MEDEOLOIDES* SURVEYS, WALLER SOLAR PROJECT, LANCASTER COUNTY, VIRGINIA (Continued)

Scientific Name:	**Common Name:**
Carex laxiculmis Schwein.	spreading sedge
Carex laxiflora Lam.	broad looseflower sedge
Carex leptalea Wahlenb.	bristlystalked sedge
Carex lurida Wahlenb.	shallow sedge
Carex normalis Mackenzie	greater straw sedge
Carex radiata (Wahlenb.) Small	eastern star sedge
Carex rosea Schkuhr ex Willd.	rosy sedge
Carex styloflexa Buckl.	bent sedge
Carex swanii (Fern.) Mackenzie	Swan's sedge
Carpinus caroliniana Walt.	American hornbeam
Carya alba (L.) Nutt. ex Ell.	mockernut hickory
Carya glabra (P. Mill.) Sweet	pignut hickory
Carya pallida (Ashe) Engl. & Graebn.	sand hickory
Castanea dentata (Marsh.) Borkh.	American chestnut
Castanea pumila (L.) P. Mill.	chinkapin
Cephalanthus occidentalis L.	common buttonbush
Cercis canadensis L.	eastern redbud
Chenopodium album L.	lambsquarters
Chimaphila maculata (L.) Pursh	striped prince's pine
Chionanthus virginicus L.	white fringetree
Cicuta maculata L.	spotted water hemlock
Cinna arundinacea L.	sweet woodreed
Circaea lutetiana L.	broadleaf enchanter's nightshade
Clethra alnifolia L.	coastal sweetpepperbush
Comandra umbellata (L.) Nutt.	bastard toadflax
Commelina virginica L.	Virginia dayflower
Conyza canadensis (L.) Cronq.	Canadian horseweed
Cornus alternifolia L. f.	alternateleaf dogwood
Cornus florida L.	flowering dogwood
Cornus foemina P. Mill.	stiff dogwood
Corylus americana Walt.	American hazelnut
Cryptotaenia canadensis (L.) DC.	Canadian honewort
Cypripedium acaule Ait.	moccasin flower
Danthonia spicata (L.) Beauv.	poverty oatgrass
Datura stramonium L.	jimsonweed
Daucus carota L.	Queen Anne's lace
Dennstaedtia punctilobula (Michx.) T. Moore	eastern hayscented fern
Desmodium glabellum (Michx.) DC.	Dillenius' ticktrefoil
Desmodium nudiflorum (L.) DC.	nakedflower ticktrefoil
Desmodium rotundifolium DC.	prostrate ticktrefoil
Dianthus armeria L.	Deptford pink
Dichanthelium boscii (Poir.) Gould & Clark	Bosc's panicgrass
Dichanthelium scoparium (Lam.) Gould	velvet panicum

PARTIAL CHECKLIST OF PLANT SPECIES ENCOUNTERED DURING *ISOTRIA MEDEOLOIDES* SURVEYS, WALLER SOLAR PROJECT, LANCASTER COUNTY, VIRGINIA (Continued)

Scientific Name:	**Common Name:**
Dichanthelium sphaerocarpon (Ell.) Gould	roundseed panicgrass
Diodia teres Walt.	poorjoe
Dioscorea villosa L.	wild yam
Diospyros virginiana L.	common persimmon
Elaeagnus umbellata Thunb.	autumn olive
Eleocharis obtusa (Willd.) J.A. Schultes	blunt spikerush
Elephantopus carolinianus Raeusch.	Carolina elephantsfoot
Elephantopus tomentosus L.	devil's grandmother
Epifagus virginiana (L.) W. Bart.	beechdrops
Epigaea repens L.	trailing arbutus
Equisetum arvense L.	field horsetail
Erigeron annuus (L.) Pers.	eastern daisy fleabane
Erigeron pulchellus Michx.	robin's plantain
Erigeron strigosus Muhl. ex Willd.	prairie fleabane
Euonymus americana L.	strawberry bush
Eupatorium capillifolium (Lam.) Small	dogfennel
Eupatorium perfoliatum L.	common boneset
Eupatorium purpureum L.	sweetscented joepyeweed
Eupatorium rotundifolium L.	roundleaf thoroughwort
Eupatorium serotinum Michx.	lateflowering thoroughwort
Fagus grandifolia Ehrh.	American beech
Festuca subverticillata (Pers.) Alexeev	nodding fescue
Fraxinus pennsylvanica Marsh.	green ash
Gaillardia pulchella Foug.	firewheel
Galearis spectabilis (L.) Raf.	showy orchid
Galium circaezans Michx.	licorice bedstraw
Galium tinctorium L.	stiff marsh bedstraw
Galium triflorum Michx.	fragrant bedstraw
Galium uniflorum Michx.	oneflower bedstraw
Gamochaeta purpurea (L.) Cabrera	spoonleaf purple everlasting
Gaylussacia baccata (Wangenh.) K. Koch	black huckleberry
Geranium carolinianum L.	Carolina geranium
Geum canadense Jacq.	white avens
Geum virginianum L.	cream avens
Glechoma hederacea L.	ground ivy
Glyceria striata (Lam.) A.S. Hitchc.	fowl mannagrass
Goodyera pubescens (Willd.) R. Br. ex Ait. f.	downy rattlesnake plantain
Gratiola virginiana L.	roundfruit hedgehyssop
Hamamelis virginiana L.	American witchhazel
Hedera helix L.	English ivy
Hemerocallis fulva (L.) L.	orange daylily
Hepatica nobilis Schreb. var. obtusak	roundlobe hepatica
Hexastylis virginica (L.) Small	Virginia heartleaf

PARTIAL CHECKLIST OF PLANT SPECIES ENCOUNTERED DURING *ISOTRIA MEDEOLOIDES* SURVEYS, WALLER SOLAR PROJECT, LANCASTER COUNTY, VIRGINIA (Continued)

Scientific Name:	**Common Name:**
Hieracium venosum L.	rattlesnakeweed
Houstonia purpurea L.	Venus' pride
Huperzia lucidula (Michx.) Trevisan	shining clubmoss
Hydrocotyle ranunculoides L. f.	floating marshpennywort
Hypericum gentianoides (L.) B.S.P.	orangegrass
Hypericum gymnanthum Engelm. & Gray	claspingleaf St. Johnswort
Hypericum hypericoides (L.) Crantz	St. Andrew's cross
Hypericum punctatum Lam.	spotted St. Johnswort
Hypochaeris radicata L.	hairy catsear
Ilex opaca Ait.	American holly
Ilex verticillata (L.) Gray	common winterberry
Impatiens capensis Meerb.	jewelweed
Isotria verticillata Raf.	purple fiveleaf orchid
Itea virginica L.	Virginia sweetspire
Juglans nigra L.	black walnut
Juncus coriaceus Mackenzie	leathery rush
Juncus dichotomus Ell.	forked rush
Juncus diffusissimus Buckl.	slimpod rush
Juncus effusus L.	common rush
Juncus marginatus Rostk.	grassleaf rush
Juncus tenuis Willd.	poverty rush
Juniperus virginiana L.	eastern redcedar
Kalmia latifolia L.	mountain laurel
Krigia virginica (L.) Willd.	Virginia dwarfdandelion
Leersia virginica Willd.	whitegrass
Lemna minor L.	common duckweed
Lepidium virginicum L.	Virginia pepperweed
Ligustrum sp.	a privet
Lindera benzoin (L.) Blume	northern spicebush
Linum virginianum L.	woodland flax
Liquidambar styraciflua L.	sweetgum
Liriodendron tulipifera L.	tuliptree
Lolium arundinaceum (Schreb.) Darbyshire	tall fescue
Lolium perenne L.	perennial ryegrass
Lonicera japonica Thunb.	Japanese honeysuckle
Lonicera sempervirens L.	trumpet honeysuckle
Luzula multiflora (Ehrh.) Lej.	common woodrush
Lycopodium dendroideum Michx.	tree groundpine
Lycopodium digitatum Dill. ex A. Braun	fan clubmoss
Lyonia ligustrina (L.) DC.	maleberry
Lysimachia ciliata L.	fringed loosestrife
Lysimachia quadrifolia L.	whorled yellow loosestrife
Magnolia virginiana L.	sweetbay

PARTIAL CHECKLIST OF PLANT SPECIES ENCOUNTERED DURING *ISOTRIA MEDEOLOIDES* SURVEYS, WALLER SOLAR PROJECT, LANCASTER COUNTY, VIRGINIA (Continued)

Scientific Name:	**Common Name:**
Maianthemum racemosum (L.) Link	feathery false lily of the vally
Medeola virginiana L.	Indian cucumber
Melilotus officinalis (L.) Lam.	yellow sweetclover
Menispermum canadense L.	common moonseed
Microstegium vimineum (Trin.) A. Camus	Nepalese browntop
Mikania scandens (L.) Willd.	climbing hempvine
Mitchella repens L.	partridgeberry
Monotropa uniflora L.	Indianpipe
Morella cerifera (L.) Small	wax myrtle
Murdannia keisak (Hassk.) Hand.-Maz.	wartremoving herb
Nuphar lutea (L.) Sm.	yellow pond-lily
Nuttallanthus canadensis (L.) D.A. Sutton	Canada toadflax
Nyssa sylvatica Marsh.	blackgum
Onoclea sensibilis L.	sensitive fern
Orontium aquaticum L.	goldenclub
Osmunda cinnamomea L.	cinnamon fern
Osmunda regalis L.	royal fern
Oxydendrum arboreum (L.) DC.	sourwood
Oxypolis rigidior (L.) Raf.	stiff cowbane
Packera anonyma (Wood) Weber & Löve	Small's ragwort
Packera aurea (L.) A.& D. Löve	golden ragwort
Parthenocissus quinquefolia (L.) Planch.	Virginia creeper
Paulownia tomentosa (Thunb.) Sieb. & Zucc.	princesstree
Peltandra virginica (L.) Schott	arrow arum
Perilla frutescens (L.) Britt.	beefsteakplant
Phegopteris hexagonoptera (Michx.) Fée	broad beechfern
Photinia pyrifolia (Lam.) Robertson & Phipps	red chokeberry
Phragmites australis (Cav.) Trin. ex Steud.	common reed
Phryma leptostachya L.	American lopseed
Physalis heterophylla Nees	clammy groundcherry
Phytolacca americana L.	American pokeweed
Pilea pumila (L.) Gray	Canadian clearweed
Pinus taeda L.	loblolly pine
Pinus virginiana P. Mill.	Virginia pine
Piptochaetium avenaceum (L.) Parodi	blackseed speargrass
Plantago aristata Michx.	largebracted plantain
Plantago major L.	common plantain
Platanthera clavellata (Michx.) Luer	small green wood orchid
Platanthera lacera (Michx.) G. Don	green fringed orchid
Platanus occidentalis L.	American sycamore
Podophyllum peltatum L.	mayapple
Polygonatum biflorum (Walt.) Ell.	smooth Solomon's seal
Polygonum arifolium L.	halberdleaf tearthumb

PARTIAL CHECKLIST OF PLANT SPECIES ENCOUNTERED DURING *ISOTRIA MEDEOLOIDES* SURVEYS, WALLER SOLAR PROJECT, LANCASTER COUNTY, VIRGINIA (Continued)

Scientific Name:	**Common Name:**
Polygonum punctatum Ell.	dotted smartweed
Polygonum sagittatum L.	arrowleaf tearthumb
Polygonum virginianum L.	jumpseed
Polystichum acrostichoides (Michx.) Schott	Christmas fern
Portulaca oleracea L.	little hogweed
Prunus serotina Ehrh.	black cherry
Pteridium aquilinum (L.) Kuhn	brackenfern
Pyrularia pubera Michx.	buffalo nut
Quercus alba L.	white oak
Quercus falcata Michx.	southern red oak
Quercus marilandica Muenchh.	blackjack oak
Quercus michauxii Nutt.	swamp chestnut oak
Quercus phellos L.	willow oak
Quercus rubra L.	northern red oak
Quercus stellata Wangenh.	post oak
Ranunculus abortivus L.	littleleaf buttercup
Ranunculus hispidus Michx.	bristly buttercup
Rhododendron viscosum (L.) Torr.	swamp azalea
Rhus copallinum L.	flameleaf sumac
Rhus glabra L.	smooth sumac
Rubus argutus Link	sawtooth blackberry
Rubus cuneifolius Pursh	sand blackberry
Rubus flagellaris Willd.	northern dewberry
Rubus hispidus L.	bristly dewberry
Rubus occidentalis L.	black raspberry
Rudbeckia hirta L.	blackeyed Susan
Rudbeckia laciniata L. var. humilis Gray	greenhead coneflower
Rumex crispus L.	curly dock
Sagittaria latifolia Willd.	broadleaf arrowhead
Salvia lyrata L.	lyreleaf sage
Sambucus nigra L. ssp. canadensis	common elderberry
Sanicula canadensis L.	Canadian blacksnakeroot
Sassafras albidum (Nutt.) Nees	sassafras
Saururus cernuus L.	lizard's tail
Scirpus cyperinus (L.) Kunth	woolgrass
Scirpus georgianus Harper	Georgia bulrush
Scleria triglomerata Michx.	whip nutrush
Scutellaria elliptica Muhl. ex Spreng.	hairy skullcap
Scutellaria integrifolia L.	helmet flower
Sericocarpus asteroides (L.) B.S.P.	toothed whitetop aster
Smallanthus uvedalius (L.) Mackenzie	hairy leafcup
Smilax glauca Walt.	cat greenbrier
Smilax rotundifolia L.	roundleaf greenbrier

PARTIAL CHECKLIST OF PLANT SPECIES ENCOUNTERED DURING *ISOTRIA MEDEOLOIDES* SURVEYS, WALLER SOLAR PROJECT, LANCASTER COUNTY, VIRGINIA (Continued)

Scientific Name:	**Common Name:**
Solanum carolinense L.	Carolina horsenettle
Solidago odora Ait.	anisescented goldenrod
Solidago rugosa P. Mill.	wrinkleleaf goldenrod
Sonchus asper (L.) Hill	spiny sowthistle
Sorghum halepense (L.) Pers.	Johnsongrass
Stellaria media (L.) Vill.	common chickweed
Symplocarpus foetidus (L.) Salisb. ex Nutt.	skunk cabbage
Thelypteris noveboracensis (L.) Nieuwl.	New York fern
Toxicodendron radicans (L.) Kuntze	eastern poison ivy
Tragopogon pratensis L.	Jack-go-to-bed-at-noon
Trifolium arvense L.	rabbitfoot clover
Trifolium repens L.	white clover
Triodanis perfoliata (L.) Nieuwl.	clasping Venus' looking-glass
Typha latifolia L.	broadleaf cattail
Ulmus americana L.	American elm
Uvularia perfoliata L.	perfoliate bellwort
Vaccinium ×marianum S. Wats. (pro sp.)	
Vaccinium pallidum Ait.	Blue Ridge blueberry
Vaccinium stamineum L.	deerberry
Veratrum viride Ait.	green false hellebore
Verbascum blattaria L.	moth mullein
Verbascum thapsus L.	common mullein
Verbena urticifolia L.	white vervain
Verbesina occidentalis (L.) Walt.	yellow crownbeard
Viburnum acerifolium L.	mapleleaf viburnum
Viburnum dentatum L. var. lucidum Ait.	southern arrowwood
Viburnum dentatum L.	southern arrowwood
Viburnum nudum L.	possumhaw
Viburnum prunifolium L.	blackhaw
Vinca major L.	bigleaf periwinkle
Vinca minor L.	common periwinkle
Viola sp.	a violet
Vitis rotundifolia Michx.	muscadine
Vitis sp.	a grape
Wisteria floribunda (Willd.) DC.	Japanese wisteria
Woodwardia areolata (L.) T. Moore	netted chainfern
Woodwardia virginica (L.) Sm.	Virginia chainfern
Xanthium strumarium L.	rough cockleburr